Computer algebra independent integration tests

Summer 2022 edition

3-Logarithms/57-3.1.4-f-x-^m-d+e-x^r-^q-a+b-log-c-x^n-^p

Nasser M. Abbasi

September 27, 2022 Compiled on September 27, 2022 at 2:31am

Contents

Chapter 1

Introduction

Local contents

This report gives the result of running the computer algebra independent integration test.

The download section in the appendix contains links to download the problems in plain text format used for all CAS systems.

The number of integrals in this report is [456]. This is test number [57].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

1. Mathematica 13.1 (June 29, 2022) on windows 10.
2. Rubi 4.16.1 (Dec 19, 2018) on Mathematica 13.0.1 on windows 10.
3. Maple 2022.1 (June 1, 2022) on windows 10.
4. Maxima 5.46 (April 13, 2022) using Lisp SBCL 2.1.11.debian on Linux via sagemath 9.6.
5. Fricas 1.3.8 (June 21, 2022) based on sbcl 2.1.11.debian on Linux via sagemath 9.6.
6. Giac/Xcas 1.9.0-13 (July 3, 2022) on Linux via sagemath 9.6.
7. Sympy 1.10.1 (March 20, 2022) Using Python 3.10.4 on Linux.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 on windows 10.

Maxima and Fricas and Giac are called using Sagemath. This was done using Sagemath `integrate` command by changing the name of the algorithm to use the different CAS systems.

Sympy was called directly from Python.

1.2 Results

Important note: A number of problems in this test suite have no antiderivative in closed form. This means the antiderivative of these integrals can not be expressed in terms of elementary, special functions or `Hypergeometric2F1` functions. `RootSum` and `RootOf` are not allowed.

If a CAS returns the above integral unevaluated within the time limit, then the result is counted as passed and assigned an A grade.

However, if CAS times out, then it is assigned an F grade even if the integral is not integrable, as this implies CAS could not determine that the integral is not integrable in the time limit.

If a CAS returns an antiderivative to such an integral, it is assigned an A grade automatically and this special result is listed in the introduction section of each individual test report to make it easy to identify as this can be important result to investigate.

The results given in in the table below reflects the above.

System	% solved	% Failed
Rubi	100.00 (456)	0.00 (0)
Mathematica	98.46 (449)	1.54 (7)
Maple	72.81 (332)	27.19 (124)
Fricas	61.40 (280)	38.60 (176)
Sympy	57.02 (260)	42.98 (196)
Maxima	53.73 (245)	46.27 (211)
Giac	43.86 (200)	56.14 (256)
Mupad	32.02 (146)	67.98 (310)

Table 1.1: Percentage solved for each CAS

The table below gives additional break down of the grading of quality of the antiderivatives generated by each CAS. The grading is given using the letters A,B,C and F with A being the best quality. The grading is accomplished by comparing the antiderivative generated with the optimal antiderivatives included in the test suite. The following table describes the meaning of these grades.

grade	description
A	Integral was solved and antiderivative is optimal in quality and leaf size.
B	Integral was solved and antiderivative is optimal in quality but leaf size is larger than twice the optimal antiderivatives leaf size.
C	Integral was solved and antiderivative is non-optimal in quality. This can be due to one or more of the following reasons 1. antiderivative contains a hypergeometric function and the optimal antiderivative does not. 2. antiderivative contains a special function and the optimal antiderivative does not. 3. antiderivative contains the imaginary unit and the optimal antiderivative does not.
F	Integral was not solved. Either the integral was returned unevaluated within the time limit, or it timed out, or CAS hanged or crashed or an exception was raised.

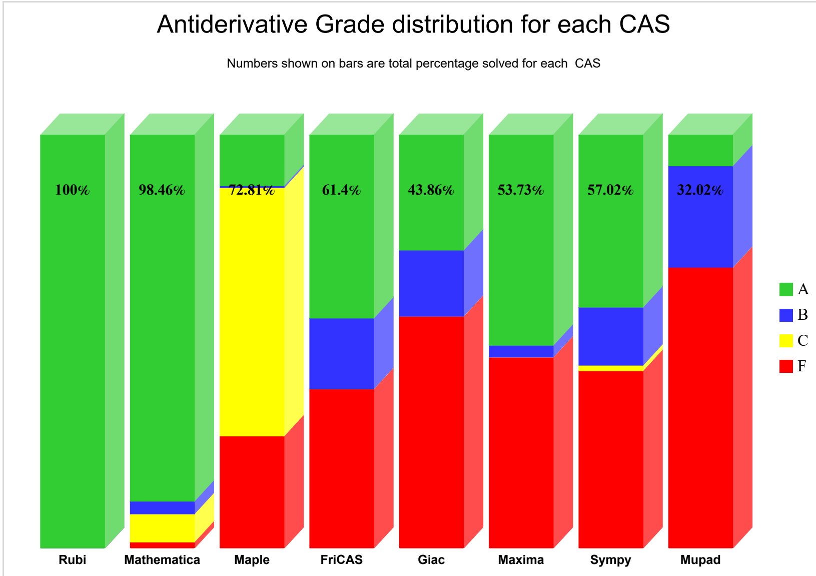
Table 1.2: Description of grading applied to integration result

Grading is implemented for all CAS systems. Based on the above, the following table summarizes the grading for this test suite.

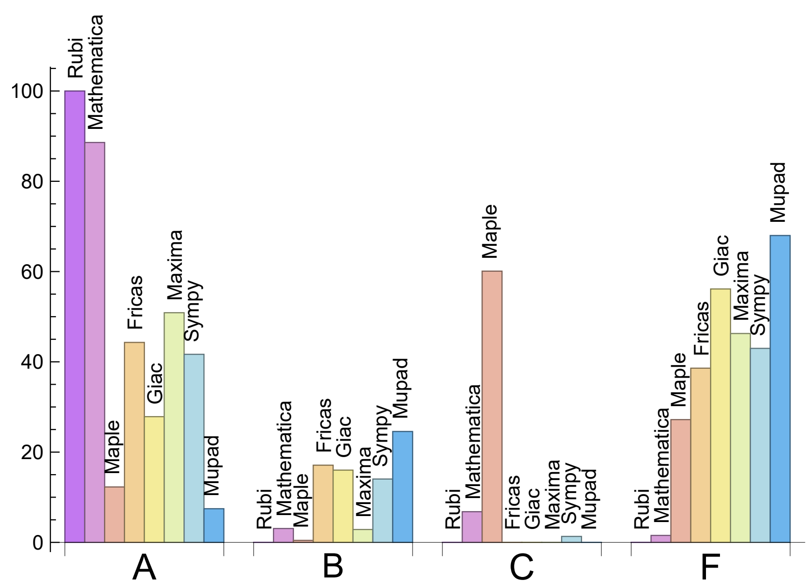
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	88.60	3.07	6.80	1.54
Maxima	50.88	2.85	0.00	46.27
Fricas	44.30	17.11	0.00	38.60
Sympy	41.67	14.04	1.32	42.98
Giac	27.85	16.01	0.00	56.14
Maple	12.28	0.44	60.09	27.19
Mupad	N/A	24.56	0.00	67.98

Table 1.3: Antiderivative Grade distribution of each CAS

The following is a Bar chart illustration of the data in the above table.



The figure below compares the CAS systems for each grade level.



The following table shows the distribution of the different types of failure for each CAS. There are 3 types of reasons why it can fail. The first is when CAS returns back the input within the time limit, which means it could not solve it. This the typical normal failure **F** .

The second is due to time out. CAS could not solve the integral within the 3 minutes time limit which is assigned **F(-1)**.

The third is due to an exception generated. Assigned **F(-2)**. This most likely indicates an interface problem between sagemath and the CAS (applicable only to FriCAS, Maxima and

Giac) or it could be an indication of an internal error in CAS. This type of error requires more investigations to determine the cause.

System	Number failed	Percentage normal failure	Percentage timeout failure	Percentage exception failure
Rubi	0	0.00 %	0.00 %	0.00 %
Mathematica	7	100.00 %	0.00 %	0.00 %
Maple	124	100.00 %	0.00 %	0.00 %
Fricas	176	92.61 %	0.00 %	7.39 %
Giac	256	99.61 %	0.00 %	0.39 %
Maxima	211	86.26 %	0.00 %	13.74 %
Sympy	196	67.86 %	22.45 %	9.69 %
Mupad	310	100.00 %	0.00 %	0.00 %

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

The table below summarizes the performance of each CAS system in terms of time used and leaf size of results.

Mean size is the average leaf size produced by the CAS (before any normalization). The Normalized mean is relative to the mean size of the optimal anti-derivative given in the input files.

For example, if CAS has **Normalized mean** of 3, then the mean size of its leaf size is 3 times as large as the mean size of the optimal leaf size.

Median size is value of leaf size where half the values are larger than this and half are smaller (before any normalization). i.e. The Middle value.

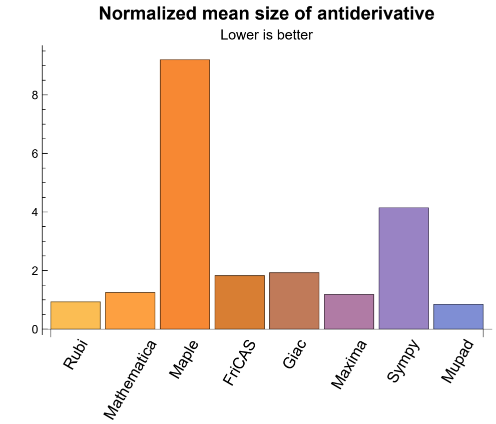
Similarly the **Normalized median** is relative to the median leaf size of the optimal.

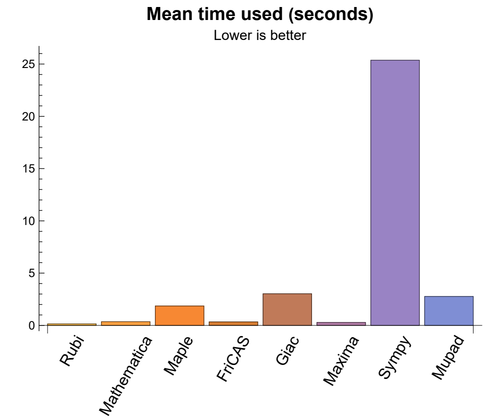
For example, if a CAS has Normalized median of 1.2, then its median is 1.2 as large as the median leaf size of the optimal.

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.15	148.53	0.93	126.00	1.00
Mathematica	0.35	167.16	1.25	125.00	1.01
Maple	1.86	1389.60	9.20	602.00	5.54
Maxima	0.28	119.58	1.18	108.00	1.17
Fricas	0.34	234.59	1.82	149.00	1.52
Sympy	25.37	537.51	4.14	186.00	1.86
Giac	3.03	221.21	1.92	140.00	1.52
Mupad	2.77	79.42	0.85	82.00	1.01

Table 1.5: Time and leaf size performance for each CAS

The following are bar charts for the normalized leafsize and time used from the above table.


Normalized mean size of antiderivative
Lower is better
0
2
4
6
8
Rubi
Mathematica
Maple
FriCAS
Giac
Maxima
Sympy
Mupad


Mean time used (seconds)
Lower is better
0
5
10
15
20
25
Rubi
Mathematica
Maple
FriCAS
Giac
Maxima
Sympy
Mupad

1.4 list of integrals that has no closed form antiderivative

$\{127, 128, 129, 157, 158, 159, 160, 161, 166, 167, 168, 170, 249, 250, 322, 323, 327, 328, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 444, 445, 452, 453\}$

1.5 List of integrals solved by CAS but has no known antiderivative

Rubi {}

Mathematica {166, 167, 168, 170, 322, 323, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 444, 445}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Mupad {}

1.6 list of integrals solved by CAS but failed verification

The following are integrals solved by CAS but the verification phase failed to verify the anti-derivative produced is correct. This does not mean necessarily that the anti-derivative is wrong, as additional methods of verification might be needed, or more time is needed (3 minutes time limit was used). These integrals are listed here to make it easier to do further investigation to determine why it was not possible to verify the result produced.

Rubi $\{\}$

Mathematica $\{355, 363, 364, 365, 366, 408, 415, 424, 425, 426, 430, 431, 432\}$

Maple Verification phase not implemented yet.

Maxima Verification phase not implemented yet.

Fricas Verification phase not implemented yet.

Sympy Verification phase not implemented yet.

Giac Verification phase not implemented yet.

Mupad Verification phase not implemented yet.

1.7 Timing

The command `AbsoluteTiming[]` was used in Mathematica to obtain the elapsed time for each integrate call. In Maple, the command `Usage` was used as in the following example

```
cpu_time := Usage(assign ('result_of_int',int(expr,x)),output='realtime'
```

For all other CAS systems, the elapsed time to complete each integral was found by taking the difference between the time after the call completed from the time before the call was made. This was done using Python's `time.time()` call.

All elapsed times shown are in seconds. A time limit of 3 CPU minutes was used for each integral. If the integrate command did not complete within this time limit, the integral was aborted and considered to have failed and assigned an F grade. The time used by failed integrals due to time out was not counted in the final statistics.

1.8 Verification

A verification phase was applied on the result of integration for `Rubi` and `Mathematica`.

Future version of this report will implement verification for the other CAS systems. For the integrals whose result was not run through a verification phase, it is assumed that the antiderivative was correct.

Verification phase also had 3 minutes time out. An integral whose result was not verified could still be correct, but further investigation is needed on those integrals. These integrals were marked in the summary table below and also in each integral separate section so they are easy to identify and locate.

1.9 Important notes about some of the results

1.9.1 Important note about Maxima results

Since tests were run in a batch mode, and using an automated script, then any integral where Maxima needed an interactive response from the user to answer a question during the evaluation of the integral will fail.

The exception raised is `ValueError`. Therefore Maxima results is lower than what would result if Maxima was run directly and each question was answered correctly.

The percentage of such failures were not counted for each test file, but for an example, for the `Timofeev` test file, there were about 14 such integrals out of total 705, or about 2 percent. This percentage can be higher or lower depending on the specific input test file.

Such integrals can be identified by looking at the output of the integration in each section for Maxima. The exception message will indicate the cause of error.

Maxima integrate was run using SageMath with the following settings set by default

```
'besselexpand : true'
'display2d : false'
'domain : complex'
'keepfloat : true'
'load(to_poly_solve)'
'load(simplify_sum)'
'load(abs_integrate)' 'load(diag)'
```

SageMath automatic loading of Maxima `abs_integrate` was found to cause some problems. So the following code was added to disable this effect.

```
from sage.interfaces.maxima_lib import maxima_lib
maxima_lib.set('extra_definite_integration_methods', '[]')
```

```
maxima_lib.set('extra_integration_methods', '[]')
```

See `https://ask.sagemath.org/question/43088/integrate-results-that-are-different-from-using-maxima/` for reference.

1.9.2 Important note about FriCAS result

There were few integrals which failed due to SageMath interface and not because FriCAS system could not do the integration.

These will fail With error `Exception raised: NotImplementedError`.

The number of such cases seems to be very small. About 1 or 2 percent of all integrals. These can be identified by looking at the exception message given in the result.

1.9.3 Important note about finding leaf size of antiderivative

For Mathematica, Rubi, and Maple, the builtin system function `LeafSize` was used to find the leaf size of each antiderivative.

The other CAS systems (SageMath and Sympy) do not have special builtin function for this purpose at this time. Therefore the leaf size for Fricas and Sympy antiderivative was determined using the following function, thanks to user `slelievre` at `https://ask.sagemath.org/question/57123/could-we-have-a-leaf_count-function-in-base-sagemath/`

```
def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)
```

For Sympy, which was called directly from Python, the following code was used to obtain the leafsize of its result

```
try:
  # 1.7 is a fudge factor since it is low side from actual leaf count
  leafCount = round(1.7*count_ops(anti))

  except Exception as ee:
        leafCount =1
```

1.9.4 Important note about Mupad results

Matlab's symbolic toolbox does not have a leaf count function to measure the size of the antiderivative. Maple was used to determine the leaf size of Mupad output by post processing Mupad result.

Currently no grading of the antiderivative for Mupad is implemented. If it can integrate the problem, it was assigned a B grade automatically as a placeholder. In the future, when grading function is implemented for Mupad, the tests will be rerun again.

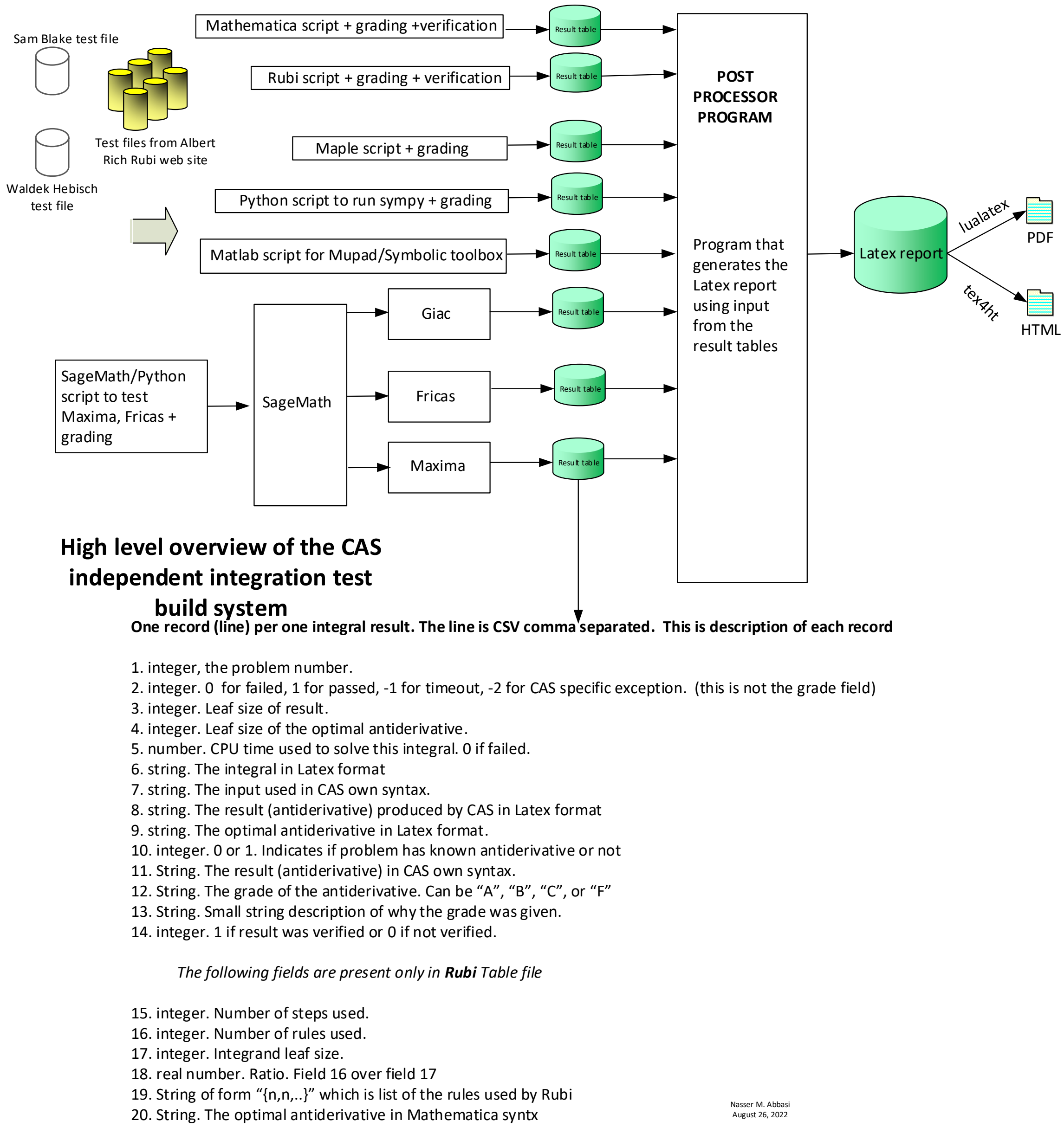
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

```
integrand = evalin(symengine,'cos(x)*sin(x)')
the_variable = evalin(symengine,'x')
anti = int(integrand,the_variable)
```

Which gives `sin(x)^2/2`

1.10 Design of the test system

The following diagram gives a high level view of the current test build system.



Chapter 2

detailed summary tables of results

Local contents

2.1 List of integrals sorted by grade for each CAS

Local contents

2.1.1 Rubi

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456 }

B grade: { }

C grade: { }

F grade: { }

2.1.2 Mathematica

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 220, 223, 226, 227, 228, 229, 230, 232, 233, 241, 242, 243, 245, 246, 247, 249, 250, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 282, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 311, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 432, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456 }

B grade: { 56, 65, 115, 121, 213, 236, 237, 238, 239, 240, 244, 363, 430, 431 }

C grade: { 221, 222, 224, 225, 231, 234, 235, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 290, 291, 292, 301, 302, 303, 304, 312 }

F grade: { 433, 434, 435, 436, 437, 438, 439 }

2.1.3 Maple

A grade: { 4, 5, 74, 75, 127, 128, 129, 147, 157, 158, 159, 160, 161, 166, 167, 168, 170, 241, 243, 244, 249, 250, 275, 322, 323, 327, 328, 337, 338, 339, 340, 341, 343, 344, 345, 346, 347, 348, 349, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 420, 444, 445, 452, 453 }

B grade: { 245, 342 }

C grade: { 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 162, 163, 164, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 242, 246, 317, 318, 319, 320, 321, 326, 329, 330, 331, 332, 333, 334, 335, 336, 351, 352, 353, 354, 359, 360, 361, 362, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 408, 415, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 440, 441, 442, 443, 454, 455, 456 }

F grade: { 120, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 148, 149, 150, 151, 152, 153, 154, 155, 156, 169, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 350, 355, 356, 357, 358, 363, 364, 365, 366, 431, 432, 433, 434, 435, 436, 437, 438, 439, 446, 447, 448, 449, 450, 451 }

2.1.4 Maxima

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 48, 49, 57, 58, 67, 68, 69, 70, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 127, 128, 129, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 232, 233, 244, 249, 250, 251, 252, 253, 260, 263, 264, 265, 272, 275, 276, 277, 278, 283, 286, 287, 288, 289, 293, 297, 298, 299, 300, 309, 310, 315, 317, 318, 319, 320, 321, 322, 323, 327, 328, 337, 338, 339, 340, 341, 342, 343, 344, 351, 352, 353, 354, 356, 357, 358, 359, 360, 361, 362, 367, 368, 369, 370, 373, 374, 375, 379, 380, 381, 382, 385, 386, 387, 392, 393, 394, 395, 398, 399, 400, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 421, 422, 423, 427, 428, 429, 440, 441, 442, 443, 444, 445, 454 }

B grade: { 56, 65, 66, 74, 75, 241, 242, 243, 345, 346, 347, 348, 349 }

C grade: { }

F grade: { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 125, 126, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 261, 262, 266, 267, 268, 269, 270, 271, 273, 274, 279, 280, 281, 282, 284, 285, 290, 291, 292, 294, 295, 296, 301, 302, 303, 304, 305, 306, 307, 308, 311, 312, 313, 314, 316, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 350, 355, 363, 364, 365, 366, 371, 372, 376, 377, 378, 383, 384, 388, 389, 390, 391, 396, 397, 401, 402, 403, 404, 405, 408, 415, 420, 424, 425, 426, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 446, 447, 448, 449, 450, 451, 452, 453, 455, 456 }

2.1.5 FriCAS

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 42, 48, 49, 57, 58, 67, 68, 69, 74, 75, 81, 82, 83, 90, 91, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 157, 158, 159, 160, 161, 165, 166, 167, 168, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 232, 233, 241, 242, 249, 250, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 315, 316, 317, 321, 322, 323, 327, 328, 348, 349, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 370, 382, 395, 406, 407, 408, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 420, 421, 422, 423, 424, 443, 444, 445, 452, 453, 454 }

B grade: { 22, 56, 65, 66, 70, 76, 77, 78, 79, 80, 84, 85, 86, 87, 88, 89, 162, 163, 164, 198, 318, 319, 320, 345, 346, 347, 350, 364, 365, 366, 367, 368, 369, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 415, 425, 426, 427, 428, 429, 430, 431, 432, 440, 441, 442 }

C grade: { }

F grade: { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 282, 290, 291, 292, 301, 302, 303, 304, 311, 312, 313, 314, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 433, 434, 435, 436, 437, 438, 439, 446, 447, 448, 449, 450, 451, 455, 456 }

2.1.6 Sympy

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 127, 128, 129, 131, 132, 133, 140, 151, 152, 153, 154, 157, 158, 159, 160, 161, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 221, 225, 231, 234, 242, 249, 253, 275, 278, 288, 289, 299, 317, 322, 323, 329, 330, 331, 332, 335, 336, 337, 338, 339, 340, 387, 388, 389, 395, 396, 400, 401, 402, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 421, 424, 425, 444, 445, 452 }

B grade: { 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 130, 137, 138, 139, 144, 145, 146, 147, 162, 163, 164, 165, 223, 232, 233, 300, 318, 319, 320, 321, 352, 353, 354, 361, 362, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 422, 423, 427, 428, 429, 441, 442, 443, 454 }

C grade: { 35, 241, 334, 342, 348, 349 }

F grade: { 34, 41, 43, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 214, 215, 216, 217, 218, 219, 220, 222, 224, 226, 227, 228, 229, 230, 235, 236, 237, 238, 239, 240, 243, 244, 245, 246, 247, 248, 250, 251, 252, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 279, 280, 281, 282, 283, 284, 285, 286, 287, 290, 291, 292, 293, 294, 295, 296, 297, 298, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 326, 327, 328, 333, 341, 343, 344, 345, 346, 347, 350, 351, 355, 356, 357, 358, 359, 360, 363, 364, 365, 366, 385, 386, 390, 391, 392, 393, 394, 397, 398, 399, 403, 404, 405, 420, 426, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 446, 447, 448, 449, 450, 451, 453, 455, 456 }

2.1.7 Giac

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 67, 127, 128, 129, 144, 145, 146, 147, 153, 154, 157, 158, 159, 160, 161, 166, 167, 168, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 249, 250, 251, 252, 253, 275, 317, 322, 323, 327, 328, 352, 353, 354, 370, 375, 382, 395, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 421, 422, 423, 444, 445, 452, 453 }

B grade: { 22, 48, 56, 58, 65, 66, 68, 69, 70, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 162, 163, 164, 165, 198, 232, 318, 319, 320, 321, 351, 356, 357, 358, 359, 360, 361, 362, 367, 368, 369, 371, 372, 373, 374, 376, 377, 378, 379, 380, 381, 385, 386, 387, 392, 393, 394, 398, 399, 400, 427, 428, 429, 440, 441, 442, 443, 454 }

C grade: { }

F grade: { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 148, 149, 150, 151, 152, 155, 156, 169, 170, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 355, 363, 364, 365, 366, 383, 384, 388, 389, 390, 391, 396, 397, 401, 402, 403, 404, 405, 408, 415, 420, 424, 425, 426, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 446, 447, 448, 449, 450, 451, 455, 456 }

2.1.8 Mupad

A grade: { 127, 128, 129, 157, 158, 159, 160, 161, 166, 167, 168, 170, 249, 250, 322, 323, 327, 328, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 444, 445, 452, 453 }

B grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 232, 233, 241, 242, 243, 244, 345, 346, 347, 348, 349, 454 }

C grade: { }

F grade: { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 408, 415, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 446, 447, 448, 449, 450, 451, 455, 456 }

2.2 Detailed conclusion table per each integral for all CAS systems

Detailed conclusion table per each integral is given by table below. The elapsed time is in seconds. For failed result it is given as F(-1) if the failure was due to timeout. It is given as F(-2) if the failure was due to an exception being raised, which could indicate a bug in the system. If the failure was due to integral not being evaluated within the time limit, then it is given just an F.

In this table,the column `N.S.` in the table below, which stands for **normalized size** is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$. To help make the table fit, **`Mathematica`** was abbreviated to **`MMA`**.

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	48	264	60	71	66	73	51
N.S.	1	1.00	1.00	5.50	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.036	0.021	0.043	0.273	0.336	0.406	1.500	3.643

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	45	264	60	71	66	73	51
N.S.	1	1.00	0.94	5.50	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.035	0.019	0.045	0.273	0.343	0.274	2.602	3.588

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	48	264	60	71	66	73	51
N.S.	1	1.00	1.00	5.50	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.024	0.016	0.060	0.266	0.379	0.185	2.501	3.631

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	55	52	52	63	56	62	43
N.S.	1	1.00	1.15	1.08	1.08	1.31	1.17	1.29	0.90
time (sec)	N/A	0.014	0.005	0.069	0.278	0.359	0.126	2.080	3.608

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	43	46	44	47	65	49	40
N.S.	1	1.00	0.98	1.05	1.00	1.07	1.48	1.11	0.91
time (sec)	N/A	0.033	0.005	0.081	0.288	0.341	0.173	1.947	3.590

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	50	48	250	51	53	53	56	59
N.S.	1	1.04	1.00	5.21	1.06	1.10	1.10	1.17	1.23
time (sec)	N/A	0.035	0.020	0.080	0.280	0.404	2.455	2.419	3.568

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	41	232	60	54	58	57	47
N.S.	1	1.00	0.68	3.87	1.00	0.90	0.97	0.95	0.78
time (sec)	N/A	0.034	0.019	0.057	0.273	0.390	0.269	2.362	3.702

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	47	235	60	59	68	58	49
N.S.	1	1.00	0.82	4.12	1.05	1.04	1.19	1.02	0.86
time (sec)	N/A	0.032	0.020	0.057	0.279	0.334	0.369	1.855	3.465

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	81	432	100	114	121	123	82
N.S.	1	1.00	1.09	5.84	1.35	1.54	1.64	1.66	1.11
time (sec)	N/A	0.060	0.039	7.221	0.267	0.355	0.602	2.885	3.688

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	81	432	100	114	116	123	82
N.S.	1	1.00	1.09	5.84	1.35	1.54	1.57	1.66	1.11
time (sec)	N/A	0.054	0.030	1.813	0.280	0.358	0.410	1.985	3.490

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	81	432	100	114	121	123	82
N.S.	1	1.00	1.09	5.84	1.35	1.54	1.64	1.66	1.11
time (sec)	N/A	0.044	0.030	0.884	0.262	0.369	0.281	2.461	3.634

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	77	414	90	106	102	109	73
N.S.	1	1.00	1.10	5.91	1.29	1.51	1.46	1.56	1.04
time (sec)	N/A	0.026	0.029	0.156	0.277	0.350	0.194	2.245	3.605

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	83	410	84	94	131	100	75
N.S.	1	1.00	1.04	5.12	1.05	1.18	1.64	1.25	0.94
time (sec)	N/A	0.048	0.034	0.179	0.287	0.357	0.301	2.234	3.568

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	78	76	419	82	95	112	101	99
N.S.	1	1.00	0.97	5.37	1.05	1.22	1.44	1.29	1.27
time (sec)	N/A	0.052	0.039	0.158	0.277	0.346	0.378	1.997	3.659

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	84	418	91	99	99	105	99
N.S.	1	1.00	1.00	4.98	1.08	1.18	1.18	1.25	1.18
time (sec)	N/A	0.056	0.040	0.160	0.265	0.360	3.138	1.715	3.693

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	76	401	100	98	104	108	82
N.S.	1	1.00	1.01	5.35	1.33	1.31	1.39	1.44	1.09
time (sec)	N/A	0.048	0.029	0.121	0.288	0.346	0.376	2.874	3.591

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	80	403	100	102	122	108	85
N.S.	1	1.00	0.84	4.24	1.05	1.07	1.28	1.14	0.89
time (sec)	N/A	0.053	0.030	0.118	0.281	0.346	0.523	2.133	3.732

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	80	403	100	102	117	108	85
N.S.	1	1.00	0.84	4.24	1.05	1.07	1.23	1.14	0.89
time (sec)	N/A	0.054	0.029	0.120	0.265	0.357	0.731	1.510	3.632

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	133	600	140	157	170	173	113
N.S.	1	1.00	1.33	6.00	1.40	1.57	1.70	1.73	1.13
time (sec)	N/A	0.070	0.044	119.096	0.268	0.355	0.860	2.223	3.577

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	133	600	140	157	175	173	113
N.S.	1	1.00	1.33	6.00	1.40	1.57	1.75	1.73	1.13
time (sec)	N/A	0.070	0.037	91.933	0.276	0.353	0.612	1.774	3.643

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	130	598	138	157	167	170	112
N.S.	1	1.00	1.07	4.90	1.13	1.29	1.37	1.39	0.92
time (sec)	N/A	0.064	0.084	0.121	0.270	0.346	0.416	2.224	3.612

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	110	571	130	149	156	159	104
N.S.	1	1.00	1.29	6.72	1.53	1.75	1.84	1.87	1.22
time (sec)	N/A	0.030	0.033	0.154	0.262	0.340	0.289	1.911	3.570

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	123	579	124	139	199	150	106
N.S.	1	1.00	1.01	4.75	1.02	1.14	1.63	1.23	0.87
time (sec)	N/A	0.061	0.044	0.174	0.273	0.352	0.462	2.059	3.642

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	118	588	123	140	182	154	154
N.S.	1	1.00	0.99	4.94	1.03	1.18	1.53	1.29	1.29
time (sec)	N/A	0.065	0.055	0.180	0.280	0.356	0.525	2.177	3.652

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	118	115	586	123	143	182	154	139
N.S.	1	1.00	0.97	4.97	1.04	1.21	1.54	1.31	1.18
time (sec)	N/A	0.062	0.057	0.149	0.281	0.353	0.541	2.218	3.594

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	122	589	131	144	144	155	136
N.S.	1	1.00	0.97	4.67	1.04	1.14	1.14	1.23	1.08
time (sec)	N/A	0.071	0.057	0.149	0.300	0.354	3.803	1.832	3.722

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	109	569	140	141	158	158	118
N.S.	1	1.00	1.21	6.32	1.56	1.57	1.76	1.76	1.31
time (sec)	N/A	0.055	0.039	0.127	0.278	0.436	0.531	2.300	3.711

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	113	571	140	145	168	158	120
N.S.	1	1.00	0.80	4.02	0.99	1.02	1.18	1.11	0.85
time (sec)	N/A	0.068	0.039	0.131	0.293	0.338	0.743	1.822	3.584

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	113	571	140	145	177	158	121
N.S.	1	1.00	0.85	4.29	1.05	1.09	1.33	1.19	0.91
time (sec)	N/A	0.068	0.039	0.144	0.281	0.374	1.032	2.468	3.739

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	113	571	140	145	172	158	121
N.S.	1	1.00	0.85	4.29	1.05	1.09	1.29	1.19	0.91
time (sec)	N/A	0.067	0.039	0.127	0.281	0.349	1.398	2.173	3.593

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	142	693	0	0	267	0	-1
N.S.	1	1.00	0.96	4.68	0.00	0.00	1.80	0.00	-0.01
time (sec)	N/A	0.114	0.055	0.115	0.000	0.000	18.600	0.000	0.000

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	105	521	0	0	218	0	-1
N.S.	1	1.00	0.98	4.87	0.00	0.00	2.04	0.00	-0.01
time (sec)	N/A	0.093	0.037	0.111	0.000	0.000	14.318	0.000	0.000

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	66	343	0	0	163	0	-1
N.S.	1	1.00	0.96	4.97	0.00	0.00	2.36	0.00	-0.01
time (sec)	N/A	0.063	0.024	0.128	0.000	0.000	8.693	0.000	0.000

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	37	195	0	0	0	0	-1
N.S.	1	1.00	0.95	5.00	0.00	0.00	0.00	0.00	-0.03
time (sec)	N/A	0.018	0.006	0.115	0.000	0.000	0.000	0.000	0.000

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	C	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	63	336	0	0	175	0	-1
N.S.	1	1.00	1.43	7.64	0.00	0.00	3.98	0.00	-0.02
time (sec)	N/A	0.038	0.026	0.116	0.000	0.000	6.472	0.000	0.000

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	88	504	0	0	216	0	-1
N.S.	1	1.00	1.19	6.81	0.00	0.00	2.92	0.00	-0.01
time (sec)	N/A	0.081	0.060	0.111	0.000	0.000	50.182	0.000	0.000

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	124	689	0	0	265	0	-1
N.S.	1	1.00	1.13	6.26	0.00	0.00	2.41	0.00	-0.01
time (sec)	N/A	0.126	0.140	0.120	0.000	0.000	50.072	0.000	0.000

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	159	868	0	0	314	0	-1
N.S.	1	1.00	1.06	5.79	0.00	0.00	2.09	0.00	-0.01
time (sec)	N/A	0.183	0.123	0.115	0.000	0.000	75.503	0.000	0.000

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	141	739	0	0	323	0	-1
N.S.	1	1.00	0.93	4.86	0.00	0.00	2.12	0.00	-0.01
time (sec)	N/A	0.151	0.085	0.118	0.000	0.000	28.396	0.000	0.000

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	107	98	558	0	0	269	0	-1
N.S.	1	1.09	1.00	5.69	0.00	0.00	2.74	0.00	-0.01
time (sec)	N/A	0.115	0.062	0.113	0.000	0.000	13.631	0.000	0.000

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	71	389	0	0	0	0	-1
N.S.	1	1.00	1.09	5.98	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.043	0.044	0.109	0.000	0.000	0.000	0.000	0.000

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	41	173	62	54	153	58	54
N.S.	1	1.00	1.05	4.44	1.59	1.38	3.92	1.49	1.38
time (sec)	N/A	0.013	0.020	0.111	0.283	0.364	0.690	3.908	4.557

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	96	521	0	0	0	0	-1
N.S.	1	1.00	1.20	6.51	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.085	0.055	0.112	0.000	0.000	0.000	0.000	0.000

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	120	703	0	0	318	0	-1
N.S.	1	1.00	1.05	6.17	0.00	0.00	2.79	0.00	-0.01
time (sec)	N/A	0.129	0.095	0.126	0.000	0.000	42.012	0.000	0.000

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	165	910	0	0	376	0	-1
N.S.	1	1.00	1.07	5.91	0.00	0.00	2.44	0.00	-0.01
time (sec)	N/A	0.156	0.156	0.130	0.000	0.000	59.494	0.000	0.000

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	150	764	0	0	391	0	-1
N.S.	1	1.00	1.01	5.13	0.00	0.00	2.62	0.00	-0.01
time (sec)	N/A	0.172	0.100	0.124	0.000	0.000	29.620	0.000	0.000

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	122	596	0	0	347	0	-1
N.S.	1	1.00	1.14	5.57	0.00	0.00	3.24	0.00	-0.01
time (sec)	N/A	0.090	0.077	0.112	0.000	0.000	20.363	0.000	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	75	349	107	113	398	122	108
N.S.	1	1.00	1.21	5.63	1.73	1.82	6.42	1.97	1.74
time (sec)	N/A	0.032	0.083	0.138	0.265	0.368	2.051	7.849	4.029

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	53	235	98	108	415	120	91
N.S.	1	1.00	0.70	3.09	1.29	1.42	5.46	1.58	1.20
time (sec)	N/A	0.024	0.040	0.119	0.343	0.346	2.059	6.796	4.055

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	141	703	0	0	352	0	-1
N.S.	1	1.00	1.05	5.25	0.00	0.00	2.63	0.00	-0.01
time (sec)	N/A	0.146	0.087	0.117	0.000	0.000	42.469	0.000	0.000

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	171	171	173	894	0	0	444	0	-1
N.S.	1	1.00	1.01	5.23	0.00	0.00	2.60	0.00	-0.01
time (sec)	N/A	0.170	0.116	0.143	0.000	0.000	45.475	0.000	0.000

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	217	217	227	1119	0	0	496	0	-1
N.S.	1	1.00	1.05	5.16	0.00	0.00	2.29	0.00	-0.00
time (sec)	N/A	0.198	0.245	0.124	0.000	0.000	49.031	0.000	0.000

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	229	229	249	1153	0	0	617	0	-1
N.S.	1	1.00	1.09	5.03	0.00	0.00	2.69	0.00	-0.00
time (sec)	N/A	0.282	0.199	0.122	0.000	0.000	65.639	0.000	0.000

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	183	207	969	0	0	563	0	-1
N.S.	1	1.00	1.13	5.30	0.00	0.00	3.08	0.00	-0.01
time (sec)	N/A	0.246	0.153	0.126	0.000	0.000	32.032	0.000	0.000

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	179	801	0	0	518	0	-1
N.S.	1	1.00	1.27	5.68	0.00	0.00	3.67	0.00	-0.01
time (sec)	N/A	0.146	0.160	0.115	0.000	0.000	30.705	0.000	0.000

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	172	553	168	169	677	193	167
N.S.	1	1.00	2.18	7.00	2.13	2.14	8.57	2.44	2.11
time (sec)	N/A	0.053	0.082	0.145	0.281	0.380	5.995	5.120	4.021

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	135	403	142	156	661	176	141
N.S.	1	1.00	1.15	3.44	1.21	1.33	5.65	1.50	1.21
time (sec)	N/A	0.062	0.067	0.141	0.271	0.375	6.019	4.001	3.859

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	66	284	139	157	700	179	127
N.S.	1	1.00	0.69	2.99	1.46	1.65	7.37	1.88	1.34
time (sec)	N/A	0.031	0.052	0.116	0.272	0.369	6.004	3.797	3.853

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	174	174	222	884	0	0	510	0	-1
N.S.	1	1.00	1.28	5.08	0.00	0.00	2.93	0.00	-0.01
time (sec)	N/A	0.212	0.123	0.119	0.000	0.000	63.804	0.000	0.000

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	231	1083	0	0	614	0	-1
N.S.	1	1.00	1.09	5.13	0.00	0.00	2.91	0.00	-0.00
time (sec)	N/A	0.231	0.183	0.128	0.000	0.000	65.599	0.000	0.000

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	263	263	276	1324	0	0	668	0	-1
N.S.	1	1.00	1.05	5.03	0.00	0.00	2.54	0.00	-0.00
time (sec)	N/A	0.278	0.221	0.128	0.000	0.000	69.821	0.000	0.000

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	329	329	403	1768	0	0	1686	0	-1
N.S.	1	1.00	1.22	5.37	0.00	0.00	5.12	0.00	-0.00
time (sec)	N/A	0.660	0.311	0.129	0.000	0.000	152.939	0.000	0.000

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	285	285	356	1584	0	0	1632	0	-1
N.S.	1	1.00	1.25	5.56	0.00	0.00	5.73	0.00	-0.00
time (sec)	N/A	0.568	0.349	0.134	0.000	0.000	109.879	0.000	0.000

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	243	243	333	1416	0	0	1588	0	-1
N.S.	1	1.00	1.37	5.83	0.00	0.00	6.53	0.00	-0.00
time (sec)	N/A	0.329	0.304	0.124	0.000	0.000	77.265	0.000	0.000

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	335	1165	348	331	1911	388	341
N.S.	1	1.00	2.46	8.57	2.56	2.43	14.05	2.85	2.51
time (sec)	N/A	0.079	0.199	0.162	0.301	0.363	85.690	3.291	4.479

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	B	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	163	316	1022	331	329	1972	382	320
N.S.	1	1.00	1.94	6.27	2.03	2.02	12.10	2.34	1.96
time (sec)	N/A	0.091	0.186	0.152	0.306	0.363	84.829	4.395	4.259

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	226	281	867	313	319	1979	372	296
N.S.	1	1.00	1.24	3.84	1.38	1.41	8.76	1.65	1.31
time (sec)	N/A	0.141	0.158	0.159	0.291	0.357	84.072	2.627	4.230

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	192	712	293	312	1986	362	275
N.S.	1	1.00	0.96	3.58	1.47	1.57	9.98	1.82	1.38
time (sec)	N/A	0.117	0.132	0.153	0.302	0.354	85.266	3.804	3.931

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	174	174	160	557	273	305	1992	352	251
N.S.	1	1.00	0.92	3.20	1.57	1.75	11.45	2.02	1.44
time (sec)	N/A	0.088	0.102	0.144	0.324	0.377	84.570	4.307	4.043

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	99	431	259	295	1955	344	232
N.S.	1	1.00	0.65	2.84	1.70	1.94	12.86	2.26	1.53
time (sec)	N/A	0.050	0.101	0.127	0.348	0.361	84.978	5.034	3.929

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	294	294	349	1427	0	0	1518	0	-1
N.S.	1	1.00	1.19	4.85	0.00	0.00	5.16	0.00	-0.00
time (sec)	N/A	0.478	0.243	0.126	0.000	0.000	159.258	0.000	0.000

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	339	339	401	1650	0	0	1685	0	-1
N.S.	1	1.00	1.18	4.87	0.00	0.00	4.97	0.00	-0.00
time (sec)	N/A	0.413	0.395	0.135	0.000	0.000	155.847	0.000	0.000

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	401	401	486	1939	0	0	1737	0	-1
N.S.	1	1.00	1.21	4.84	0.00	0.00	4.33	0.00	-0.00
time (sec)	N/A	0.462	0.341	0.137	0.000	0.000	161.238	0.000	0.000

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	12	12	12	9	48	11	0	0	8
N.S.	1	1.00	1.00	0.75	4.00	0.92	0.00	0.00	0.67
time (sec)	N/A	0.008	0.003	0.108	0.272	0.337	0.000	0.000	3.462

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	11	7	45	9	0	0	6
N.S.	1	1.00	1.10	0.70	4.50	0.90	0.00	0.00	0.60
time (sec)	N/A	0.008	0.003	0.078	0.265	0.350	0.000	0.000	3.503

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	1622	156	221	185	251	116
N.S.	1	1.00	0.75	14.88	1.43	2.03	1.70	2.30	1.06
time (sec)	N/A	0.106	0.043	0.084	0.273	0.352	0.421	4.624	3.583

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	1621	155	221	184	248	116
N.S.	1	1.00	0.75	14.87	1.42	2.03	1.69	2.28	1.06
time (sec)	N/A	0.083	0.041	0.082	0.270	0.418	0.295	3.909	3.531

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	77	1545	141	202	163	225	104
N.S.	1	1.00	0.76	15.30	1.40	2.00	1.61	2.23	1.03
time (sec)	N/A	0.052	0.034	0.151	0.270	0.346	0.206	4.089	3.678

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	59	1555	106	145	138	169	85
N.S.	1	1.00	0.84	22.21	1.51	2.07	1.97	2.41	1.21
time (sec)	N/A	0.062	0.016	0.155	0.270	0.358	0.312	2.940	3.432

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	63	1544	117	155	141	172	138
N.S.	1	1.00	0.88	21.44	1.62	2.15	1.96	2.39	1.92
time (sec)	N/A	0.088	0.028	0.175	0.274	0.467	3.224	2.520	3.733

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	90	1483	155	180	165	205	109
N.S.	1	1.00	0.87	14.40	1.50	1.75	1.60	1.99	1.06
time (sec)	N/A	0.099	0.035	0.107	0.278	0.409	0.294	2.489	3.537

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	1486	156	189	185	206	114
N.S.	1	1.00	0.75	13.63	1.43	1.73	1.70	1.89	1.05
time (sec)	N/A	0.091	0.043	0.107	0.270	0.365	0.397	2.932	3.794

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	82	1486	156	190	187	206	114
N.S.	1	1.00	0.75	13.63	1.43	1.74	1.72	1.89	1.05
time (sec)	N/A	0.101	0.041	0.109	0.287	0.376	0.546	2.932	3.508

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	149	2597	250	348	311	408	180
N.S.	1	1.00	0.84	14.59	1.40	1.96	1.75	2.29	1.01
time (sec)	N/A	0.151	0.062	150.035	0.289	0.356	0.645	3.918	3.742

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	134	2597	250	347	308	408	179
N.S.	1	1.00	0.75	14.59	1.40	1.95	1.73	2.29	1.01
time (sec)	N/A	0.119	0.065	83.599	0.286	0.352	0.439	2.598	3.620

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	173	173	135	2565	235	331	286	385	166
N.S.	1	1.00	0.78	14.83	1.36	1.91	1.65	2.23	0.96
time (sec)	N/A	0.092	0.048	0.316	0.286	0.382	0.314	2.844	3.495

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	114	2543	198	277	269	321	152
N.S.	1	1.00	0.83	18.56	1.45	2.02	1.96	2.34	1.11
time (sec)	N/A	0.165	0.027	0.317	0.283	0.460	0.480	2.238	3.775

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	107	2521	198	278	255	329	228
N.S.	1	1.00	0.80	18.95	1.49	2.09	1.92	2.47	1.71
time (sec)	N/A	0.121	0.029	0.282	0.323	0.363	0.563	2.994	3.744

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	117	2520	212	286	258	325	221
N.S.	1	1.00	0.85	18.39	1.55	2.09	1.88	2.37	1.61
time (sec)	N/A	0.134	0.058	0.298	0.278	0.364	4.314	2.864	3.767

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	168	168	131	2473	250	309	287	366	184
N.S.	1	1.00	0.78	14.72	1.49	1.84	1.71	2.18	1.10
time (sec)	N/A	0.144	0.067	0.199	0.275	0.350	0.411	2.619	3.896

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	134	2475	251	316	309	366	188
N.S.	1	1.00	0.75	13.90	1.41	1.78	1.74	2.06	1.06
time (sec)	N/A	0.141	0.070	0.213	0.298	0.345	0.565	3.432	3.670

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	271	271	211	4508	0	0	0	0	-1
N.S.	1	1.00	0.78	16.63	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.196	0.115	0.235	0.000	0.000	0.000	0.000	0.000

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	200	200	158	3479	0	0	0	0	-1
N.S.	1	1.00	0.79	17.40	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.154	0.070	0.226	0.000	0.000	0.000	0.000	0.000

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	103	2420	0	0	0	0	-1
N.S.	1	1.00	0.79	18.62	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.111	0.047	0.200	0.000	0.000	0.000	0.000	0.000

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	68	1392	0	0	0	0	-1
N.S.	1	1.00	0.94	19.33	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.044	0.019	0.159	0.000	0.000	0.000	0.000	0.000

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	94	2293	0	0	0	0	-1
N.S.	1	1.00	1.19	29.03	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.075	0.038	0.197	0.000	0.000	0.000	0.000	0.000

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	130	3292	0	0	0	0	-1
N.S.	1	1.00	0.96	24.39	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.159	0.073	0.208	0.000	0.000	0.000	0.000	0.000

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	204	204	185	4413	0	0	0	0	-1
N.S.	1	1.00	0.91	21.63	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.237	0.092	0.197	0.000	0.000	0.000	0.000	0.000

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	273	273	237	5435	0	0	0	0	-1
N.S.	1	1.00	0.87	19.91	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.342	0.093	0.223	0.000	0.000	0.000	0.000	0.000

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	281	281	240	4871	0	0	0	0	-1
N.S.	1	1.00	0.85	17.33	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.218	0.140	0.214	0.000	0.000	0.000	0.000	0.000

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	203	203	186	3778	0	0	0	0	-1
N.S.	1	1.00	0.92	18.61	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.191	0.119	0.205	0.000	0.000	0.000	0.000	0.000

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	143	143	142	2674	0	0	0	0	-1
N.S.	1	1.00	0.99	18.70	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.148	0.088	0.201	0.000	0.000	0.000	0.000	0.000

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	81	755	0	0	0	0	-1
N.S.	1	1.00	1.05	9.81	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.039	0.035	0.141	0.000	0.000	0.000	0.000	0.000

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	151	151	166	3536	0	0	0	0	-1
N.S.	1	1.00	1.10	23.42	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.169	0.115	0.173	0.000	0.000	0.000	0.000	0.000

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	223	4586	0	0	0	0	-1
N.S.	1	1.00	1.06	21.73	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.225	0.209	0.216	0.000	0.000	0.000	0.000	0.000

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	285	285	268	5791	0	0	0	0	-1
N.S.	1	1.00	0.94	20.32	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.265	0.121	0.257	0.000	0.000	0.000	0.000	0.000

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	296	327	258	4952	0	0	0	0	-1
N.S.	1	1.10	0.87	16.73	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.307	0.176	0.222	0.000	0.000	0.000	0.000	0.000

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	232	262	212	3831	0	0	0	0	-1
N.S.	1	1.13	0.91	16.51	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.280	0.160	0.178	0.000	0.000	0.000	0.000	0.000

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	155	1199	0	0	0	0	-1
N.S.	1	1.00	1.38	10.71	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.083	0.156	0.153	0.000	0.000	0.000	0.000	0.000

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	146	990	0	0	0	0	-1
N.S.	1	1.00	1.16	7.86	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.112	0.070	0.145	0.000	0.000	0.000	0.000	0.000

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	257	268	232	4606	0	0	0	0	-1
N.S.	1	1.04	0.90	17.92	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.339	0.174	0.230	0.000	0.000	0.000	0.000	0.000

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	322	335	290	5696	0	0	0	0	-1
N.S.	1	1.04	0.90	17.69	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.344	0.283	0.245	0.000	0.000	0.000	0.000	0.000

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	398	430	344	6114	0	0	0	0	-1
N.S.	1	1.08	0.86	15.36	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.508	0.442	0.229	0.000	0.000	0.000	0.000	0.000

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	333	364	298	5003	0	0	0	0	-1
N.S.	1	1.09	0.89	15.02	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.479	0.297	0.256	0.000	0.000	0.000	0.000	0.000

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	371	1658	0	0	0	0	-1
N.S.	1	1.00	2.30	10.30	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.149	0.322	0.159	0.000	0.000	0.000	0.000	0.000

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	222	281	1400	0	0	0	0	-1
N.S.	1	1.06	1.34	6.67	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.157	0.162	0.161	0.000	0.000	0.000	0.000	0.000

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	203	203	211	1227	0	0	0	0	-1
N.S.	1	1.00	1.04	6.04	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.178	0.109	0.159	0.000	0.000	0.000	0.000	0.000

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	351	363	318	5668	0	0	0	0	-1
N.S.	1	1.03	0.91	16.15	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.582	0.281	0.221	0.000	0.000	0.000	0.000	0.000

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	420	432	378	6791	0	0	0	0	-1
N.S.	1	1.03	0.90	16.17	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.553	0.439	0.245	0.000	0.000	0.000	0.000	0.000

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	157	96	0	129	0	0	0	-1
N.S.	1	1.47	0.90	0.00	1.21	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.113	0.091	0.032	0.290	0.000	0.000	0.000	0.000

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	243	9690	0	0	0	0	-1
N.S.	1	1.00	2.15	85.75	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.098	0.108	0.339	0.000	0.000	0.000	0.000	0.000

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	217	217	432	14905	0	0	0	0	-1
N.S.	1	1.00	1.99	68.69	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.222	0.310	0.403	0.000	0.000	0.000	0.000	0.000

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	361	409	706	19018	0	0	0	0	-1
N.S.	1	1.13	1.96	52.68	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.480	0.595	0.424	0.000	0.000	0.000	0.000	0.000

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	169	0	0	0	0	0	-1
N.S.	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.208	0.191	0.005	0.000	0.000	0.000	0.000	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	298	298	287	0	0	0	0	0	-1
N.S.	1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.338	0.239	0.017	0.000	0.000	0.000	0.000	0.000

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	402	402	366	0	0	0	0	0	-1
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.447	0.341	0.018	0.000	0.000	0.000	0.000	0.000

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.032	7.596	0.019	0.000	0.000	0.000	0.000	0.000

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	61	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.066	6.881	0.019	0.000	0.000	0.000	0.000	0.000

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	66	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.135	15.650	0.019	0.000	0.000	0.000	0.000	0.000

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	242	242	183	0	232	466	518	0	-1
N.S.	1	1.00	0.76	0.00	0.96	1.93	2.14	0.00	-0.00
time (sec)	N/A	0.152	0.284	0.021	0.497	0.404	8.727	0.000	0.000

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	192	192	151	0	188	379	364	0	-1
N.S.	1	1.00	0.79	0.00	0.98	1.97	1.90	0.00	-0.01
time (sec)	N/A	0.124	0.139	0.019	0.499	0.394	5.626	0.000	0.000

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	116	0	146	286	224	0	-1
N.S.	1	1.00	0.82	0.00	1.03	2.01	1.58	0.00	-0.01
time (sec)	N/A	0.070	0.087	0.020	0.513	0.390	3.494	0.000	0.000

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	77	0	96	191	102	0	-1
N.S.	1	1.00	0.82	0.00	1.02	2.03	1.09	0.00	-0.01
time (sec)	N/A	0.030	0.073	0.021	0.497	0.380	1.753	0.000	0.000

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	331	0	0	0	0	0	-1
N.S.	1	1.00	1.57	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.224	0.144	0.020	0.000	0.000	0.000	0.000	0.000

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	221	221	392	0	0	0	0	0	-1
N.S.	1	1.00	1.77	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.193	0.221	0.029	0.000	0.000	0.000	0.000	0.000

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	298	298	500	0	0	0	0	0	-1
N.S.	1	1.00	1.68	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.238	0.372	0.021	0.000	0.000	0.000	0.000	0.000

Problem 137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	263	263	187	0	245	554	1188	0	-1
N.S.	1	1.00	0.71	0.00	0.93	2.11	4.52	0.00	-0.00
time (sec)	N/A	0.165	0.226	0.021	0.511	0.410	73.962	0.000	0.000

Problem 138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	213	213	153	0	201	467	870	0	-1
N.S.	1	1.00	0.72	0.00	0.94	2.19	4.08	0.00	-0.00
time (sec)	N/A	0.136	0.160	0.021	0.497	0.408	50.586	0.000	0.000

Problem 139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	163	120	0	159	374	583	0	-1
N.S.	1	1.00	0.74	0.00	0.98	2.29	3.58	0.00	-0.01
time (sec)	N/A	0.083	0.119	0.019	0.501	0.404	33.332	0.000	0.000

Problem 140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	87	0	109	283	333	0	-1
N.S.	1	1.00	0.76	0.00	0.95	2.46	2.90	0.00	-0.01
time (sec)	N/A	0.036	0.061	0.021	0.497	0.395	17.859	0.000	0.000

Problem 141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	255	255	375	0	0	0	0	0	-1
N.S.	1	1.00	1.47	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.303	0.176	0.022	0.000	0.000	0.000	0.000	0.000

Problem 142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	259	259	480	0	0	0	0	0	-1
N.S.	1	1.00	1.85	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.227	0.236	0.026	0.000	0.000	0.000	0.000	0.000

Problem 143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	293	293	501	0	0	0	0	0	-1
N.S.	1	1.00	1.71	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.270	0.413	0.022	0.000	0.000	0.000	0.000	0.000

Problem 144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	217	217	150	0	219	378	986	275	-1
N.S.	1	1.00	0.69	0.00	1.01	1.74	4.54	1.27	-0.00
time (sec)	N/A	0.139	0.155	0.024	0.503	0.393	171.409	11.063	0.000

Problem 145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	169	118	0	175	291	714	210	-1
N.S.	1	1.00	0.70	0.00	1.04	1.72	4.22	1.24	-0.01
time (sec)	N/A	0.116	0.125	0.023	0.494	0.405	122.510	5.970	0.000

Problem 146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	80	0	129	196	473	145	-1
N.S.	1	1.00	0.67	0.00	1.08	1.65	3.97	1.22	-0.01
time (sec)	N/A	0.062	0.075	0.022	0.490	0.392	75.620	2.962	0.000

Problem 147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	55	61	84	119	252	78	-1
N.S.	1	1.00	0.80	0.88	1.22	1.72	3.65	1.13	-0.01
time (sec)	N/A	0.023	0.034	0.164	0.483	0.434	10.992	3.208	0.000

Problem 148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	249	0	0	0	0	0	-1
N.S.	1	1.00	1.64	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.141	0.066	0.022	0.000	0.000	0.000	0.000	0.000

Problem 149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	226	392	0	0	0	0	0	-1
N.S.	1	1.00	1.73	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.189	0.173	0.024	0.000	0.000	0.000	0.000	0.000

Problem 150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	304	304	501	0	0	0	0	0	-1
N.S.	1	1.00	1.65	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.235	0.223	0.025	0.000	0.000	0.000	0.000	0.000

Problem 151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	194	194	159	0	203	418	384	0	-1
N.S.	1	1.00	0.82	0.00	1.05	2.15	1.98	0.00	-0.01
time (sec)	N/A	0.135	0.085	0.024	0.498	0.426	26.838	0.000	0.000

Problem 152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	146	146	124	0	159	325	262	0	-1
N.S.	1	1.00	0.85	0.00	1.09	2.23	1.79	0.00	-0.01
time (sec)	N/A	0.110	0.065	0.022	0.502	0.407	20.513	0.000	0.000

Problem 153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	83	0	113	230	153	105	-1
N.S.	1	1.00	0.88	0.00	1.20	2.45	1.63	1.12	-0.01
time (sec)	N/A	0.060	0.051	0.021	0.507	0.391	30.215	2.310	0.000

Problem 154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	53	0	72	162	66	57	-1
N.S.	1	1.00	1.00	0.00	1.36	3.06	1.25	1.08	-0.02
time (sec)	N/A	0.022	0.031	0.022	0.521	0.479	6.462	1.536	0.000

Problem 155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	295	0	0	0	0	0	-1
N.S.	1	1.00	1.47	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.231	0.193	0.020	0.000	0.000	0.000	0.000	0.000

Problem 156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	253	253	506	0	0	0	0	0	-1
N.S.	1	1.00	2.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.360	0.327	0.022	0.000	0.000	0.000	0.000	0.000

Problem 157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.058	1.561	0.018	0.000	0.000	0.000	0.000	0.000

Problem 158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.037	0.984	0.042	0.000	0.000	0.000	0.000	0.000

Problem 159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	23	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.020	0.020	0.044	0.000	0.000	0.000	0.000	0.000

Problem 160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.054	0.289	0.018	0.000	0.000	0.000	0.000	0.000

Problem 161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.059	0.586	0.018	0.000	0.000	0.000	0.000	0.000

Problem 162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	230	5021	286	1023	6156	531	-1
N.S.	1	1.00	1.09	23.80	1.36	4.85	29.18	2.52	-0.00
time (sec)	N/A	0.163	0.384	0.462	0.297	0.387	7.509	2.513	0.000

Problem 163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	153	153	167	2702	207	553	2791	374	-1
N.S.	1	1.00	1.09	17.66	1.35	3.61	18.24	2.44	-0.01
time (sec)	N/A	0.126	0.199	0.283	0.288	0.387	5.211	1.983	0.000

Problem 164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	88	1122	128	225	899	217	-1
N.S.	1	1.00	0.93	11.81	1.35	2.37	9.46	2.28	-0.01
time (sec)	N/A	0.057	0.087	0.102	0.291	0.389	3.545	3.696	0.000

Problem 165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	371	57	52	141	95	-1
N.S.	1	1.00	0.70	8.07	1.24	1.13	3.07	2.07	-0.02
time (sec)	N/A	0.012	0.011	0.054	0.287	0.363	4.952	2.494	0.000

Problem 166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	72	0	0	0	0	0	-1
N.S.	1	0.00	2.77	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.037	0.068	0.027	0.000	0.000	0.000	0.000	0.000

Problem 167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	72	0	0	0	0	0	-1
N.S.	1	0.00	2.77	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.037	0.064	0.029	0.000	0.000	0.000	0.000	0.000

Problem 168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	0	173	0	0	0	0	0	-1
N.S.	1	0.00	9.61	0.00	0.00	0.00	0.00	0.00	-0.06
time (sec)	N/A	0.013	0.171	0.023	0.000	0.000	0.000	0.000	0.000

Problem 169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	61	0	0	0	252	0	-1
N.S.	1	1.00	0.90	0.00	0.00	0.00	3.71	0.00	-0.01
time (sec)	N/A	0.020	0.015	0.022	0.000	0.000	14.379	0.000	0.000

Problem 170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F(-2)	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	0	89	0	0	0	0	0	-1
N.S.	1	0.00	4.45	0.00	0.00	0.00	0.00	0.00	-0.05
time (sec)	N/A	0.020	0.043	0.020	0.000	0.000	0.000	0.000	0.000

Problem 171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	69	266	60	71	66	73	51
N.S.	1	1.00	1.44	5.54	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.030	0.006	0.407	0.272	0.393	1.366	1.597	3.417

Problem 172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	69	266	60	71	66	73	51
N.S.	1	1.00	1.44	5.54	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.030	0.005	0.146	0.281	0.375	0.669	2.358	3.395

Problem 173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	69	2346	60	69	66	73	51
N.S.	1	1.00	1.47	49.91	1.28	1.47	1.40	1.55	1.09
time (sec)	N/A	0.026	0.006	0.159	0.280	0.413	0.295	2.337	3.386

Problem 174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	57	257	52	57	78	60	48
N.S.	1	1.00	1.10	4.94	1.00	1.10	1.50	1.15	0.92
time (sec)	N/A	0.044	0.006	0.070	0.290	0.454	0.309	2.270	3.342

Problem 175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	54	57	266	51	62	63	63	66
N.S.	1	1.04	1.10	5.12	0.98	1.19	1.21	1.21	1.27
time (sec)	N/A	0.036	0.006	0.073	0.272	0.449	2.430	3.981	3.402

Problem 176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	69	248	60	62	68	65	51
N.S.	1	1.00	1.21	4.35	1.05	1.09	1.19	1.14	0.89
time (sec)	N/A	0.034	0.006	0.050	0.271	0.404	0.559	2.696	3.383

Problem 177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	69	266	60	71	66	73	51
N.S.	1	1.00	1.44	5.54	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.029	0.005	0.182	0.289	0.382	0.931	3.439	3.345

Problem 178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	69	266	60	71	66	73	51
N.S.	1	1.00	1.44	5.54	1.25	1.48	1.38	1.52	1.06
time (sec)	N/A	0.029	0.005	0.117	0.273	0.367	0.425	2.665	3.315

Problem 179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	55	247	52	63	56	62	43
N.S.	1	1.00	1.15	5.15	1.08	1.31	1.17	1.29	0.90
time (sec)	N/A	0.014	0.005	0.057	0.285	0.408	0.191	4.816	3.315

Problem 180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	49	249	52	60	46	62	51
N.S.	1	1.00	1.11	5.66	1.18	1.36	1.05	1.41	1.16
time (sec)	N/A	0.028	0.005	0.051	0.285	0.397	0.226	5.745	3.340

Problem 181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	63	249	60	60	58	65	51
N.S.	1	1.00	1.19	4.70	1.13	1.13	1.09	1.23	0.96
time (sec)	N/A	0.034	0.006	0.048	0.266	0.392	0.410	4.675	3.630

Problem 182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	69	251	60	65	68	66	53
N.S.	1	1.00	1.21	4.40	1.05	1.14	1.19	1.16	0.93
time (sec)	N/A	0.034	0.005	0.052	0.292	0.384	0.752	3.631	3.609

Problem 183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	84	434	100	114	116	123	82
N.S.	1	1.00	1.14	5.86	1.35	1.54	1.57	1.66	1.11
time (sec)	N/A	0.063	0.029	2.018	0.285	0.377	2.480	4.839	3.703

Problem 184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	87	434	100	114	116	123	82
N.S.	1	1.00	1.18	5.86	1.35	1.54	1.57	1.66	1.11
time (sec)	N/A	0.059	0.028	1.269	0.271	0.373	1.283	3.243	3.646

Problem 185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	85	434	100	112	116	123	82
N.S.	1	1.00	1.12	5.71	1.32	1.47	1.53	1.62	1.08
time (sec)	N/A	0.047	0.027	0.180	0.275	0.380	0.626	6.881	3.633

Problem 186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	82	3072	88	100	133	105	80
N.S.	1	1.00	0.92	34.52	0.99	1.12	1.49	1.18	0.90
time (sec)	N/A	0.058	0.038	0.247	0.286	0.375	0.704	4.013	3.664

Problem 187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	83	433	90	105	139	112	110
N.S.	1	1.00	0.91	4.76	0.99	1.15	1.53	1.23	1.21
time (sec)	N/A	0.070	0.044	0.162	0.273	0.378	0.769	3.457	3.745

Problem 188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	82	434	91	107	105	113	102
N.S.	1	1.00	0.91	4.82	1.01	1.19	1.17	1.26	1.13
time (sec)	N/A	0.065	0.041	0.161	0.261	0.381	3.201	3.894	3.574

Problem 189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	95	434	100	114	121	123	82
N.S.	1	1.00	1.28	5.86	1.35	1.54	1.64	1.66	1.11
time (sec)	N/A	0.051	0.027	1.448	0.274	0.372	1.853	5.932	3.695

Problem 190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	95	434	100	114	121	123	82
N.S.	1	1.00	1.28	5.86	1.35	1.54	1.64	1.66	1.11
time (sec)	N/A	0.051	0.028	0.126	0.268	0.385	0.935	7.845	3.591

Problem 191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	89	416	92	108	110	112	74
N.S.	1	1.00	1.03	4.84	1.07	1.26	1.28	1.30	0.86
time (sec)	N/A	0.030	0.026	0.133	0.298	0.360	0.441	10.360	3.444

Problem 192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	86	419	94	105	100	116	102
N.S.	1	1.00	1.04	5.05	1.13	1.27	1.20	1.40	1.23
time (sec)	N/A	0.051	0.027	0.161	0.281	0.361	0.478	8.876	3.456

Problem 193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	80	417	92	106	100	116	90
N.S.	1	1.00	0.98	5.09	1.12	1.29	1.22	1.41	1.10
time (sec)	N/A	0.054	0.030	0.130	0.270	0.378	0.549	6.799	3.482

Problem 194	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	86	419	100	106	112	116	88
N.S.	1	1.00	0.95	4.60	1.10	1.16	1.23	1.27	0.97
time (sec)	N/A	0.060	0.030	0.134	0.274	0.387	0.897	3.946	3.511

Problem 195	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	95	419	100	108	122	116	89
N.S.	1	1.00	1.00	4.41	1.05	1.14	1.28	1.22	0.94
time (sec)	N/A	0.060	0.034	0.122	0.274	0.348	1.591	4.454	3.549

Problem 196	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	120	602	140	157	175	173	113
N.S.	1	1.00	1.20	6.02	1.40	1.57	1.75	1.73	1.13
time (sec)	N/A	0.073	0.039	109.902	0.265	0.378	4.344	12.075	3.515

Problem 197	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	120	602	140	157	170	173	113
N.S.	1	1.00	0.92	4.63	1.08	1.21	1.31	1.33	0.87
time (sec)	N/A	0.104	0.039	0.140	0.265	0.395	2.480	4.407	3.482

Problem 198	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	91	91	118	591	140	155	170	173	113
N.S.	1	1.00	1.30	6.49	1.54	1.70	1.87	1.90	1.24
time (sec)	N/A	0.054	0.037	0.169	0.271	0.398	1.333	3.555	3.491

Problem 199	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	116	595	130	145	212	158	112
N.S.	1	1.00	0.89	4.58	1.00	1.12	1.63	1.22	0.86
time (sec)	N/A	0.078	0.047	0.167	0.267	0.398	1.515	4.791	3.666

Problem 200	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	115	4039	129	146	209	160	163
N.S.	1	1.00	0.88	30.83	0.98	1.11	1.60	1.22	1.24
time (sec)	N/A	0.093	0.059	0.309	0.268	0.377	1.535	2.299	3.641

Problem 201	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	115	602	131	150	209	162	149
N.S.	1	1.00	0.88	4.60	1.00	1.15	1.60	1.24	1.14
time (sec)	N/A	0.090	0.060	0.170	0.266	0.367	1.592	3.923	3.664

Problem 202	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	133	602	140	157	170	173	113
N.S.	1	1.00	1.33	6.02	1.40	1.57	1.70	1.73	1.13
time (sec)	N/A	0.066	0.035	0.128	0.265	0.372	3.353	3.378	3.726

Problem 203	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	133	602	140	157	175	173	113
N.S.	1	1.00	1.33	6.02	1.40	1.57	1.75	1.73	1.13
time (sec)	N/A	0.065	0.035	0.133	0.271	0.345	1.750	4.509	3.625

Problem 204	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	124	582	130	151	156	159	104
N.S.	1	1.00	1.02	4.81	1.07	1.25	1.29	1.31	0.86
time (sec)	N/A	0.035	0.033	0.139	0.263	0.380	0.972	3.923	3.717

Problem 205	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	118	123	587	132	149	146	166	145
N.S.	1	1.00	1.04	4.97	1.12	1.26	1.24	1.41	1.23
time (sec)	N/A	0.061	0.042	0.164	0.285	0.349	0.973	3.835	3.515

Problem 206	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	112	585	134	146	155	166	141
N.S.	1	1.00	0.93	4.83	1.11	1.21	1.28	1.37	1.17
time (sec)	N/A	0.071	0.041	0.165	0.264	0.364	1.050	4.218	3.531

Problem 207	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	118	118	115	585	132	150	146	166	125
N.S.	1	1.00	0.97	4.96	1.12	1.27	1.24	1.41	1.06
time (sec)	N/A	0.063	0.041	0.133	0.281	0.374	1.113	5.646	3.584

Problem 208	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	127	587	140	149	158	166	123
N.S.	1	1.00	1.00	4.62	1.10	1.17	1.24	1.31	0.97
time (sec)	N/A	0.072	0.043	0.135	0.266	0.364	1.575	7.906	3.795

Problem 209	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	133	587	140	151	177	166	125
N.S.	1	1.00	1.00	4.41	1.05	1.14	1.33	1.25	0.94
time (sec)	N/A	0.072	0.043	0.141	0.265	0.353	2.668	4.722	3.699

Problem 210	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	174	651	0	0	257	0	-1
N.S.	1	1.00	1.44	5.38	0.00	0.00	2.12	0.00	-0.01
time (sec)	N/A	0.125	0.080	0.140	0.000	0.000	45.853	0.000	0.000

Problem 211	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	135	460	0	0	202	0	-1
N.S.	1	1.00	1.63	5.54	0.00	0.00	2.43	0.00	-0.01
time (sec)	N/A	0.101	0.051	0.117	0.000	0.000	21.603	0.000	0.000

Problem 212	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	94	299	0	0	141	0	-1
N.S.	1	1.00	1.92	6.10	0.00	0.00	2.88	0.00	-0.02
time (sec)	N/A	0.034	0.024	0.111	0.000	0.000	3.731	0.000	0.000

Problem 213	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	126	439	0	0	144	0	-1
N.S.	1	1.00	2.57	8.96	0.00	0.00	2.94	0.00	-0.02
time (sec)	N/A	0.046	0.054	0.118	0.000	0.000	7.623	0.000	0.000

Problem 214	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	157	611	0	0	0	0	-1
N.S.	1	1.00	1.89	7.36	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.097	0.077	0.124	0.000	0.000	0.000	0.000	0.000

Problem 215	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	196	805	0	0	0	0	-1
N.S.	1	1.00	1.62	6.65	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.143	0.127	0.123	0.000	0.000	0.000	0.000	0.000

Problem 216	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	167	167	208	693	0	0	0	0	-1
N.S.	1	1.00	1.25	4.15	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.137	0.100	0.127	0.000	0.000	0.000	0.000	0.000

Problem 217	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	132	132	170	512	0	0	0	0	-1
N.S.	1	1.00	1.29	3.88	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.117	0.070	0.124	0.000	0.000	0.000	0.000	0.000

Problem 218	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	107	332	0	0	0	0	-1
N.S.	1	1.00	1.02	3.16	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.046	0.034	0.129	0.000	0.000	0.000	0.000	0.000

Problem 219	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	173	531	0	0	0	0	-1
N.S.	1	1.00	1.29	3.96	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.098	0.096	0.143	0.000	0.000	0.000	0.000	0.000

Problem 220	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	211	706	0	0	0	0	-1
N.S.	1	1.00	1.28	4.28	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.156	0.127	0.124	0.000	0.000	0.000	0.000	0.000

Problem 221	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	129	129	287	687	0	0	316	0	-1
N.S.	1	1.00	2.22	5.33	0.00	0.00	2.45	0.00	-0.01
time (sec)	N/A	0.154	0.331	0.126	0.000	0.000	53.796	0.000	0.000

Problem 222	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	321	511	0	0	0	0	-1
N.S.	1	1.00	3.38	5.38	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.136	0.148	0.122	0.000	0.000	0.000	0.000	0.000

Problem 223	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	74	179	70	64	292	70	73
N.S.	1	1.00	1.48	3.58	1.40	1.28	5.84	1.40	1.46
time (sec)	N/A	0.030	0.035	0.123	0.276	0.369	26.996	4.740	3.498

Problem 224	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	279	644	0	0	0	0	-1
N.S.	1	1.00	3.40	7.85	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.097	0.267	0.125	0.000	0.000	0.000	0.000	0.000

Problem 225	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	334	817	0	0	364	0	-1
N.S.	1	1.00	2.65	6.48	0.00	0.00	2.89	0.00	-0.01
time (sec)	N/A	0.170	0.358	0.129	0.000	0.000	227.406	0.000	0.000

Problem 226	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	296	913	0	0	0	0	-1
N.S.	1	1.00	1.55	4.78	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.213	0.379	0.135	0.000	0.000	0.000	0.000	0.000

Problem 227	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	164	164	258	752	0	0	0	0	-1
N.S.	1	1.00	1.57	4.59	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.195	0.323	0.137	0.000	0.000	0.000	0.000	0.000

Problem 228	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	164	164	289	685	0	0	0	0	-1
N.S.	1	1.00	1.76	4.18	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.073	0.340	0.137	0.000	0.000	0.000	0.000	0.000

Problem 229	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	183	328	933	0	0	0	0	-1
N.S.	1	1.00	1.79	5.10	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.174	0.490	0.143	0.000	0.000	0.000	0.000	0.000

Problem 230	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	224	224	361	1133	0	0	0	0	-1
N.S.	1	1.00	1.61	5.06	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.250	0.457	0.142	0.000	0.000	0.000	0.000	0.000

Problem 231	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	498	727	0	0	403	0	-1
N.S.	1	1.00	3.28	4.78	0.00	0.00	2.65	0.00	-0.01
time (sec)	N/A	0.208	0.363	0.128	0.000	0.000	72.699	0.000	0.000

Problem 232	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	129	369	121	124	612	140	129
N.S.	1	1.00	1.90	5.43	1.78	1.82	9.00	2.06	1.90
time (sec)	N/A	0.056	0.077	0.133	0.277	0.348	201.607	4.442	3.736

Problem 233	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	111	243	108	119	619	136	109
N.S.	1	1.00	1.35	2.96	1.32	1.45	7.55	1.66	1.33
time (sec)	N/A	0.047	0.039	0.129	0.279	0.363	201.820	3.568	3.679

Problem 234	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	396	841	0	0	403	0	-1
N.S.	1	1.00	3.44	7.31	0.00	0.00	3.50	0.00	-0.01
time (sec)	N/A	0.157	0.679	0.126	0.000	0.000	145.080	0.000	0.000

Problem 235	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	C	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	162	507	1030	0	0	0	0	-1
N.S.	1	1.00	3.13	6.36	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.241	0.829	0.131	0.000	0.000	0.000	0.000	0.000

Problem 236	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	495	1311	0	0	0	0	-1
N.S.	1	1.00	2.35	6.21	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.310	0.858	0.146	0.000	0.000	0.000	0.000	0.000

Problem 237	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	187	187	497	1247	0	0	0	0	-1
N.S.	1	1.00	2.66	6.67	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.261	0.650	0.155	0.000	0.000	0.000	0.000	0.000

Problem 238	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	210	544	1047	0	0	0	0	-1
N.S.	1	1.00	2.59	4.99	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.099	0.601	0.146	0.000	0.000	0.000	0.000	0.000

Problem 239	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	219	219	552	1518	0	0	0	0	-1
N.S.	1	1.00	2.52	6.93	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.234	1.007	0.152	0.000	0.000	0.000	0.000	0.000

Problem 240	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F(-2)	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	260	260	584	1729	0	0	0	0	-1
N.S.	1	1.00	2.25	6.65	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.315	1.088	0.149	0.000	0.000	0.000	0.000	0.000

Problem 241	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	C	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	12	76	14	94	0	11
N.S.	1	1.00	1.00	0.71	4.47	0.82	5.53	0.00	0.65
time (sec)	N/A	0.029	0.006	0.114	0.263	0.345	4.638	0.000	3.382

Problem 242	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	B	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	17	53	58	13	117	0	10
N.S.	1	1.00	1.06	3.31	3.62	0.81	7.31	0.00	0.62
time (sec)	N/A	0.028	0.004	0.103	0.290	0.366	3.213	0.000	3.345

Problem 243	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	31	20	48	0	0	0	18
N.S.	1	1.00	1.41	0.91	2.18	0.00	0.00	0.00	0.82
time (sec)	N/A	0.015	0.005	0.100	0.267	0.000	0.000	0.000	0.041

Problem 244	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	A	A	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	65	46	26	0	0	0	24
N.S.	1	1.00	2.03	1.44	0.81	0.00	0.00	0.00	0.75
time (sec)	N/A	0.025	0.007	0.094	0.516	0.000	0.000	0.000	3.329

Problem 245	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	68	112	0	0	0	0	-1
N.S.	1	1.00	1.10	1.81	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.028	0.022	0.124	0.000	0.000	0.000	0.000	0.000

Problem 246	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	72	55	0	0	0	0	-1
N.S.	1	1.00	1.09	0.83	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.028	0.019	0.132	0.000	0.000	0.000	0.000	0.000

Problem 247	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	509	509	432	0	0	0	0	0	-1
N.S.	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.441	0.493	0.032	0.000	0.000	0.000	0.000	0.000

Problem 248	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	711	711	1073	0	0	0	0	0	-1
N.S.	1	1.00	1.51	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.598	1.553	0.024	0.000	0.000	0.000	0.000	0.000

Problem 249	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.022	2.258	0.020	0.000	0.000	0.000	0.000	0.000

Problem 250	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F(-1)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.021	10.768	0.007	0.000	0.000	0.000	0.000	0.000

Problem 251	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	208	208	251	0	224	397	0	296	-1
N.S.	1	1.00	1.21	0.00	1.08	1.91	0.00	1.42	-0.00
time (sec)	N/A	0.174	0.121	0.022	0.496	0.433	0.000	2.844	0.000

Problem 252	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	204	0	170	304	0	221	-1
N.S.	1	1.00	1.32	0.00	1.10	1.97	0.00	1.44	-0.01
time (sec)	N/A	0.120	0.090	0.021	0.513	0.405	0.000	2.639	0.000

Problem 253	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	136	0	85	209	155	145	-1
N.S.	1	1.00	1.33	0.00	0.83	2.05	1.52	1.42	-0.01
time (sec)	N/A	0.061	0.067	0.021	0.275	0.402	12.318	5.377	0.000

Problem 254	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	220	220	203	0	0	0	0	0	-1
N.S.	1	1.00	0.92	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.234	0.217	0.020	0.000	0.000	0.000	0.000	0.000

Problem 255	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	252	252	303	0	0	0	0	0	-1
N.S.	1	1.00	1.20	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.264	0.320	0.029	0.000	0.000	0.000	0.000	0.000

Problem 256	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	469	469	276	0	0	0	0	0	-1
N.S.	1	1.00	0.59	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.407	0.390	0.022	0.000	0.000	0.000	0.000	0.000

Problem 257	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	409	410	250	0	0	0	0	0	-1
N.S.	1	1.00	0.61	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.282	0.269	0.021	0.000	0.000	0.000	0.000	0.000

Problem 258	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	330	330	237	0	0	0	0	0	-1
N.S.	1	1.00	0.72	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.138	0.239	0.021	0.000	0.000	0.000	0.000	0.000

Problem 259	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	345	345	183	0	0	0	0	0	-1
N.S.	1	1.00	0.53	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.261	0.377	0.023	0.000	0.000	0.000	0.000	0.000

Problem 260	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	99	0	121	112	0	0	-1
N.S.	1	1.00	0.88	0.00	1.08	1.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	0.090	0.024	0.280	0.375	0.000	0.000	0.000

Problem 261	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	170	170	145	0	0	160	0	0	-1
N.S.	1	1.00	0.85	0.00	0.00	0.94	0.00	0.00	-0.01
time (sec)	N/A	0.101	0.123	0.020	0.000	0.402	0.000	0.000	0.000

Problem 262	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	230	230	180	0	0	206	0	0	-1
N.S.	1	1.00	0.78	0.00	0.00	0.90	0.00	0.00	-0.00
time (sec)	N/A	0.133	0.152	0.020	0.000	0.417	0.000	0.000	0.000

Problem 263	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	231	231	256	0	239	485	0	0	-1
N.S.	1	1.00	1.11	0.00	1.03	2.10	0.00	0.00	-0.00
time (sec)	N/A	0.187	0.243	0.020	0.489	0.449	0.000	0.000	0.000

Problem 264	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	177	177	227	0	185	392	0	0	-1
N.S.	1	1.00	1.28	0.00	1.05	2.21	0.00	0.00	-0.01
time (sec)	N/A	0.139	0.121	0.021	0.514	0.446	0.000	0.000	0.000

Problem 265	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	125	125	181	0	100	299	0	0	-1
N.S.	1	1.00	1.45	0.00	0.80	2.39	0.00	0.00	-0.01
time (sec)	N/A	0.075	0.091	0.020	0.278	0.439	0.000	0.000	0.000

Problem 266	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	260	260	301	0	0	0	0	0	-1
N.S.	1	1.00	1.16	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.269	0.488	0.020	0.000	0.000	0.000	0.000	0.000

Problem 267	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	295	295	349	0	0	0	0	0	-1
N.S.	1	1.00	1.18	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.312	0.614	0.020	0.000	0.000	0.000	0.000	0.000

Problem 268	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	464	464	331	0	0	0	0	0	-1
N.S.	1	1.00	0.71	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.407	0.689	0.022	0.000	0.000	0.000	0.000	0.000

Problem 269	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	378	378	314	0	0	0	0	0	-1
N.S.	1	1.00	0.83	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.186	0.582	0.020	0.000	0.000	0.000	0.000	0.000

Problem 270	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	400	400	329	0	0	0	0	0	-1
N.S.	1	1.00	0.82	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.324	0.644	0.021	0.000	0.000	0.000	0.000	0.000

Problem 271	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	400	400	269	0	0	0	0	0	-1
N.S.	1	1.00	0.67	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.298	0.498	0.022	0.000	0.000	0.000	0.000	0.000

Problem 272	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	138	138	114	0	159	156	0	0	-1
N.S.	1	1.00	0.83	0.00	1.15	1.13	0.00	0.00	-0.01
time (sec)	N/A	0.085	0.120	0.020	0.293	0.405	0.000	0.000	0.000

Problem 273	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	145	0	0	204	0	0	-1
N.S.	1	1.00	0.74	0.00	0.00	1.04	0.00	0.00	-0.01
time (sec)	N/A	0.122	0.146	0.020	0.000	0.434	0.000	0.000	0.000

Problem 274	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	256	256	178	0	0	250	0	0	-1
N.S.	1	1.00	0.70	0.00	0.00	0.98	0.00	0.00	-0.00
time (sec)	N/A	0.152	0.176	0.021	0.000	0.514	0.000	0.000	0.000

Problem 275	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	53	75	39	54	65	54	-1
N.S.	1	1.00	0.88	1.25	0.65	0.90	1.08	0.90	-0.02
time (sec)	N/A	0.031	0.033	0.104	0.512	0.434	14.582	3.053	0.000

Problem 276	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	182	182	204	0	209	309	0	0	-1
N.S.	1	1.00	1.12	0.00	1.15	1.70	0.00	0.00	-0.01
time (sec)	N/A	0.163	0.118	0.024	0.508	0.409	0.000	0.000	0.000

Problem 277	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	129	129	145	0	151	214	0	0	-1
N.S.	1	1.00	1.12	0.00	1.17	1.66	0.00	0.00	-0.01
time (sec)	N/A	0.110	0.090	0.022	0.499	0.417	0.000	0.000	0.000

Problem 278	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	91	0	68	127	126	0	-1
N.S.	1	1.00	1.25	0.00	0.93	1.74	1.73	0.00	-0.01
time (sec)	N/A	0.054	0.052	0.027	0.287	0.424	2.666	0.000	0.000

Problem 279	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	166	166	162	0	0	0	0	0	-1
N.S.	1	1.00	0.98	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.183	0.127	0.022	0.000	0.000	0.000	0.000	0.000

Problem 280	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	258	258	229	0	0	0	0	0	-1
N.S.	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.273	0.732	0.024	0.000	0.000	0.000	0.000	0.000

Problem 281	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	359	359	205	0	0	0	0	0	-1
N.S.	1	1.00	0.57	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.289	0.543	0.022	0.000	0.000	0.000	0.000	0.000

Problem 282	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	250	250	186	0	0	0	0	0	-1
N.S.	1	1.00	0.74	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.097	0.361	0.022	0.000	0.000	0.000	0.000	0.000

Problem 283	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	77	0	78	68	0	0	-1
N.S.	1	1.00	0.95	0.00	0.96	0.84	0.00	0.00	-0.01
time (sec)	N/A	0.058	0.060	0.022	0.284	0.390	0.000	0.000	0.000

Problem 284	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	144	144	110	0	0	116	0	0	-1
N.S.	1	1.00	0.76	0.00	0.00	0.81	0.00	0.00	-0.01
time (sec)	N/A	0.098	0.091	0.023	0.000	0.381	0.000	0.000	0.000

Problem 285	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	204	204	147	0	0	162	0	0	-1
N.S.	1	1.00	0.72	0.00	0.00	0.79	0.00	0.00	-0.00
time (sec)	N/A	0.118	0.147	0.022	0.000	0.416	0.000	0.000	0.000

Problem 286	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	209	209	195	0	247	444	0	0	-1
N.S.	1	1.00	0.93	0.00	1.18	2.12	0.00	0.00	-0.00
time (sec)	N/A	0.208	0.123	0.020	0.504	0.444	0.000	0.000	0.000

Problem 287	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	160	0	191	351	0	0	-1
N.S.	1	1.00	1.01	0.00	1.21	2.22	0.00	0.00	-0.01
time (sec)	N/A	0.149	0.103	0.025	0.500	0.435	0.000	0.000	0.000

Problem 288	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	118	0	133	252	163	0	-1
N.S.	1	1.00	1.18	0.00	1.33	2.52	1.63	0.00	-0.01
time (sec)	N/A	0.111	0.085	0.021	0.488	0.423	24.833	0.000	0.000

Problem 289	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	77	0	57	176	80	0	-1
N.S.	1	1.00	1.35	0.00	1.00	3.09	1.40	0.00	-0.02
time (sec)	N/A	0.053	0.088	0.020	0.279	0.387	6.139	0.000	0.000

Problem 290	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	209	209	241	0	0	0	0	0	-1
N.S.	1	1.00	1.15	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.234	0.247	0.020	0.000	0.000	0.000	0.000	0.000

Problem 291	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	287	287	218	0	0	0	0	0	-1
N.S.	1	1.00	0.76	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.269	0.206	0.020	0.000	0.000	0.000	0.000	0.000

Problem 292	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	328	328	217	0	0	0	0	0	-1
N.S.	1	1.00	0.66	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.326	0.305	0.019	0.000	0.000	0.000	0.000	0.000

Problem 293	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	70	0	56	95	0	0	-1
N.S.	1	1.00	1.21	0.00	0.97	1.64	0.00	0.00	-0.02
time (sec)	N/A	0.023	0.056	0.020	0.282	0.389	0.000	0.000	0.000

Problem 294	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	103	0	0	128	0	0	-1
N.S.	1	1.00	0.94	0.00	0.00	1.16	0.00	0.00	-0.01
time (sec)	N/A	0.090	0.076	0.022	0.000	0.386	0.000	0.000	0.000

Problem 295	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	176	176	144	0	0	186	0	0	-1
N.S.	1	1.00	0.82	0.00	0.00	1.06	0.00	0.00	-0.01
time (sec)	N/A	0.121	0.101	0.021	0.000	0.448	0.000	0.000	0.000

Problem 296	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	236	236	180	0	0	230	0	0	-1
N.S.	1	1.00	0.76	0.00	0.00	0.97	0.00	0.00	-0.00
time (sec)	N/A	0.187	0.122	0.020	0.000	0.421	0.000	0.000	0.000

Problem 297	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	212	212	240	0	248	483	0	0	-1
N.S.	1	1.00	1.13	0.00	1.17	2.28	0.00	0.00	-0.00
time (sec)	N/A	0.230	0.152	0.021	0.532	0.435	0.000	0.000	0.000

Problem 298	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	155	155	205	0	194	392	0	0	-1
N.S.	1	1.00	1.32	0.00	1.25	2.53	0.00	0.00	-0.01
time (sec)	N/A	0.159	0.127	0.019	0.505	0.416	0.000	0.000	0.000

Problem 299	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	108	108	137	0	138	328	333	0	-1
N.S.	1	1.00	1.27	0.00	1.28	3.04	3.08	0.00	-0.01
time (sec)	N/A	0.119	0.171	0.020	0.513	0.487	30.872	0.000	0.000

Problem 300	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	97	0	74	272	245	0	-1
N.S.	1	1.00	1.15	0.00	0.88	3.24	2.92	0.00	-0.01
time (sec)	N/A	0.060	0.149	0.021	0.297	0.400	16.917	0.000	0.000

Problem 301	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	251	251	273	0	0	0	0	0	-1
N.S.	1	1.00	1.09	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.288	0.297	0.020	0.000	0.000	0.000	0.000	0.000

Problem 302	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	337	337	227	0	0	0	0	0	-1
N.S.	1	1.00	0.67	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.348	0.184	0.021	0.000	0.000	0.000	0.000	0.000

Problem 303	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	443	443	199	0	0	0	0	0	-1
N.S.	1	1.00	0.45	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.374	0.159	0.020	0.000	0.000	0.000	0.000	0.000

Problem 304	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	383	383	244	0	0	0	0	0	-1
N.S.	1	1.00	0.64	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.379	0.566	0.020	0.000	0.000	0.000	0.000	0.000

Problem 305	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	101	0	0	134	0	0	-1
N.S.	1	1.00	1.13	0.00	0.00	1.51	0.00	0.00	-0.01
time (sec)	N/A	0.071	0.091	0.020	0.000	0.402	0.000	0.000	0.000

Problem 306	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	116	0	0	167	0	0	-1
N.S.	1	1.00	1.03	0.00	0.00	1.48	0.00	0.00	-0.01
time (sec)	N/A	0.046	0.083	0.021	0.000	0.383	0.000	0.000	0.000

Problem 307	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	166	166	144	0	0	200	0	0	-1
N.S.	1	1.00	0.87	0.00	0.00	1.20	0.00	0.00	-0.01
time (sec)	N/A	0.111	0.112	0.021	0.000	0.404	0.000	0.000	0.000

Problem 308	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	230	230	182	0	0	253	0	0	-1
N.S.	1	1.00	0.79	0.00	0.00	1.10	0.00	0.00	-0.00
time (sec)	N/A	0.173	0.137	0.021	0.000	0.433	0.000	0.000	0.000

Problem 309	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	251	251	163	0	184	122	0	0	-1
N.S.	1	1.00	0.65	0.00	0.73	0.49	0.00	0.00	-0.00
time (sec)	N/A	0.343	0.243	0.034	0.545	0.396	0.000	0.000	0.000

Problem 310	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	113	0	98	69	0	0	-1
N.S.	1	1.00	0.76	0.00	0.66	0.47	0.00	0.00	-0.01
time (sec)	N/A	0.199	0.099	0.035	0.507	0.383	0.000	0.000	0.000

Problem 311	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	301	301	310	0	0	0	0	0	-1
N.S.	1	1.00	1.03	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.397	1.182	0.033	0.000	0.000	0.000	0.000	0.000

Problem 312	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	489	489	255	0	0	0	0	0	-1
N.S.	1	1.00	0.52	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.493	0.593	0.034	0.000	0.000	0.000	0.000	0.000

Problem 313	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	406	406	316	0	0	0	0	0	-1
N.S.	1	1.00	0.78	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.403	1.892	0.034	0.000	0.000	0.000	0.000	0.000

Problem 314	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	248	248	217	0	0	0	0	0	-1
N.S.	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.145	0.353	0.035	0.000	0.000	0.000	0.000	0.000

Problem 315	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	70	0	87	77	0	0	-1
N.S.	1	1.00	0.49	0.00	0.61	0.54	0.00	0.00	-0.01
time (sec)	N/A	0.264	0.117	0.033	0.508	0.353	0.000	0.000	0.000

Problem 316	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	252	252	116	0	0	131	0	0	-1
N.S.	1	1.00	0.46	0.00	0.00	0.52	0.00	0.00	-0.00
time (sec)	N/A	0.309	0.177	0.037	0.000	0.380	0.000	0.000	0.000

Problem 317	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	27	119	27	27	29	28	-1
N.S.	1	1.00	0.79	3.50	0.79	0.79	0.85	0.82	-0.03
time (sec)	N/A	0.026	0.017	0.118	0.485	0.367	1.554	1.761	0.000

Problem 318	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	235	5139	286	1023	6217	553	-1
N.S.	1	1.00	1.11	24.36	1.36	4.85	29.46	2.62	-0.00
time (sec)	N/A	1.062	0.387	0.452	0.303	0.374	20.008	2.595	0.000

Problem 319	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	153	153	172	2790	207	553	2820	396	-1
N.S.	1	1.00	1.12	18.24	1.35	3.61	18.43	2.59	-0.01
time (sec)	N/A	0.133	0.203	0.280	0.289	0.345	8.694	2.541	0.000

Problem 320	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	94	1180	128	225	920	239	-1
N.S.	1	1.00	0.99	12.42	1.35	2.37	9.68	2.52	-0.01
time (sec)	N/A	0.061	0.096	0.103	0.300	0.361	4.251	2.054	0.000

Problem 321	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	371	57	52	141	95	-1
N.S.	1	1.00	0.70	8.07	1.24	1.13	3.07	2.07	-0.02
time (sec)	N/A	0.012	0.011	0.029	0.325	0.342	4.937	1.827	0.000

Problem 322	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	0	108	0	0	0	0	0	-1
N.S.	1	0.00	3.86	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.046	0.149	0.029	0.000	0.000	0.000	0.000	0.000

Problem 323	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	0	108	0	0	0	0	0	-1
N.S.	1	0.00	3.86	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.043	0.074	0.035	0.000	0.000	0.000	0.000	0.000

Problem 324	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1198	1198	2215	0	0	0	0	0	-1
N.S.	1	1.00	1.85	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	1.058	7.210	0.030	0.000	0.000	0.000	0.000	0.000

Problem 325	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	860	860	1379	0	0	0	0	0	-1
N.S.	1	1.00	1.60	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.577	6.074	0.029	0.000	0.000	0.000	0.000	0.000

Problem 326	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	520	520	571	1388	0	0	0	0	-1
N.S.	1	1.00	1.10	2.67	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.322	1.004	0.152	0.000	0.000	0.000	0.000	0.000

Problem 327	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F(-1)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.022	4.045	0.040	0.000	0.000	0.000	0.000	0.000

Problem 328	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F(-1)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	25	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.020	19.218	0.010	0.000	0.000	0.000	0.000	0.000

Problem 329	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	171	867	0	0	316	0	-1
N.S.	1	1.00	0.92	4.69	0.00	0.00	1.71	0.00	-0.01
time (sec)	N/A	0.141	0.074	0.104	0.000	0.000	115.413	0.000	0.000

Problem 330	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	142	693	0	0	267	0	-1
N.S.	1	1.00	0.96	4.68	0.00	0.00	1.80	0.00	-0.01
time (sec)	N/A	0.121	0.051	0.057	0.000	0.000	121.400	0.000	0.000

Problem 331	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	105	521	0	0	218	0	-1
N.S.	1	1.00	0.98	4.87	0.00	0.00	2.04	0.00	-0.01
time (sec)	N/A	0.085	0.036	0.053	0.000	0.000	77.888	0.000	0.000

Problem 332	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	66	343	0	0	163	0	-1
N.S.	1	1.00	0.96	4.97	0.00	0.00	2.36	0.00	-0.01
time (sec)	N/A	0.057	0.025	0.075	0.000	0.000	67.872	0.000	0.000

Problem 333	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	37	195	0	0	0	0	-1
N.S.	1	1.00	0.95	5.00	0.00	0.00	0.00	0.00	-0.03
time (sec)	N/A	0.049	0.007	0.057	0.000	0.000	0.000	0.000	0.000

Problem 334	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	C	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	63	336	0	0	173	0	-1
N.S.	1	1.00	1.43	7.64	0.00	0.00	3.93	0.00	-0.02
time (sec)	N/A	0.042	0.027	0.055	0.000	0.000	7.474	0.000	0.000

Problem 335	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	88	504	0	0	216	0	-1
N.S.	1	1.00	0.93	5.31	0.00	0.00	2.27	0.00	-0.01
time (sec)	N/A	0.106	0.062	0.057	0.000	0.000	59.408	0.000	0.000

Problem 336	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	124	689	0	0	265	0	-1
N.S.	1	1.00	0.92	5.10	0.00	0.00	1.96	0.00	-0.01
time (sec)	N/A	0.120	0.141	0.061	0.000	0.000	63.205	0.000	0.000

Problem 337	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	170	170	156	258	184	0	299	0	-1
N.S.	1	1.00	0.92	1.52	1.08	0.00	1.76	0.00	-0.01
time (sec)	N/A	0.126	0.057	0.131	0.318	0.000	110.948	0.000	0.000

Problem 338	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	125	211	146	0	253	0	-1
N.S.	1	1.00	0.92	1.55	1.07	0.00	1.86	0.00	-0.01
time (sec)	N/A	0.109	0.047	0.071	0.327	0.000	126.326	0.000	0.000

Problem 339	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	99	160	102	0	207	0	-1
N.S.	1	1.00	1.01	1.63	1.04	0.00	2.11	0.00	-0.01
time (sec)	N/A	0.081	0.031	0.066	0.319	0.000	87.499	0.000	0.000

Problem 340	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	64	101	68	0	156	0	-1
N.S.	1	1.00	1.02	1.60	1.08	0.00	2.48	0.00	-0.02
time (sec)	N/A	0.050	0.022	0.061	0.318	0.000	74.396	0.000	0.000

Problem 341	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	36	36	34	62	42	0	0	0	-1
N.S.	1	1.00	0.94	1.72	1.17	0.00	0.00	0.00	-0.03
time (sec)	N/A	0.048	0.006	0.058	0.313	0.000	0.000	0.000	0.000

Problem 342	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	F	C	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	54	103	62	0	170	0	-1
N.S.	1	1.00	1.32	2.51	1.51	0.00	4.15	0.00	-0.02
time (sec)	N/A	0.042	0.020	0.067	0.372	0.000	8.232	0.000	0.000

Problem 343	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	77	148	92	0	0	0	-1
N.S.	1	1.00	0.92	1.76	1.10	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.095	0.063	0.071	0.306	0.000	0.000	0.000	0.000

Problem 344	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	121	121	110	200	141	0	0	0	-1
N.S.	1	1.00	0.91	1.65	1.17	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.111	0.103	0.080	0.313	0.000	0.000	0.000	0.000

Problem 345	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	F(-2)	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	54	38	0	0	13
N.S.	1	1.00	1.00	0.82	3.18	2.24	0.00	0.00	0.76
time (sec)	N/A	0.045	0.010	0.213	0.441	0.349	0.000	0.000	3.526

Problem 346	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	F(-2)	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	16	16	17	13	45	50	0	0	12
N.S.	1	1.00	1.06	0.81	2.81	3.12	0.00	0.00	0.75
time (sec)	N/A	0.043	0.009	0.142	0.380	0.369	0.000	0.000	3.478

Problem 347	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	F(-2)	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	21	19	66	58	0	0	18
N.S.	1	1.00	1.05	0.95	3.30	2.90	0.00	0.00	0.90
time (sec)	N/A	0.048	0.009	0.163	0.410	0.341	0.000	0.000	3.526

Problem 348	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	C	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	16	11	72	13	82	0	10
N.S.	1	1.00	1.14	0.79	5.14	0.93	5.86	0.00	0.71
time (sec)	N/A	0.053	0.005	0.109	0.277	0.357	5.568	0.000	3.463

Problem 349	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	C	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	21	12	81	14	92	0	11
N.S.	1	1.00	1.24	0.71	4.76	0.82	5.41	0.00	0.65
time (sec)	N/A	0.059	0.006	0.102	0.321	0.366	6.543	0.000	3.501

Problem 350	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	23	0	0	89	0	0	-1
N.S.	1	1.00	0.88	0.00	0.00	3.42	0.00	0.00	-0.04
time (sec)	N/A	0.067	0.009	0.066	0.000	0.440	0.000	0.000	0.000

Problem 351	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	171	171	140	806	259	189	0	335	-1
N.S.	1	1.00	0.82	4.71	1.51	1.11	0.00	1.96	-0.01
time (sec)	N/A	0.147	0.111	0.198	0.303	0.357	0.000	3.948	0.000

Problem 352	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	101	616	186	135	1593	241	-1
N.S.	1	1.00	0.71	4.34	1.31	0.95	11.22	1.70	-0.01
time (sec)	N/A	0.138	0.083	0.180	0.297	0.386	40.510	4.427	0.000

Problem 353	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	113	61	425	115	80	445	150	-1
N.S.	1	1.26	0.68	4.72	1.28	0.89	4.94	1.67	-0.01
time (sec)	N/A	0.084	0.049	0.097	0.298	0.359	16.533	4.085	0.000

Problem 354	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	38	38	29	281	48	42	119	64	-1
N.S.	1	1.00	0.76	7.39	1.26	1.11	3.13	1.68	-0.03
time (sec)	N/A	0.013	0.008	0.052	0.285	0.355	6.495	4.770	0.000

Problem 355	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	141	0	0	79	0	0	-1
N.S.	1	1.00	1.83	0.00	0.00	1.03	0.00	0.00	-0.01
time (sec)	N/A	0.132	0.089	0.054	0.000	0.359	0.000	0.000	0.000

Problem 356	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	89	0	108	92	0	206	-1
N.S.	1	1.00	1.29	0.00	1.57	1.33	0.00	2.99	-0.01
time (sec)	N/A	0.070	0.075	0.058	0.361	0.379	0.000	7.405	0.000

Problem 357	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	137	0	165	168	0	628	-1
N.S.	1	1.00	0.91	0.00	1.10	1.12	0.00	4.19	-0.01
time (sec)	N/A	0.150	0.090	0.058	0.307	0.351	0.000	5.049	0.000

Problem 358	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	188	188	178	0	228	239	0	1080	-1
N.S.	1	1.00	0.95	0.00	1.21	1.27	0.00	5.74	-0.01
time (sec)	N/A	0.161	0.095	0.056	0.302	0.360	0.000	7.816	0.000

Problem 359	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	372	372	285	4156	585	570	0	985	-1
N.S.	1	1.00	0.77	11.17	1.57	1.53	0.00	2.65	-0.00
time (sec)	N/A	0.341	0.172	0.438	0.313	0.386	0.000	7.283	0.000

Problem 360	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	298	298	207	3038	425	411	0	715	-1
N.S.	1	1.00	0.69	10.19	1.43	1.38	0.00	2.40	-0.00
time (sec)	N/A	0.301	0.135	0.325	0.295	0.391	0.000	7.723	0.000

Problem 361	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	226	125	1919	266	250	1535	445	-1
N.S.	1	1.00	0.55	8.49	1.18	1.11	6.79	1.97	-0.00
time (sec)	N/A	0.202	0.092	0.192	0.300	0.402	47.983	8.654	0.000

Problem 362	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	67	1008	117	124	311	198	-1
N.S.	1	1.00	0.97	14.61	1.70	1.80	4.51	2.87	-0.01
time (sec)	N/A	0.034	0.018	0.090	0.301	0.353	16.339	4.793	0.000

Problem 363	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	A	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	129	129	502	0	0	181	0	0	-1
N.S.	1	1.00	3.89	0.00	0.00	1.40	0.00	0.00	-0.01
time (sec)	N/A	0.204	0.148	0.057	0.000	0.430	0.000	0.000	0.000

Problem 364	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	138	138	157	0	0	276	0	0	-1
N.S.	1	1.00	1.14	0.00	0.00	2.00	0.00	0.00	-0.01
time (sec)	N/A	0.224	0.280	0.054	0.000	0.366	0.000	0.000	0.000

Problem 365	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	214	214	207	0	0	539	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	2.52	0.00	0.00	-0.00
time (sec)	N/A	0.341	0.216	0.056	0.000	0.371	0.000	0.000	0.000

Problem 366	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	346	346	240	0	0	802	0	0	-1
N.S.	1	1.00	0.69	0.00	0.00	2.32	0.00	0.00	-0.00
time (sec)	N/A	0.465	0.332	0.056	0.000	0.375	0.000	0.000	0.000

Problem 367	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	73	613	76	158	398	137	-1
N.S.	1	1.00	1.24	10.39	1.29	2.68	6.75	2.32	-0.02
time (sec)	N/A	0.056	0.080	0.081	0.288	0.350	12.554	4.280	0.000

Problem 368	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	73	613	76	158	398	137	-1
N.S.	1	1.00	1.24	10.39	1.29	2.68	6.75	2.32	-0.02
time (sec)	N/A	0.056	0.073	0.079	0.283	0.347	3.841	3.321	0.000

Problem 369	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	73	613	76	158	398	137	-1
N.S.	1	1.00	1.24	10.39	1.29	2.68	6.75	2.32	-0.02
time (sec)	N/A	0.045	0.072	0.084	0.284	0.369	0.982	1.777	0.000

Problem 370	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	51	278	56	69	131	69	-1
N.S.	1	1.00	0.96	5.25	1.06	1.30	2.47	1.30	-0.02
time (sec)	N/A	0.060	0.050	0.100	0.287	0.419	5.235	2.724	0.000

Problem 371	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	613	0	140	495	396	-1
N.S.	1	1.00	1.01	8.63	0.00	1.97	6.97	5.58	-0.01
time (sec)	N/A	0.051	0.082	0.101	0.000	0.365	3.449	4.316	0.000

Problem 372	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	613	0	140	495	397	-1
N.S.	1	1.00	1.01	8.63	0.00	1.97	6.97	5.59	-0.01
time (sec)	N/A	0.051	0.085	0.101	0.000	0.362	5.564	3.443	0.000

Problem 373	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	73	614	76	158	398	137	-1
N.S.	1	1.00	1.24	10.41	1.29	2.68	6.75	2.32	-0.02
time (sec)	N/A	0.056	0.073	0.081	0.286	0.363	7.077	2.690	0.000

Problem 374	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	73	614	76	158	398	137	-1
N.S.	1	1.00	1.24	10.41	1.29	2.68	6.75	2.32	-0.02
time (sec)	N/A	0.056	0.073	0.086	0.288	0.359	2.025	2.350	0.000

Problem 375	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	61	606	68	136	323	115	-1
N.S.	1	1.00	1.07	10.63	1.19	2.39	5.67	2.02	-0.02
time (sec)	N/A	0.024	0.060	0.082	0.288	0.395	0.476	2.446	0.000

Problem 376	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	67	614	0	130	348	193	-1
N.S.	1	1.00	1.00	9.16	0.00	1.94	5.19	2.88	-0.01
time (sec)	N/A	0.054	0.079	0.102	0.000	0.385	3.203	2.396	0.000

Problem 377	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	614	0	140	495	397	-1
N.S.	1	1.00	1.01	8.65	0.00	1.97	6.97	5.59	-0.01
time (sec)	N/A	0.051	0.087	0.109	0.000	0.368	4.136	2.386	0.000

Problem 378	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	72	614	0	140	495	397	-1
N.S.	1	1.00	1.01	8.65	0.00	1.97	6.97	5.59	-0.01
time (sec)	N/A	0.050	0.072	0.101	0.000	0.353	7.998	3.349	0.000

Problem 379	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	115	1924	148	441	1634	744	-1
N.S.	1	1.00	1.12	18.68	1.44	4.28	15.86	7.22	-0.01
time (sec)	N/A	0.111	0.181	0.202	0.291	0.391	38.435	2.601	0.000

Problem 380	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	103	103	115	1924	148	440	1625	744	-1
N.S.	1	1.00	1.12	18.68	1.44	4.27	15.78	7.22	-0.01
time (sec)	N/A	0.109	0.166	0.203	0.283	0.383	10.101	2.503	0.000

Problem 381	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	114	1922	148	440	1622	744	-1
N.S.	1	1.00	1.12	18.84	1.45	4.31	15.90	7.29	-0.01
time (sec)	N/A	0.092	0.161	0.194	0.287	0.386	2.400	2.632	0.000

Problem 382	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	87	487	114	116	216	140	-1
N.S.	1	1.00	0.84	4.68	1.10	1.12	2.08	1.35	-0.01
time (sec)	N/A	0.094	0.139	0.147	0.322	0.481	5.338	3.442	0.000

Problem 383	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	114	1923	0	413	2118	0	-1
N.S.	1	1.00	0.84	14.24	0.00	3.06	15.69	0.00	-0.01
time (sec)	N/A	0.114	0.170	0.211	0.000	0.353	4.672	0.000	0.000

Problem 384	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	115	1924	0	413	2127	0	-1
N.S.	1	1.00	0.85	14.25	0.00	3.06	15.76	0.00	-0.01
time (sec)	N/A	0.113	0.166	0.216	0.000	0.380	8.586	0.000	0.000

Problem 385	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	119	1930	152	449	0	746	-1
N.S.	1	1.00	1.13	18.38	1.45	4.28	0.00	7.10	-0.01
time (sec)	N/A	0.114	0.168	0.187	0.286	0.374	0.000	3.086	0.000

Problem 386	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	119	1930	152	449	0	746	-1
N.S.	1	1.00	1.13	18.38	1.45	4.28	0.00	7.10	-0.01
time (sec)	N/A	0.114	0.169	0.185	0.295	0.528	0.000	1.607	0.000

Problem 387	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	113	113	106	1921	144	416	211	244	-1
N.S.	1	1.00	0.94	17.00	1.27	3.68	1.87	2.16	-0.01
time (sec)	N/A	0.051	0.151	0.182	0.290	0.368	5.183	2.465	0.000

Problem 388	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	123	123	112	1927	0	411	197	0	-1
N.S.	1	1.00	0.91	15.67	0.00	3.34	1.60	0.00	-0.01
time (sec)	N/A	0.111	0.173	0.220	0.000	0.370	10.131	0.000	0.000

Problem 389	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	119	1930	0	422	228	0	-1
N.S.	1	1.00	0.94	15.20	0.00	3.32	1.80	0.00	-0.01
time (sec)	N/A	0.115	0.168	0.246	0.000	0.383	36.086	0.000	0.000

Problem 390	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	119	1930	0	422	0	0	-1
N.S.	1	1.00	0.94	15.20	0.00	3.32	0.00	0.00	-0.01
time (sec)	N/A	0.119	0.172	0.226	0.000	0.356	0.000	0.000	0.000

Problem 391	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	119	1930	0	422	0	0	-1
N.S.	1	1.00	0.94	15.20	0.00	3.32	0.00	0.00	-0.01
time (sec)	N/A	0.123	0.168	0.223	0.000	0.351	0.000	0.000	0.000

Problem 392	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	147	147	156	4021	218	868	0	1586	-1
N.S.	1	1.00	1.06	27.35	1.48	5.90	0.00	10.79	-0.01
time (sec)	N/A	0.252	0.169	0.268	0.294	0.379	0.000	1.701	0.000

Problem 393	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	160	4027	222	879	0	1588	-1
N.S.	1	1.00	1.07	27.03	1.49	5.90	0.00	10.66	-0.01
time (sec)	N/A	0.261	0.164	0.271	0.291	0.356	0.000	2.484	0.000

Problem 394	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	160	4027	222	881	0	1588	-1
N.S.	1	1.00	1.07	27.03	1.49	5.91	0.00	10.66	-0.01
time (sec)	N/A	0.240	0.158	0.262	0.290	0.379	0.000	1.955	0.000

Problem 395	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	129	693	172	166	299	210	-1
N.S.	1	1.00	0.85	4.56	1.13	1.09	1.97	1.38	-0.01
time (sec)	N/A	0.119	0.188	0.162	0.290	0.350	7.273	2.321	0.000

Problem 396	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	160	4027	0	844	338	0	-1
N.S.	1	1.00	0.84	21.08	0.00	4.42	1.77	0.00	-0.01
time (sec)	N/A	0.264	0.158	0.322	0.000	0.347	75.877	0.000	0.000

Problem 397	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	160	4027	0	843	0	0	-1
N.S.	1	1.00	0.84	21.08	0.00	4.41	0.00	0.00	-0.01
time (sec)	N/A	0.267	0.159	0.321	0.000	0.379	0.000	0.000	0.000

Problem 398	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	151	151	164	4031	228	880	0	1588	-1
N.S.	1	1.00	1.09	26.70	1.51	5.83	0.00	10.52	-0.01
time (sec)	N/A	0.263	0.159	0.287	0.289	0.372	0.000	1.880	0.000

Problem 399	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	159	4027	224	879	0	1588	-1
N.S.	1	1.00	1.07	27.21	1.51	5.94	0.00	10.73	-0.01
time (sec)	N/A	0.259	0.159	0.275	0.284	0.371	0.000	3.264	0.000

Problem 400	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	169	149	4023	220	838	325	374	-1
N.S.	1	1.00	0.88	23.80	1.30	4.96	1.92	2.21	-0.01
time (sec)	N/A	0.069	0.140	0.266	0.286	0.345	9.525	3.313	0.000

Problem 401	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	179	179	157	4031	0	830	304	0	-1
N.S.	1	1.00	0.88	22.52	0.00	4.64	1.70	0.00	-0.01
time (sec)	N/A	0.270	0.161	0.310	0.000	0.371	27.799	0.000	0.000

Problem 402	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	159	4027	0	843	338	0	-1
N.S.	1	1.00	0.83	21.08	0.00	4.41	1.77	0.00	-0.01
time (sec)	N/A	0.270	0.156	0.325	0.000	0.354	88.388	0.000	0.000

Problem 403	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	183	164	4031	0	844	0	0	-1
N.S.	1	1.00	0.90	22.03	0.00	4.61	0.00	0.00	-0.01
time (sec)	N/A	0.278	0.157	0.341	0.000	0.366	0.000	0.000	0.000

Problem 404	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	183	183	164	4031	0	844	0	0	-1
N.S.	1	1.00	0.90	22.03	0.00	4.61	0.00	0.00	-0.01
time (sec)	N/A	0.281	0.157	0.319	0.000	0.366	0.000	0.000	0.000

Problem 405	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F(-2)	B	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	160	4027	0	844	0	0	-1
N.S.	1	1.00	0.84	21.08	0.00	4.42	0.00	0.00	-0.01
time (sec)	N/A	0.283	0.161	0.330	0.000	0.370	0.000	0.000	0.000

Problem 406	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	87	0	0	0	0	0	-1
N.S.	1	0.00	3.35	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.044	0.072	0.048	0.000	0.000	0.000	0.000	0.000

Problem 407	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	0	87	0	0	0	0	0	-1
N.S.	1	0.00	3.62	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.028	0.066	0.046	0.000	0.000	0.000	0.000	0.000

Problem 408	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	A	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	108	451	0	96	452	0	-1
N.S.	1	1.00	2.00	8.35	0.00	1.78	8.37	0.00	-0.02
time (sec)	N/A	0.053	0.072	0.154	0.000	0.364	194.899	0.000	0.000

Problem 409	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	86	0	0	0	0	0	-1
N.S.	1	0.00	3.31	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.044	0.065	0.054	0.000	0.000	0.000	0.000	0.000

Problem 410	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	87	0	0	0	0	0	-1
N.S.	1	0.00	3.35	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.044	0.067	0.046	0.000	0.000	0.000	0.000	0.000

Problem 411	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	0	69	0	0	0	0	0	-1
N.S.	1	0.00	3.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.012	0.052	0.044	0.000	0.000	0.000	0.000	0.000

Problem 412	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	83	0	0	0	0	0	-1
N.S.	1	0.00	3.19	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.043	0.065	0.051	0.000	0.000	0.000	0.000	0.000

Problem 413	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	140	0	0	0	0	0	-1
N.S.	1	0.00	5.38	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.044	0.162	0.052	0.000	0.000	0.000	0.000	0.000

Problem 414	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	0	140	0	0	0	0	0	-1
N.S.	1	0.00	5.83	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.027	0.149	0.048	0.000	0.000	0.000	0.000	0.000

Problem 415	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	A	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	132	715	0	229	360	0	-1
N.S.	1	1.00	1.29	7.01	0.00	2.25	3.53	0.00	-0.01
time (sec)	N/A	0.161	0.206	0.164	0.000	0.335	206.756	0.000	0.000

Problem 416	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	139	0	0	0	0	0	-1
N.S.	1	0.00	5.35	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.044	0.150	0.051	0.000	0.000	0.000	0.000	0.000

Problem 417	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	140	0	0	0	0	0	-1
N.S.	1	0.00	5.38	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.043	0.152	0.055	0.000	0.000	0.000	0.000	0.000

Problem 418	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	0	161	0	0	0	0	0	-1
N.S.	1	0.00	7.00	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.012	1.975	0.046	0.000	0.000	0.000	0.000	0.000

Problem 419	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	0	135	0	0	0	0	0	-1
N.S.	1	0.00	5.19	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.042	0.130	0.051	0.000	0.000	0.000	0.000	0.000

Problem 420	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	A	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	37	31	0	45	0	0	-1
N.S.	1	1.00	1.00	0.84	0.00	1.22	0.00	0.00	-0.03
time (sec)	N/A	0.101	0.015	0.180	0.000	0.371	0.000	0.000	0.000

Problem 421	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	152	152	129	693	172	166	299	210	-1
N.S.	1	1.00	0.85	4.56	1.13	1.09	1.97	1.38	-0.01
time (sec)	N/A	0.117	0.195	0.091	0.283	0.358	6.459	1.933	0.000

Problem 422	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	87	487	114	116	216	140	-1
N.S.	1	1.00	0.84	4.68	1.10	1.12	2.08	1.35	-0.01
time (sec)	N/A	0.089	0.137	0.090	0.281	0.353	5.312	4.446	0.000

Problem 423	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	51	278	56	69	131	69	-1
N.S.	1	1.00	0.96	5.25	1.06	1.30	2.47	1.30	-0.02
time (sec)	N/A	0.060	0.050	0.027	0.282	0.352	5.408	2.736	0.000

Problem 424	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	A	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	108	451	0	96	452	0	-1
N.S.	1	1.00	2.00	8.35	0.00	1.78	8.37	0.00	-0.02
time (sec)	N/A	0.055	0.058	0.116	0.000	0.349	209.778	0.000	0.000

Problem 425	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	A	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	132	715	0	229	360	0	-1
N.S.	1	1.00	1.29	7.01	0.00	2.25	3.53	0.00	-0.01
time (sec)	N/A	0.164	0.177	0.109	0.000	0.357	216.369	0.000	0.000

Problem 426	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	169	169	170	1012	0	411	0	0	-1
N.S.	1	1.00	1.01	5.99	0.00	2.43	0.00	0.00	-0.01
time (sec)	N/A	0.288	0.136	0.174	0.000	0.347	0.000	0.000	0.000

Problem 427	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	245	245	262	3984	391	500	588	634	-1
N.S.	1	1.00	1.07	16.26	1.60	2.04	2.40	2.59	-0.00
time (sec)	N/A	0.211	0.285	0.330	0.288	0.392	16.580	3.748	0.000

Problem 428	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	178	2844	259	346	408	421	-1
N.S.	1	1.00	1.11	17.66	1.61	2.15	2.53	2.61	-0.01
time (sec)	N/A	0.172	0.218	0.284	0.289	0.359	15.605	4.835	0.000

Problem 429	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	114	1712	131	200	245	219	-1
N.S.	1	1.00	1.42	21.40	1.64	2.50	3.06	2.74	-0.01
time (sec)	N/A	0.098	0.093	0.179	0.283	0.361	12.865	6.289	0.000

Problem 430	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	F	B	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	270	3012	0	232	0	0	-1
N.S.	1	1.00	2.87	32.04	0.00	2.47	0.00	0.00	-0.01
time (sec)	N/A	0.090	0.175	0.178	0.000	0.389	0.000	0.000	0.000

Problem 431	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	B	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	182	182	397	0	0	631	0	0	-1
N.S.	1	1.00	2.18	0.00	0.00	3.47	0.00	0.00	-0.01
time (sec)	N/A	0.287	0.232	0.046	0.000	0.357	0.000	0.000	0.000

Problem 432	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	267	267	459	0	0	1162	0	0	-1
N.S.	1	1.00	1.72	0.00	0.00	4.35	0.00	0.00	-0.00
time (sec)	N/A	0.611	0.358	0.046	0.000	0.392	0.000	0.000	0.000

Problem 433	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F(-2)	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	327	327	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.340	0.326	0.044	0.000	0.000	0.000	0.000	0.000

Problem 434	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	284	284	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.277	0.253	0.042	0.000	0.000	0.000	0.000	0.000

Problem 435	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	240	240	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.232	0.192	0.042	0.000	0.000	0.000	0.000	0.000

Problem 436	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	174	174	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.190	0.074	0.043	0.000	0.000	0.000	0.000	0.000

Problem 437	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	225	225	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.241	0.165	0.043	0.000	0.000	0.000	0.000	0.000

Problem 438	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	271	271	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.293	0.204	0.043	0.000	0.000	0.000	0.000	0.000

Problem 439	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	314	314	0	0	0	0	0	0	-1
N.S.	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.331	0.235	0.044	0.000	0.000	0.000	0.000	0.000

Problem 440	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	F(-2)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	233	233	187	22706	331	4049	0	766	-1
N.S.	1	1.00	0.80	97.45	1.42	17.38	0.00	3.29	-0.00
time (sec)	N/A	1.894	0.346	1.367	0.322	0.441	0.000	4.592	0.000

Problem 441	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	139	8737	234	1610	29667	528	-1
N.S.	1	1.00	0.84	52.95	1.42	9.76	179.80	3.20	-0.01
time (sec)	N/A	0.132	0.184	0.607	0.304	0.386	56.394	2.743	0.000

Problem 442	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	89	2152	137	406	4223	291	-1
N.S.	1	1.00	0.92	22.19	1.41	4.19	43.54	3.00	-0.01
time (sec)	N/A	0.071	0.098	0.216	0.308	0.355	17.937	2.964	0.000

Problem 443	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	371	57	52	141	95	-1
N.S.	1	1.00	0.70	8.07	1.24	1.13	3.07	2.07	-0.02
time (sec)	N/A	0.012	0.010	0.019	0.295	0.372	5.072	2.534	0.000

Problem 444	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	0	111	0	0	0	0	0	-1
N.S.	1	0.00	3.96	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.048	0.089	0.068	0.000	0.000	0.000	0.000	0.000

Problem 445	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	A
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	0	177	0	0	0	0	0	-1
N.S.	1	0.00	6.32	0.00	0.00	0.00	0.00	0.00	-0.04
time (sec)	N/A	0.048	0.246	0.053	0.000	0.000	0.000	0.000	0.000

Problem 446	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	143	0	0	0	0	0	-1
N.S.	1	1.00	1.40	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.031	0.432	0.090	0.000	0.000	0.000	0.000	0.000

Problem 447	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	98	0	0	0	0	0	-1
N.S.	1	1.00	0.82	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.095	0.214	0.127	0.000	0.000	0.000	0.000	0.000

Problem 448	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	480	480	408	0	0	0	0	0	-1
N.S.	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.454	1.522	0.104	0.000	0.000	0.000	0.000	0.000

Problem 449	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	350	350	304	0	0	0	0	0	-1
N.S.	1	1.00	0.87	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.290	0.768	0.103	0.000	0.000	0.000	0.000	0.000

Problem 450	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	220	220	200	0	0	0	0	0	-1
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.174	0.327	0.092	0.000	0.000	0.000	0.000	0.000

Problem 451	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	107	0	0	0	0	0	-1
N.S.	1	1.00	1.01	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.046	0.055	0.023	0.000	0.000	0.000	0.000	0.000

Problem 452	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	30	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03
time (sec)	N/A	0.066	2.069	0.121	0.000	0.000	0.000	0.000	0.000

Problem 453	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	A	F(-1)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	30	0	0	0	0	0	0	0	-1
N.S.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03
time (sec)	N/A	0.065	2.322	0.121	0.000	0.000	0.000	0.000	0.000

Problem 454	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	108	624	210	213	908	252	174
N.S.	1	1.00	0.94	5.43	1.83	1.85	7.90	2.19	1.51
time (sec)	N/A	0.069	0.134	0.166	0.297	0.357	3.109	3.476	4.002

Problem 455	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	202	202	244	2163	0	0	0	0	-1
N.S.	1	1.00	1.21	10.71	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.220	0.169	0.198	0.000	0.000	0.000	0.000	0.000

Problem 456	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	295	295	339	11535	0	0	0	0	-1
N.S.	1	1.00	1.15	39.10	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.332	0.260	0.369	0.000	0.000	0.000	0.000	0.000

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is given. The larger this ratio is, the harder the integral was to solve. In this test, problem number [309] had the largest ratio of [33]

Table 2.1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	4	3	1.00	19	0.158
2	A	4	3	1.00	19	0.158
3	A	4	3	1.00	17	0.176
4	A	2	1	1.00	16	0.062
5	A	4	3	1.00	19	0.158
6	A	4	4	1.04	19	0.210
7	A	4	4	1.00	19	0.210
8	A	4	3	1.00	19	0.158
9	A	4	4	1.00	21	0.190
10	A	4	4	1.00	21	0.190
11	A	4	4	1.00	19	0.210
12	A	4	4	1.00	18	0.222
13	A	3	3	1.00	21	0.143
14	A	3	3	1.00	21	0.143
15	A	4	4	1.00	21	0.190
16	A	4	4	1.00	21	0.190
17	A	4	4	1.00	21	0.190
18	A	4	4	1.00	21	0.190
19	A	4	4	1.00	21	0.190
20	A	4	4	1.00	21	0.190
21	A	5	4	1.00	19	0.210
22	A	4	4	1.00	18	0.222
23	A	4	3	1.00	21	0.143
24	A	3	3	1.00	21	0.143
25	A	3	3	1.00	21	0.143

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
26	A	5	4	1.00	21	0.190
27	A	4	4	1.00	21	0.190
28	A	5	6	1.00	21	0.286
29	A	4	4	1.00	21	0.190
30	A	4	4	1.00	21	0.190
31	A	8	6	1.00	21	0.286
32	A	7	6	1.00	21	0.286
33	A	6	5	1.00	19	0.263
34	A	2	2	1.00	18	0.111
35	A	2	2	1.00	21	0.095
36	A	4	4	1.00	21	0.190
37	A	6	4	1.00	21	0.190
38	A	8	4	1.00	21	0.190
39	A	8	7	1.00	21	0.333
40	A	7	6	1.09	21	0.286
41	A	3	3	1.00	19	0.158
42	A	2	2	1.00	18	0.111
43	A	5	5	1.00	21	0.238
44	A	7	7	1.00	21	0.333
45	A	8	7	1.00	21	0.333
46	A	8	6	1.00	21	0.286
47	A	4	3	1.00	21	0.143
48	A	3	2	1.00	19	0.105
49	A	3	2	1.00	18	0.111
50	A	9	7	1.00	21	0.333
51	A	10	8	1.00	21	0.381
52	A	11	8	1.00	21	0.381
53	A	10	7	1.00	21	0.333
54	A	9	6	1.00	21	0.286
55	A	5	3	1.00	21	0.143
56	A	3	2	1.00	21	0.095
57	A	4	4	1.00	19	0.210
58	A	3	2	1.00	18	0.111
59	A	13	7	1.00	21	0.333
60	A	13	8	1.00	21	0.381

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
61	A	14	8	1.00	21	0.381
62	A	13	7	1.00	21	0.333
63	A	12	6	1.00	21	0.286
64	A	8	3	1.00	21	0.143
65	A	3	2	1.00	21	0.095
66	A	5	6	1.00	21	0.286
67	A	4	4	1.00	21	0.190
68	A	4	4	1.00	21	0.190
69	A	4	4	1.00	19	0.210
70	A	3	2	1.00	18	0.111
71	A	25	7	1.00	21	0.333
72	A	22	8	1.00	21	0.381
73	A	23	8	1.00	21	0.381
74	A	1	1	1.00	13	0.077
75	A	1	1	1.00	14	0.071
76	A	6	3	1.00	21	0.143
77	A	6	3	1.00	19	0.158
78	A	7	5	1.00	18	0.278
79	A	6	5	1.00	21	0.238
80	A	6	5	1.00	21	0.238
81	A	6	3	1.00	21	0.143
82	A	6	3	1.00	21	0.143
83	A	6	3	1.00	21	0.143
84	A	8	3	1.00	23	0.130
85	A	8	3	1.00	21	0.143
86	A	5	4	1.00	20	0.200
87	A	14	8	1.00	23	0.348
88	A	9	7	1.00	23	0.304
89	A	8	5	1.00	23	0.217
90	A	8	3	1.00	23	0.130
91	A	8	3	1.00	23	0.130
92	A	12	8	1.00	23	0.348
93	A	10	8	1.00	23	0.348
94	A	8	6	1.00	21	0.286
95	A	3	3	1.00	20	0.150

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
96	A	3	3	1.00	23	0.130
97	A	6	6	1.00	23	0.261
98	A	9	6	1.00	23	0.261
99	A	12	6	1.00	23	0.261
100	A	13	10	1.00	23	0.435
101	A	11	8	1.00	23	0.348
102	A	8	6	1.00	21	0.286
103	A	3	3	1.00	20	0.150
104	A	7	7	1.00	23	0.304
105	A	10	9	1.00	23	0.391
106	A	12	9	1.00	23	0.391
107	A	17	13	1.10	23	0.565
108	A	14	11	1.13	23	0.478
109	A	4	4	1.00	21	0.190
110	A	6	6	1.00	20	0.300
111	A	14	10	1.04	23	0.435
112	A	16	13	1.04	23	0.565
113	A	27	14	1.08	23	0.609
114	A	24	12	1.09	23	0.522
115	A	5	4	1.00	23	0.174
116	A	8	7	1.06	21	0.333
117	A	10	7	1.00	20	0.350
118	A	25	11	1.03	23	0.478
119	A	26	14	1.03	23	0.609
120	A	8	7	1.47	13	0.538
121	A	4	4	1.00	23	0.174
122	A	9	7	1.00	23	0.304
123	A	18	9	1.13	23	0.391
124	A	10	7	1.00	20	0.350
125	A	14	7	1.00	22	0.318
126	A	18	7	1.00	22	0.318
127	A	0	0	0.00	0	0.000
128	A	0	0	0.00	0	0.000
129	A	0	0	0.00	0	0.000
130	A	8	7	1.00	23	0.304

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
131	A	6	6	1.00	23	0.261
132	A	7	7	1.00	21	0.333
133	A	5	4	1.00	20	0.200
134	A	12	11	1.00	23	0.478
135	A	11	9	1.00	23	0.391
136	A	16	11	1.00	23	0.478
137	A	9	7	1.00	23	0.304
138	A	6	6	1.00	23	0.261
139	A	8	7	1.00	21	0.333
140	A	6	4	1.00	20	0.200
141	A	18	11	1.00	23	0.478
142	A	14	10	1.00	23	0.435
143	A	16	11	1.00	23	0.478
144	A	7	7	1.00	23	0.304
145	A	6	6	1.00	23	0.261
146	A	6	7	1.00	21	0.333
147	A	4	4	1.00	20	0.200
148	A	7	8	1.00	23	0.348
149	A	11	10	1.00	23	0.435
150	A	16	11	1.00	23	0.478
151	A	6	6	1.00	23	0.261
152	A	6	6	1.00	23	0.261
153	A	5	6	1.00	21	0.286
154	A	3	3	1.00	20	0.150
155	A	11	10	1.00	23	0.435
156	A	15	13	1.00	23	0.565
157	A	0	0	0.00	0	0.000
158	A	0	0	0.00	0	0.000
159	A	0	0	0.00	0	0.000
160	A	0	0	0.00	0	0.000
161	A	0	0	0.00	0	0.000
162	A	3	3	1.00	23	0.130
163	A	4	4	1.00	23	0.174
164	A	3	2	1.00	21	0.095
165	A	1	1	1.00	16	0.062

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
166	A	0	0	0.00	0	0.000
167	A	0	0	0.00	0	0.000
168	A	0	0	0.00	0	0.000
169	A	2	2	1.00	14	0.143
170	A	0	0	0.00	0	0.000
171	A	2	2	1.00	21	0.095
172	A	2	2	1.00	21	0.095
173	A	4	3	1.00	19	0.158
174	A	4	4	1.00	21	0.190
175	A	3	3	1.04	21	0.143
176	A	4	3	1.00	21	0.143
177	A	2	2	1.00	21	0.095
178	A	2	2	1.00	21	0.095
179	A	2	1	1.00	18	0.056
180	A	2	2	1.00	21	0.095
181	A	4	3	1.00	21	0.143
182	A	4	3	1.00	21	0.143
183	A	4	5	1.00	23	0.217
184	A	4	5	1.00	23	0.217
185	A	5	5	1.00	21	0.238
186	A	3	4	1.00	23	0.174
187	A	7	6	1.00	23	0.261
188	A	5	5	1.00	23	0.217
189	A	2	2	1.00	23	0.087
190	A	2	2	1.00	23	0.087
191	A	2	2	1.00	20	0.100
192	A	2	2	1.00	23	0.087
193	A	2	2	1.00	23	0.087
194	A	4	4	1.00	23	0.174
195	A	4	4	1.00	23	0.174
196	A	4	5	1.00	23	0.217
197	A	6	6	1.00	23	0.261
198	A	5	5	1.00	21	0.238
199	A	5	5	1.00	23	0.217
200	A	7	6	1.00	23	0.261

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
201	A	7	6	1.00	23	0.261
202	A	2	2	1.00	23	0.087
203	A	2	2	1.00	23	0.087
204	A	2	2	1.00	20	0.100
205	A	2	2	1.00	23	0.087
206	A	3	3	1.00	23	0.130
207	A	2	2	1.00	23	0.087
208	A	4	4	1.00	23	0.174
209	A	4	4	1.00	23	0.174
210	A	6	6	1.00	23	0.261
211	A	5	6	1.00	23	0.261
212	A	2	2	1.00	21	0.095
213	A	2	2	1.00	23	0.087
214	A	4	4	1.00	23	0.174
215	A	6	4	1.00	23	0.174
216	A	10	9	1.00	23	0.391
217	A	9	8	1.00	23	0.348
218	A	5	5	1.00	20	0.250
219	A	7	7	1.00	23	0.304
220	A	9	7	1.00	23	0.304
221	A	7	8	1.00	23	0.348
222	A	6	7	1.00	23	0.304
223	A	2	2	1.00	21	0.095
224	A	3	3	1.00	23	0.130
225	A	5	5	1.00	23	0.217
226	A	16	10	1.00	23	0.435
227	A	14	8	1.00	23	0.348
228	A	7	6	1.00	20	0.300
229	A	8	8	1.00	23	0.348
230	A	10	8	1.00	23	0.348
231	A	10	9	1.00	23	0.391
232	A	4	3	1.00	23	0.130
233	A	4	3	1.00	21	0.143
234	A	4	3	1.00	23	0.130
235	A	6	5	1.00	23	0.217

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
236	A	24	9	1.00	23	0.391
237	A	19	9	1.00	23	0.391
238	A	10	7	1.00	20	0.350
239	A	9	8	1.00	23	0.348
240	A	11	8	1.00	23	0.348
241	A	2	2	1.00	18	0.111
242	A	2	2	1.00	19	0.105
243	A	2	3	1.00	12	0.250
244	A	4	4	1.00	10	0.400
245	A	3	4	1.00	19	0.210
246	A	3	4	1.00	21	0.190
247	A	16	6	1.00	22	0.273
248	A	20	6	1.00	22	0.273
249	A	0	0	0.00	0	0.000
250	A	0	0	0.00	0	0.000
251	A	7	8	1.00	25	0.320
252	A	8	9	1.00	25	0.360
253	A	6	5	1.00	23	0.217
254	A	12	9	1.00	25	0.360
255	A	14	11	1.00	25	0.440
256	A	19	13	1.00	25	0.520
257	A	11	12	1.00	25	0.480
258	A	11	11	1.00	22	0.500
259	A	11	10	1.00	25	0.400
260	A	5	4	1.00	25	0.160
261	A	7	8	1.00	25	0.320
262	A	8	9	1.00	25	0.360
263	A	7	8	1.00	25	0.320
264	A	9	9	1.00	25	0.360
265	A	7	5	1.00	23	0.217
266	A	17	9	1.00	25	0.360
267	A	18	12	1.00	25	0.480
268	A	19	13	1.00	25	0.520
269	A	16	11	1.00	22	0.500
270	A	14	12	1.00	25	0.480

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
271	A	11	10	1.00	25	0.400
272	A	6	4	1.00	25	0.160
273	A	8	8	1.00	25	0.320
274	A	9	9	1.00	25	0.360
275	A	6	5	1.00	13	0.385
276	A	7	8	1.00	25	0.320
277	A	7	9	1.00	25	0.360
278	A	5	5	1.00	23	0.217
279	A	8	9	1.00	25	0.360
280	A	14	12	1.00	25	0.480
281	A	12	12	1.00	25	0.480
282	A	7	7	1.00	22	0.318
283	A	4	4	1.00	25	0.160
284	A	6	8	1.00	25	0.320
285	A	7	9	1.00	25	0.360
286	A	7	8	1.00	25	0.320
287	A	7	8	1.00	25	0.320
288	A	6	8	1.00	25	0.320
289	A	4	4	1.00	23	0.174
290	A	11	9	1.00	25	0.360
291	A	12	12	1.00	25	0.480
292	A	11	11	1.00	25	0.440
293	A	3	3	1.00	22	0.136
294	A	5	7	1.00	25	0.280
295	A	6	8	1.00	25	0.320
296	A	8	10	1.00	25	0.400
297	A	9	8	1.00	25	0.320
298	A	7	8	1.00	25	0.320
299	A	6	8	1.00	25	0.320
300	A	5	5	1.00	23	0.217
301	A	15	9	1.00	25	0.360
302	A	13	14	1.00	25	0.560
303	A	12	13	1.00	25	0.520
304	A	11	11	1.00	25	0.440
305	A	4	4	1.00	25	0.160

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
306	A	5	5	1.00	22	0.227
307	A	6	9	1.00	25	0.360
308	A	7	10	1.00	25	0.400
309	A	8	10	1.00	33	0.303
310	A	6	6	1.00	31	0.194
311	A	8	9	1.00	33	0.273
312	A	13	11	1.00	33	0.333
313	A	12	12	1.00	33	0.364
314	A	7	7	1.00	30	0.233
315	A	4	4	1.00	33	0.121
316	A	6	8	1.00	33	0.242
317	A	5	5	1.00	13	0.385
318	A	3	3	1.00	25	0.120
319	A	4	4	1.00	25	0.160
320	A	3	2	1.00	23	0.087
321	A	1	1	1.00	16	0.062
322	A	0	0	0.00	0	0.000
323	A	0	0	0.00	0	0.000
324	A	26	6	1.00	22	0.273
325	A	20	6	1.00	22	0.273
326	A	14	11	1.00	20	0.550
327	A	0	0	0.00	0	0.000
328	A	0	0	0.00	0	0.000
329	A	9	7	1.00	23	0.304
330	A	8	7	1.00	23	0.304
331	A	7	7	1.00	21	0.333
332	A	6	6	1.00	20	0.300
333	A	3	3	1.00	23	0.130
334	A	2	2	1.00	23	0.087
335	A	6	7	1.00	23	0.304
336	A	7	7	1.00	23	0.304
337	A	9	7	1.00	21	0.333
338	A	8	7	1.00	21	0.333
339	A	7	7	1.00	19	0.368
340	A	6	6	1.00	18	0.333

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
341	A	3	3	1.00	21	0.143
342	A	2	2	1.00	21	0.095
343	A	6	7	1.00	21	0.333
344	A	7	7	1.00	21	0.333
345	A	2	2	1.00	22	0.091
346	A	2	2	1.00	23	0.087
347	A	2	2	1.00	25	0.080
348	A	4	4	1.00	18	0.222
349	A	4	4	1.00	18	0.222
350	A	3	3	1.00	22	0.136
351	A	5	4	1.00	27	0.148
352	A	5	4	1.00	27	0.148
353	A	5	4	1.26	25	0.160
354	A	1	1	1.00	18	0.056
355	A	3	3	1.00	27	0.111
356	A	3	3	1.00	27	0.111
357	A	5	4	1.00	27	0.148
358	A	5	4	1.00	27	0.148
359	A	7	7	1.00	29	0.241
360	A	7	8	1.00	29	0.276
361	A	7	8	1.00	27	0.296
362	A	2	2	1.00	20	0.100
363	A	4	4	1.00	29	0.138
364	A	4	4	1.00	29	0.138
365	A	7	7	1.00	29	0.241
366	A	12	9	1.00	29	0.310
367	A	4	3	1.00	21	0.143
368	A	4	3	1.00	21	0.143
369	A	4	3	1.00	19	0.158
370	A	4	4	1.00	21	0.190
371	A	2	2	1.00	21	0.095
372	A	2	2	1.00	21	0.095
373	A	4	3	1.00	21	0.143
374	A	4	3	1.00	21	0.143
375	A	3	2	1.00	18	0.111

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
376	A	4	3	1.00	21	0.143
377	A	2	2	1.00	21	0.095
378	A	2	2	1.00	21	0.095
379	A	4	4	1.00	23	0.174
380	A	4	4	1.00	23	0.174
381	A	4	4	1.00	21	0.190
382	A	5	6	1.00	23	0.261
383	A	4	4	1.00	23	0.174
384	A	4	4	1.00	23	0.174
385	A	4	4	1.00	23	0.174
386	A	4	4	1.00	23	0.174
387	A	2	2	1.00	20	0.100
388	A	3	3	1.00	23	0.130
389	A	4	4	1.00	23	0.174
390	A	4	4	1.00	23	0.174
391	A	4	4	1.00	23	0.174
392	A	4	4	1.00	23	0.174
393	A	4	4	1.00	23	0.174
394	A	4	4	1.00	21	0.190
395	A	5	6	1.00	23	0.261
396	A	4	4	1.00	23	0.174
397	A	4	4	1.00	23	0.174
398	A	4	4	1.00	23	0.174
399	A	4	4	1.00	23	0.174
400	A	2	2	1.00	20	0.100
401	A	3	3	1.00	23	0.130
402	A	4	4	1.00	23	0.174
403	A	4	4	1.00	23	0.174
404	A	4	4	1.00	23	0.174
405	A	4	4	1.00	23	0.174
406	A	0	0	0.00	0	0.000
407	A	0	0	0.00	0	0.000
408	A	2	2	1.00	23	0.087
409	A	0	0	0.00	0	0.000
410	A	0	0	0.00	0	0.000

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
411	A	0	0	0.00	0	0.000
412	A	0	0	0.00	0	0.000
413	A	0	0	0.00	0	0.000
414	A	0	0	0.00	0	0.000
415	A	5	5	1.00	23	0.217
416	A	0	0	0.00	0	0.000
417	A	0	0	0.00	0	0.000
418	A	0	0	0.00	0	0.000
419	A	0	0	0.00	0	0.000
420	A	4	4	1.00	25	0.160
421	A	5	6	1.00	23	0.261
422	A	5	6	1.00	23	0.261
423	A	4	4	1.00	21	0.190
424	A	2	2	1.00	23	0.087
425	A	5	5	1.00	23	0.217
426	A	10	8	1.00	23	0.348
427	A	10	5	1.00	25	0.200
428	A	8	5	1.00	25	0.200
429	A	6	5	1.00	23	0.217
430	A	3	3	1.00	25	0.120
431	A	7	6	1.00	25	0.240
432	A	14	8	1.00	25	0.320
433	A	23	9	1.00	25	0.360
434	A	17	9	1.00	25	0.360
435	A	12	9	1.00	25	0.360
436	A	8	9	1.00	25	0.360
437	A	11	9	1.00	25	0.360
438	A	15	9	1.00	25	0.360
439	A	20	9	1.00	25	0.360
440	A	9	5	1.00	25	0.200
441	A	7	5	1.00	25	0.200
442	A	5	4	1.00	23	0.174
443	A	1	1	1.00	16	0.062
444	A	0	0	0.00	0	0.000
445	A	0	0	0.00	0	0.000

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
446	A	3	3	1.00	26	0.115
447	A	3	3	1.00	32	0.094
448	A	13	4	1.00	27	0.148
449	A	10	4	1.00	27	0.148
450	A	7	4	1.00	25	0.160
451	A	2	2	1.00	18	0.111
452	A	0	0	0.00	0	0.000
453	A	0	0	0.00	0	0.000
454	A	3	2	1.00	23	0.087
455	A	8	7	1.00	25	0.280
456	A	11	9	1.00	25	0.360

Chapter 3

Listing of integrals

Local contents

3.1 $\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=48

$$-\frac{1}{16}bdnx^4-\frac{1}{25}benx^5+\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/16*b*d*n*x^4-1/25*b*e*n*x^5+1/20*(4*e*x^5+5*d*x^4)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.04, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}=0.158$, Rules used = {45, 2371, 12}

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{16}bdnx^4-\frac{1}{25}benx^5$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d*n*x^4) - (b*e*n*x^5)/25 + ((5*d*x^4 + 4*e*x^5)*(a + b*Log[c*x^n]
))/20
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{20}x^3(5d+4ex)\,dx\\ &= \frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}(bn)\int x^3(5d+4ex)\,dx\\ &= \frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}(bn)\int\left(5dx^3+4ex^4\right)\,dx\\ &= -\frac{1}{16}bdnx^4-\frac{1}{25}benx^5+\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)\end{aligned}$$

Mathematica [A]
time = 0.02, size = 48, normalized size = 1.00

$$\frac{1}{400}x^4(20a(5d+4ex)-bn(25d+16ex)+20b(5d+4ex)\log\left(cx^n\right))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x)*(a + b*Log[c*x^n]),x]
[Out] (x^4*(20*a*(5*d + 4*e*x) - b*n*(25*d + 16*e*x) + 20*b*(5*d + 4*e*x)*Log[c*x
^n]))/400
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.04, size = 264, normalized size = 5.50

method	result
risch	$\frac{b\,x^4(4ex+5d)\ln(x^n)}{20}-\frac{i\pi be\,x^5\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{10}+\frac{i\pi be\,x^5\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{10}+\frac{i\pi be\,x^5\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{10}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
[Out] 1/20*b*x^4*(4*e*x+5*d)*ln(x^n)-1/10*I*Pi*b*e*x^5*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+1/10*I*Pi*b*e*x^5*csgn(I*c)*csgn(I*c*x^n)^2+1/10*I*Pi*b*e*x^5*csg
n(I*x^n)*csgn(I*c*x^n)^2-1/10*I*Pi*b*e*x^5*csgn(I*c*x^n)^3+1/5*ln(c)*b*e*x^
5-1/25*b*e*n*x^5+1/5*x^5*a*e-1/8*I*Pi*b*d*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+1/8*I*Pi*b*d*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/8*I*Pi*b*d*x^4*csgn(I*x
^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b*d*x^4*csgn(I*c*x^n)^3+1/4*ln(c)*b*d*x^4-1/16
*b*d*n*x^4+1/4*x^4*a*d
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.25

$$-\frac{1}{25}\,bnx^5e+\frac{1}{5}\,bx^5e\log\left(cx^n\right)-\frac{1}{16}\,bdnx^4+\frac{1}{5}\,ax^5e+\frac{1}{4}\,bdx^4\log\left(cx^n\right)+\frac{1}{4}\,adx^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*n*x^5*e + 1/5*b*x^5*e*log(c*x^n) - 1/16*b*d*n*x^4 + 1/5*a*x^5*e + 1
/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4
```

Fricas [A]
time = 0.34, size = 71, normalized size = 1.48

$$-\frac{1}{25}(bn-5a)x^5e-\frac{1}{16}(bdn-4ad)x^4+\frac{1}{20}\left(4bx^5e+5bdx^4\right)\log(c)+\frac{1}{20}\left(4bnx^5e+5bdnx^4\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/25*(b*n - 5*a)*x^5*e - 1/16*(b*d*n - 4*a*d)*x^4 + 1/20*(4*b*x^5*e + 5*b*
d*x^4)*log(c) + 1/20*(4*b*n*x^5*e + 5*b*d*n*x^4)*log(x)
```

Sympy [A]
time = 0.41, size = 66, normalized size = 1.38

$$\frac{adx^4}{4}+\frac{aex^5}{5}-\frac{bdnx^4}{16}+\frac{bdx^4\log(cx^n)}{4}-\frac{benx^5}{25}+\frac{bex^5\log(cx^n)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**4/4 + a*e*x**5/5 - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 - b*e*n*x*
*5/25 + b*e*x**5*log(c*x**n)/5
```

Giac [A]
time = 1.50, size = 73, normalized size = 1.52

$$\frac{1}{5}bnx^5e\log(x)-\frac{1}{25}bnx^5e+\frac{1}{5}bx^5e\log(c)+\frac{1}{4}bdnx^4\log(x)-\frac{1}{16}bdnx^4+\frac{1}{5}ax^5e+\frac{1}{4}bdx^4\log(c)+\frac{1}{4}adx^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/5*b*n*x^5*e*log(x) - 1/25*b*n*x^5*e + 1/5*b*x^5*e*log(c) + 1/4*b*d*n*x^4*
log(x) - 1/16*b*d*n*x^4 + 1/5*a*x^5*e + 1/4*b*d*x^4*log(c) + 1/4*a*d*x^4
```

Mupad [B]
time = 3.64, size = 51, normalized size = 1.06

$$\ln(c\,x^n)\left(\frac{b\,e\,x^5}{5}+\frac{b\,d\,x^4}{4}\right)+\frac{d\,x^4\,(4\,a-b\,n)}{16}+\frac{e\,x^5\,(5\,a-b\,n)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a + b*log(c*x^n))*(d + e*x),x)
```

```
[Out] log(c*x^n)*((b*d*x^4)/4 + (b*e*x^5)/5) + (d*x^4*(4*a - b*n))/16 + (e*x^5*(5
*a - b*n))/25
```

3.2 $\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=48

$$-\frac{1}{9}bdnx^3-\frac{1}{16}benx^4+\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/9*b*d*n*x^3-1/16*b*e*n*x^4+1/12*(3*e*x^4+4*d*x^3)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.04, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}=0.158$, Rules used = {45, 2371, 12}

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{9}bdnx^3-\frac{1}{16}benx^4$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d*n*x^3) - (b*e*n*x^4)/16 + ((4*d*x^3 + 3*e*x^4)*(a + b*Log[c*x^n])
)/12
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{12}x^2(4d+3ex)\,dx\\ &= \frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}(bn)\int x^2(4d+3ex)\,dx\\ &= \frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}(bn)\int\left(4dx^2+3ex^3\right)\,dx\\ &= -\frac{1}{9}bdnx^3-\frac{1}{16}benx^4+\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)\end{aligned}$$

Mathematica [**A**]
time = 0.02, size = 45, normalized size = 0.94

$$\frac{1}{144}x^3(48ad-16bdn+36aex-9benx+12b(4d+3ex)\log\left(cx^n\right))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^3*(48*a*d - 16*b*d*n + 36*a*e*x - 9*b*e*n*x + 12*b*(4*d + 3*e*x)*Log[c*x
^n]))/144
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.04, size = 264, normalized size = 5.50

method	result
risch	$\frac{b\,x^3(3ex+4d)\ln(x^n)}{12}-\frac{i\pi be\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{8}+\frac{i\pi be\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{8}+\frac{i\pi be\,x^4\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{8}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/12*b*x^3*(3*e*x+4*d)*ln(x^n)-1/8*I*Pi*b*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+1/8*I*Pi*b*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/8*I*Pi*b*e*x^4*csgn(I
*x^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b*e*x^4*csgn(I*c*x^n)^3+1/4*ln(c)*b*e*x^4-1/
16*b*e*n*x^4+1/4*x^4*a*e-1/6*I*Pi*b*d*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+1/6*I*Pi*b*d*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*d*x^3*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/6*I*Pi*b*d*x^3*csgn(I*c*x^n)^3+1/3*ln(c)*b*d*x^3-1/9*b*d*
n*x^3+1/3*x^3*a*d
```

Maxima [**A**]
time = 0.27, size = 60, normalized size = 1.25

$$-\frac{1}{16}\,bnx^4e+\frac{1}{4}\,bx^4e\log\left(cx^n\right)-\frac{1}{9}\,bdnx^3+\frac{1}{4}\,ax^4e+\frac{1}{3}\,bdx^3\log\left(cx^n\right)+\frac{1}{3}\,adx^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*n*x^4*e + 1/4*b*x^4*e*log(c*x^n) - 1/9*b*d*n*x^3 + 1/4*a*x^4*e + 1/
3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3
```

Fricas [A]
time = 0.34, size = 71, normalized size = 1.48

$$-\frac{1}{16}\,(bn-4\,a)x^4e-\frac{1}{9}\,(bdn-3\,ad)x^3+\frac{1}{12}\,\left(3\,bx^4e+4\,bdx^3\right)\log\left(c\right)+\frac{1}{12}\,\left(3\,bnx^4e+4\,bdnx^3\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/16*(b*n - 4*a)*x^4*e - 1/9*(b*d*n - 3*a*d)*x^3 + 1/12*(3*b*x^4*e + 4*b*d
*x^3)*log(c) + 1/12*(3*b*n*x^4*e + 4*b*d*n*x^3)*log(x)
```

Sympy [A]
time = 0.27, size = 66, normalized size = 1.38

$$\frac{adx^3}{3}+\frac{aex^4}{4}-\frac{bdnx^3}{9}+\frac{bdx^3\log\left(cx^n\right)}{3}-\frac{benx^4}{16}+\frac{bex^4\log\left(cx^n\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**3/3 + a*e*x**4/4 - b*d*n*x**3/9 + b*d*x**3*log(c*x**n)/3 - b*e*n*x**
4/16 + b*e*x**4*log(c*x**n)/4
```

Giac [A]
time = 2.60, size = 73, normalized size = 1.52

$$\frac{1}{4}\,bnx^4e\log\left(x\right)-\frac{1}{16}\,bnx^4e+\frac{1}{4}\,bx^4e\log\left(c\right)+\frac{1}{3}\,bdnx^3\log\left(x\right)-\frac{1}{9}\,bdnx^3+\frac{1}{4}\,ax^4e+\frac{1}{3}\,bdx^3\log\left(c\right)+\frac{1}{3}\,adx^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/4*b*n*x^4*e*log(x) - 1/16*b*n*x^4*e + 1/4*b*x^4*e*log(c) + 1/3*b*d*n*x^3*
log(x) - 1/9*b*d*n*x^3 + 1/4*a*x^4*e + 1/3*b*d*x^3*log(c) + 1/3*a*d*x^3
```

Mupad [B]
time = 3.59, size = 51, normalized size = 1.06

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^4}{4}+\frac{b\,d\,x^3}{3}\right)+\frac{d\,x^3\,\left(3\,a-b\,n\right)}{9}+\frac{e\,x^4\,\left(4\,a-b\,n\right)}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))*(d + e*x),x)
```

```
[Out] log(c*x^n)*((b*d*x^3)/3 + (b*e*x^4)/4) + (d*x^3*(3*a - b*n))/9 + (e*x^4*(4*
a - b*n))/16
```

3.3 $\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=48

$$-\frac{1}{4}bdnx^2-\frac{1}{9}benx^3+\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/4*b*d*n*x^2-1/9*b*e*n*x^3+1/6*(2*e*x^3+3*d*x^2)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.02, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}=0.176$, Rules used = {45, 2371, 12}

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bdnx^2-\frac{1}{9}benx^3$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d*n*x^2) - (b*e*n*x^3)/9 + ((3*d*x^2 + 2*e*x^3)*(a + b*Log[c*x^n]))
/6
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int \frac{1}{6}x(3d+2ex)\,dx\\ &= \frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}(bn)\int x(3d+2ex)\,dx\\ &= \frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}(bn)\int \left(3dx+2ex^2\right)\,dx\\ &= -\frac{1}{4}bdnx^2-\frac{1}{9}benx^3+\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)\end{aligned}$$

Mathematica [A]
time = 0.02, size = 48, normalized size = 1.00

$$\frac{1}{36}x^2(6a(3d+2ex)-bn(9d+4ex)+6b(3d+2ex)\log\left(cx^n\right))$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(6*a*(3*d + 2*e*x) - b*n*(9*d + 4*e*x) + 6*b*(3*d + 2*e*x)*Log[c*x^n])
)/36
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 264, normalized size = 5.50

method	result
risch	$\frac{b\,x^2(2ex+3d)\ln(x^n)}{6}-\frac{i\pi be\,x^3\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{6}+\frac{i\pi be\,x^3\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{6}+\frac{i\pi be\,x^3\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{6}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*b*x^2*(2*e*x+3*d)*ln(x^n)-1/6*I*Pi*b*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+1/6*I*Pi*b*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*e*x^3*csgn(I*
x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*e*x^3*csgn(I*c*x^n)^3+1/3*ln(c)*b*e*x^3-1/9
*b*e*n*x^3+1/3*x^3*a*e-1/4*I*Pi*b*d*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+1/4*I*Pi*b*d*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/4*I*Pi*b*d*x^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2-1/4*I*Pi*b*d*x^2*csgn(I*c*x^n)^3+1/2*ln(c)*b*d*x^2-1/4*b*d*n*
x^2+1/2*x^2*a*d
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.25

$$-\frac{1}{9}\,bnx^3e+\frac{1}{3}\,bx^3e\log\left(cx^n\right)-\frac{1}{4}\,bdnx^2+\frac{1}{3}\,ax^3e+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/9*b*n*x^3*e + 1/3*b*x^3*e*log(c*x^n) - 1/4*b*d*n*x^2 + 1/3*a*x^3*e + 1/2
*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2
```

Fricas [A]
time = 0.38, size = 71, normalized size = 1.48

$$-\frac{1}{9}(bn-3a)x^3e-\frac{1}{4}(bdn-2ad)x^2+\frac{1}{6}\left(2bx^3e+3bdx^2\right)\log(c)+\frac{1}{6}\left(2bnx^3e+3bdnx^2\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/9*(b*n - 3*a)*x^3*e - 1/4*(b*d*n - 2*a*d)*x^2 + 1/6*(2*b*x^3*e + 3*b*d*x
^2)*log(c) + 1/6*(2*b*n*x^3*e + 3*b*d*n*x^2)*log(x)
```

Sympy [A]
time = 0.19, size = 66, normalized size = 1.38

$$\frac{adx^2}{2}+\frac{aex^3}{3}-\frac{bdnx^2}{4}+\frac{bdx^2\log(cx^n)}{2}-\frac{benx^3}{9}+\frac{bex^3\log(cx^n)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**2/2 + a*e*x**3/3 - b*d*n*x**2/4 + b*d*x**2*log(c*x**n)/2 - b*e*n*x**
3/9 + b*e*x**3*log(c*x**n)/3
```

Giac [A]
time = 2.50, size = 73, normalized size = 1.52

$$\frac{1}{3}bnx^3e\log(x)-\frac{1}{9}bnx^3e+\frac{1}{3}bx^3e\log(c)+\frac{1}{2}bdnx^2\log(x)-\frac{1}{4}bdnx^2+\frac{1}{3}ax^3e+\frac{1}{2}bdx^2\log(c)+\frac{1}{2}adx^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/3*b*n*x^3*e*log(x) - 1/9*b*n*x^3*e + 1/3*b*x^3*e*log(c) + 1/2*b*d*n*x^2*l
og(x) - 1/4*b*d*n*x^2 + 1/3*a*x^3*e + 1/2*b*d*x^2*log(c) + 1/2*a*d*x^2
```

Mupad [B]
time = 3.63, size = 51, normalized size = 1.06

$$\ln(c\,x^n)\left(\frac{b\,e\,x^3}{3}+\frac{b\,d\,x^2}{2}\right)+\frac{d\,x^2\,(2\,a-b\,n)}{4}+\frac{e\,x^3\,(3\,a-b\,n)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))*(d + e*x),x)
```

```
[Out] log(c*x^n)*((b*d*x^2)/2 + (b*e*x^3)/3) + (d*x^2*(2*a - b*n))/4 + (e*x^3*(3*
a - b*n))/9
```

3.4 $\int (d+ex) (a+b\log(cx^n)) \, dx$

Optimal. Leaf size=48

$$-bdnx-\frac{1}{4}benx^2+dx(a+b\log(cx^n))+\frac{1}{2}ex^2(a+b\log(cx^n))$$

```
[Out] -b*d*n*x-1/4*b*e*n*x^2+d*x*(a+b*ln(c*x^n))+1/2*e*x^2*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.01, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {2350}

$$dx(a+b\log(cx^n))+\frac{1}{2}ex^2(a+b\log(cx^n))-bdnx-\frac{1}{4}benx^2$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d*n*x) - (b*e*n*x^2)/4 + d*x*(a + b*Log[c*x^n]) + (e*x^2*(a + b*Log[c*x
^n]))/2
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex) (a+b\log(cx^n)) \, dx &= \frac{1}{2}\left(2dx+ex^2\right) (a+b\log(cx^n))-(bn)\int \left(d+\frac{ex}{2}\right) \, dx\\ &= -bdnx-\frac{1}{4}benx^2+\frac{1}{2}\left(2dx+ex^2\right) (a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.01, size = 55, normalized size = 1.15

$$adx-bdnx+\frac{1}{2}aex^2-\frac{1}{4}benx^2+bdx\log(cx^n)+\frac{1}{2}bex^2\log(cx^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] a*d*x - b*d*n*x + (a*e*x^2)/2 - (b*e*n*x^2)/4 + b*d*x*Log[c*x^n] + (b*e*x^2
*Log[c*x^n])/2
```

Maple [A]
time = 0.07, size = 52, normalized size = 1.08

method	result
default	$xad+\frac{ae\,x^2}{2}+x\ln\left(c\,x^n\right)bd-bdnx+\frac{be\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}-\frac{ben\,x^2}{4}$
norman	$\left(-\frac{1}{4}ben+\frac{1}{2}ae\right)x^2+\left(-bdn+ad\right)x+bdx\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)+\frac{be\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}$
risch	$\frac{bx(ex+2d)\ln(x^n)}{2}-\frac{i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{4}+\frac{i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{4}+\frac{i\pi be\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{4}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] x*a*d+1/2*a*e*x^2+x*ln(c*x^n)*b*d-b*d*n*x+1/2*b*e*x^2*ln(c*exp(n*ln(x)))-1/
4*b*e*n*x^2
```

Maxima [A]
time = 0.28, size = 52, normalized size = 1.08

$$-\frac{1}{4}\,bnx^2e+\frac{1}{2}\,bx^2e\log\left(cx^n\right)-bdnx+\frac{1}{2}\,ax^2e+bdx\log\left(cx^n\right)+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/4*b*n*x^2*e + 1/2*b*x^2*e*log(c*x^n) - b*d*n*x + 1/2*a*x^2*e + b*d*x*log
(c*x^n) + a*d*x
```

Fricas [A]
time = 0.36, size = 63, normalized size = 1.31

$$-\frac{1}{4}\,(bn-2\,a)x^2e-(bdn-ad)x+\frac{1}{2}\,\left(bx^2e+2\,bdx\right)\log\left(c\right)+\frac{1}{2}\,\left(bnx^2e+2\,bdnx\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/4*(b*n - 2*a)*x^2*e - (b*d*n - a*d)*x + 1/2*(b*x^2*e + 2*b*d*x)*log(c) +
 1/2*(b*n*x^2*e + 2*b*d*n*x)*log(x)
```

Sympy [A]
time = 0.13, size = 56, normalized size = 1.17

$$adx+\frac{aex^2}{2}-bdnx+bdx\log\left(cx^n\right)-\frac{benx^2}{4}+\frac{bex^2\log\left(cx^n\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x + a*e*x**2/2 - b*d*n*x + b*d*x*log(c*x**n) - b*e*n*x**2/4 + b*e*x**2*
log(c*x**n)/2
```

Giac [A]
time = 2.08, size = 62, normalized size = 1.29

$$\frac{1}{2}\,bnx^2e\log\left(x\right)-\frac{1}{4}\,bnx^2e+\frac{1}{2}\,bx^2e\log\left(c\right)+bdnx\log\left(x\right)-bdnx+\frac{1}{2}\,ax^2e+bdx\log\left(c\right)+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/2*b*n*x^2*e*log(x) - 1/4*b*n*x^2*e + 1/2*b*x^2*e*log(c) + b*d*n*x*log(x)
- b*d*n*x + 1/2*a*x^2*e + b*d*x*log(c) + a*d*x
```

Mupad [B]
time = 3.61, size = 43, normalized size = 0.90

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{2}+b\,d\,x\right)+d\,x\,\left(a-b\,n\right)+\frac{e\,x^2\,\left(2\,a-b\,n\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))*(d + e*x),x)
```

```
[Out] log(c*x^n)*(b*d*x + (b*e*x^2)/2) + d*x*(a - b*n) + (e*x^2*(2*a - b*n))/4
```

3.5 $\int \frac{(d+ex)(a+b\log(cx^n))}{x} \, dx$

Optimal. Leaf size=44

$$aex - benx + bex\log(cx^n) + \frac{d(a+b\log(cx^n))^2}{2bn}$$

```
[Out] a*e*x-b*e*n*x+b*e*x*ln(c*x^n)+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Rubi [A]
time = 0.03, antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {2388, 2338, 2332}

$$\frac{d(a+b\log(cx^n))^2}{2bn} + aex + bex\log(cx^n) - benx$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] a*e*x - b*e*n*x + b*e*x*Log[c*x^n] + (d*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2388

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Dist[d, Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x),
 x], x] + Dist[e, Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex)(a+b\log(cx^n))}{x} \, dx &= d\int \frac{a+b\log(cx^n)}{x} \, dx + e\int (a+b\log(cx^n)) \, dx \\
&= aex + \frac{d(a+b\log(cx^n))^2}{2bn} + (be)\int \log(cx^n) \, dx \\
&= aex - benx + bex\log(cx^n) + \frac{d(a+b\log(cx^n))^2}{2bn}
\end{aligned}$$

Mathematica [A]
time = 0.00, size = 43, normalized size = 0.98

$$aex - benx + ad\log(x) + bex\log\left(cx^n\right) + \frac{bd\log^2\left(cx^n\right)}{2n}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x,x]
[Out] a*e*x - b*e*n*x + a*d*Log[x] + b*e*x*Log[c*x^n] + (b*d*Log[c*x^n]^2)/(2*n)
```

Maple [A]
time = 0.08, size = 46, normalized size = 1.05

method	result
default	$\ln(x)\,ad + aex + bex\ln\left(c\,\mathrm{e}^{n\ln(x)}\right) + \frac{bd\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2}{2n} - benx$
norman	$(-ben + ae)\,x + \frac{ad\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{n} + bex\ln\left(c\,\mathrm{e}^{n\ln(x)}\right) + \frac{bd\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2}{2n}$
risch	$(bex + bd\ln(x))\ln(x^n) - \frac{bdn\ln(x)^2}{2} - \frac{i\pi bex\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{2} + \frac{i\pi bex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{2} + \frac{i\pi bex\,\mathrm{csgn}($

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
[Out] ln(x)*a*d+a*e*x+b*e*x*ln(c*exp(n*ln(x)))+1/2*b*d/n*ln(c*exp(n*ln(x)))^2-b*e
*n*x
```

Maxima [A]
time = 0.29, size = 44, normalized size = 1.00

$$-bnxe + bxe\log\left(cx^n\right) + axe + \frac{bd\log\left(cx^n\right)^2}{2\,n} + ad\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
[Out] -b*n*x*e + b*x*e*log(c*x^n) + a*x*e + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x)
```

Fricas [A]
time = 0.34, size = 47, normalized size = 1.07

$$\frac{1}{2}\,bdn\log\left(x\right)^2 + bxe\log\left(c\right) - (bn - a)xe + (bnxe + bd\log\left(c\right) + ad)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*b*d*n*log(x)^2 + b*x*e*log(c) - (b*n - a)*x*e + (b*n*x*e + b*d*log(c) +
 a*d)*log(x)
```

Sympy [A]
time = 0.17, size = 65, normalized size = 1.48

$$\begin{cases} \frac{ad\log(cx^n)}{n} + aex + \frac{bd\log(cx^n)^2}{2n} - benx + bex\log(cx^n) & \text{for } n \neq 0 \\ (a + b\log(c))(d\log(x) + ex) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise((a*d*log(c*x**n)/n + a*e*x + b*d*log(c*x**n)**2/(2*n) - b*e*n*x +
 b*e*x*log(c*x**n), Ne(n, 0)), ((a + b*log(c))*(d*log(x) + e*x), True))
```

Giac [A]
time = 1.95, size = 49, normalized size = 1.11

$$bnxe\log(x) + \frac{1}{2}bdn\log(x)^2 - bnxe + bxe\log(c) + bd\log(c)\log(x) + axe + ad\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] b*n*x*e*log(x) + 1/2*b*d*n*log(x)^2 - b*n*x*e + b*x*e*log(c) + b*d*log(c)*l
og(x) + a*x*e + a*d*log(x)
```

Mupad [B]
time = 3.59, size = 40, normalized size = 0.91

$$a\,d\,\ln(x) + e\,x\,(a - b\,n) + b\,e\,x\,\ln(c\,x^n) + \frac{b\,d\ln(c\,x^n)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x))/x,x)
```

```
[Out] a*d*log(x) + e*x*(a - b*n) + b*e*x*log(c*x^n) + (b*d*log(c*x^n)^2)/(2*n)
```

3.6 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=48

$$-\frac{bdn}{x}-\frac{d(a+b\log(cx^n))}{x}+\frac{e(a+b\log(cx^n))^2}{2bn}$$

```
[Out] -b*d*n/x-d*(a+b*ln(c*x^n))/x+1/2*e*(a+b*ln(c*x^n))^2/b/n
```

Rubi [A]
time = 0.03, antiderivative size = 50, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {45, 2372, 14, 2338}

$$-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))-\frac{bdn}{x}-\frac{1}{2}ben\log^2(x)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d*n)/x) - (b*e*n*Log[x]^2)/2 - (d*(a + b*Log[c*x^n]))/x + e*Log[x]*(a
+ b*Log[c*x^n])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
```

```
&& EqQ[m, -1])
```

Rubi steps

$$
\begin{aligned}
\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx &= -\left(\frac{d}{x}-e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int \frac{-d+ex\log(x)}{x^2}\,dx\\
&= -\left(\frac{d}{x}-e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int \left(-\frac{d}{x^2}+\frac{e\log(x)}{x}\right)dx\\
&= -\frac{bdn}{x}-\left(\frac{d}{x}-e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-(ben)\int \frac{\log(x)}{x}\,dx\\
&= -\frac{bdn}{x}-\frac{1}{2}ben\log^2(x)-\left(\frac{d}{x}-e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)
\end{aligned}
$$

Mathematica [A]
time = 0.02, size = 48, normalized size = 1.00

$$-\frac{bdn}{x}-\frac{d\left(a+b\log\left(cx^n\right)\right)}{x}+\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^2,x]
[Out] -((b*d*n)/x) - (d*(a + b*Log[c*x^n]))/x + (e*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 250, normalized size = 5.21

method	result
risch	$-\frac{b(-ex\ln(x)+d)\ln(x^n)}{x}-\frac{i\ln(x)\pi be\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)x-i\ln(x)\pi be\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2x-i\ln(x)\pi be\,\mathrm{csgn}(ix^n)\mathrm{csgn}($

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
[Out] -b*(-e*x*ln(x)+d)/x*ln(x^n)-1/2*(I*ln(x)*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)*x-I*ln(x)*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x-I*ln(x)*Pi*b*e*csgn(I
*x^n)*csgn(I*c*x^n)^2*x+I*ln(x)*Pi*b*e*csgn(I*c*x^n)^3*x-I*Pi*b*d*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*csgn
(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d*csgn(I*c*x^n)^3+b*e*n*ln(x)^2*x-2*ln(x)*ln
(c)*b*e*x-2*ln(x)*a*e*x+2*d*b*ln(c)+2*b*d*n+2*a*d)/x
```

Maxima [A]
time = 0.28, size = 51, normalized size = 1.06

$$\frac{be\log\left(cx^{n}\right)^{2}}{2\,n}+ae\log\left(x\right)-\frac{bdn}{x}-\frac{bd\log\left(cx^{n}\right)}{x}-\frac{ad}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*b*e*log(c*x^n)^2/n + a*e*log(x) - b*d*n/x - b*d*log(c*x^n)/x - a*d/x
```

Fricas [A]
time = 0.40, size = 53, normalized size = 1.10

$$\frac{bnxe\log\left(x\right)^{2}-2\,bdn-2\,bd\log\left(c\right)-2\,ad+2\,\left(bxe\log\left(c\right)-bdn+axe\right)\log\left(x\right)}{2\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] 1/2*(b*n*x*e*log(x)^2 - 2*b*d*n - 2*b*d*log(c) - 2*a*d + 2*(b*x*e*log(c) -
b*d*n + a*x*e)*log(x))/x
```

Sympy [A]
time = 2.45, size = 53, normalized size = 1.10

$$-\frac{ad}{x}+ae\log\left(x\right)+bd\left(-\frac{n}{x}-\frac{\log\left(cx^{n}\right)}{x}\right)-be\left(\begin{cases}-\log\left(c\right)\log\left(x\right) & \text{for}\: n=0\\-\frac{\log\left(cx^{n}\right)^{2}}{2n} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] -a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewise((-log(c)*l
og(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Giac [A]
time = 2.42, size = 56, normalized size = 1.17

$$\frac{bnxe\log\left(x\right)^{2}+2\,bxe\log\left(c\right)\log\left(x\right)-2\,bdn\log\left(x\right)+2\,axe\log\left(x\right)-2\,bdn-2\,bd\log\left(c\right)-2\,ad}{2\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] 1/2*(b*n*x*e*log(x)^2 + 2*b*x*e*log(c)*log(x) - 2*b*d*n*log(x) + 2*a*x*e*lo
g(x) - 2*b*d*n - 2*b*d*log(c) - 2*a*d)/x
```

Mupad [B]
time = 3.57, size = 59, normalized size = 1.23

$$\ln(x)\,\left(a\,e+b\,e\,n\right)-\frac{a\,d+b\,d\,n}{x}-\frac{\ln\left(c\,x^n\right)\,\left(b\,d+b\,e\,x\right)}{x}+\frac{b\,e\,{\ln\left(c\,x^n\right)}^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x))/x^2,x)
```

```
[Out] log(x)*(a*e + b*e*n) - (a*d + b*d*n)/x - (log(c*x^n)*(b*d + b*e*x))/x + (b*
e*log(c*x^n)^2)/(2*n)
```

3.7 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^3} dx$

Optimal. Leaf size=60

$$-\frac{bdn}{4x^2}-\frac{ben}{x}+\frac{be^2n\log(x)}{2d}-\frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{2dx^2}$$

```
[Out] -1/4*b*d*n/x^2-b*e*n/x+1/2*b*e^2*n*ln(x)/d-1/2*(e*x+d)^2*(a+b*ln(c*x^n))/d/
x^2
```

Rubi [A]
time = 0.03, antiderivative size = 60, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {37, 2372, 12, 45}

$$-\frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{2dx^2}+\frac{be^2n\log(x)}{2d}-\frac{bdn}{4x^2}-\frac{ben}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d*n)/x^2 - (b*e*n)/x + (b*e^2*n*Log[x])/(2*d) - ((d + e*x)^2*(a + b
*Log[c*x^n]))/(2*d*x^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 37

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n + 2, 0] && NeQ[m, -
1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex)\,(a+b\log(cx^n))}{x^3}\,dx &= -\frac{(d+ex)^2\,(a+b\log(cx^n))}{2dx^2}-(bn)\int -\frac{(d+ex)^2}{2dx^3}\,dx\\
&= -\frac{(d+ex)^2\,(a+b\log(cx^n))}{2dx^2}+\frac{(bn)\int \frac{(d+ex)^2}{x^3}\,dx}{2d}\\
&= -\frac{(d+ex)^2\,(a+b\log(cx^n))}{2dx^2}+\frac{(bn)\int \left(\frac{d^2}{x^3}+\frac{2de}{x^2}+\frac{e^2}{x}\right)dx}{2d}\\
&= -\frac{bdn}{4x^2}-\frac{ben}{x}+\frac{be^2n\log(x)}{2d}-\frac{(d+ex)^2\,(a+b\log(cx^n))}{2dx^2}
\end{aligned}$$

Mathematica [A]
time = 0.02, size = 41, normalized size = 0.68

$$-\frac{2a(d+2ex)+bn(d+4ex)+2b(d+2ex)\log(cx^n)}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^3,x]
[Out] -1/4*(2*a*(d + 2*e*x) + b*n*(d + 4*e*x) + 2*b*(d + 2*e*x)*Log[c*x^n])/x^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 232, normalized size = 3.87

method	result
risch	$-\frac{b(2ex+d)\ln(x^n)}{2x^2}-\frac{-2i\pi bex\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+2i\pi bex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+2i\pi bex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-2i\pi bex}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
[Out] -1/2*b*(2*e*x+d)/x^2*ln(x^n)-1/4*(-2*I*Pi*b*e*x*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+2*I*Pi*b*e*x*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*e*x*csgn(I*x^n)*cs
gn(I*c*x^n)^2-2*I*Pi*b*e*x*csgn(I*c*x^n)^3+4*ln(c)*b*e*x+4*b*e*n*x+4*a*e*x-
I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d*csgn(I*c)*csgn(I*c*x^
n)^2+I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d*csgn(I*c*x^n)^3+2*d*b*ln
(c)+b*d*n+2*a*d)/x^2
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.00

$$-\frac{bne}{x}-\frac{be\log\left(cx^{n}\right)}{x}-\frac{bdn}{4\,x^{2}}-\frac{ae}{x}-\frac{bd\log\left(cx^{n}\right)}{2\,x^{2}}-\frac{ad}{2\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] -b*n*e/x - b*e*log(c*x^n)/x - 1/4*b*d*n/x^2 - a*e/x - 1/2*b*d*log(c*x^n)/x^
2 - 1/2*a*d/x^2
```

Fricas [A]
time = 0.39, size = 54, normalized size = 0.90

$$-\frac{bdn+4\,(bn+a)xe+2\,ad+2\,(2\,bxe+bd)\log\left(c\right)+2\,(2\,bnxe+bdn)\log\left(x\right)}{4\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(b*d*n + 4*(b*n + a)*x*e + 2*a*d + 2*(2*b*x*e + b*d)*log(c) + 2*(2*b*n
*x*e + b*d*n)*log(x))/x^2
```

Sympy [A]
time = 0.27, size = 58, normalized size = 0.97

$$-\frac{ad}{2x^{2}}-\frac{ae}{x}-\frac{bdn}{4x^{2}}-\frac{bd\log\left(cx^{n}\right)}{2x^{2}}-\frac{ben}{x}-\frac{be\log\left(cx^{n}\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] -a*d/(2*x**2) - a*e/x - b*d*n/(4*x**2) - b*d*log(c*x**n)/(2*x**2) - b*e*n/x
 - b*e*log(c*x**n)/x
```

Giac [A]
time = 2.36, size = 57, normalized size = 0.95

$$-\frac{4\,bnxe\log\left(x\right)+4\,bnxe+4\,bxe\log\left(c\right)+2\,bdn\log\left(x\right)+bdn+4\,axe+2\,bd\log\left(c\right)+2\,ad}{4\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] -1/4*(4*b*n*x*e*log(x) + 4*b*n*x*e + 4*b*x*e*log(c) + 2*b*d*n*log(x) + b*d*
n + 4*a*x*e + 2*b*d*log(c) + 2*a*d)/x^2
```

Mupad [B]
time = 3.70, size = 47, normalized size = 0.78

$$-\frac{a\,d+x\,\left(2\,a\,e+2\,b\,e\,n\right)+\frac{b\,d\,n}{2}}{2\,x^2}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{2}+b\,e\,x\right)}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x))/x^3,x)
```

```
[Out] - (a*d + x*(2*a*e + 2*b*e*n) + (b*d*n)/2)/(2*x^2) - (log(c*x^n)*((b*d)/2 +
b*e*x))/x^2
```

3.8 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^4} dx$

Optimal. Leaf size=57

$$-\frac{bdn}{9x^3}-\frac{ben}{4x^2}-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

```
[Out] -1/9*b*d*n/x^3-1/4*b*e*n/x^2-1/3*d*(a+b*ln(c*x^n))/x^3-1/2*e*(a+b*ln(c*x^n)
)/x^2
```

Rubi [A]
time = 0.03, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {45, 2372, 12}

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}-\frac{bdn}{9x^3}-\frac{ben}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d*n)/x^3 - (b*e*n)/(4*x^2) - (d*(a + b*Log[c*x^n]))/(3*x^3) - (e*(a
 + b*Log[c*x^n]))/(2*x^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx &= -\frac{1}{6}\left(\frac{2d}{x^3}+\frac{3e}{x^2}\right)(a+b\log(cx^n)) - (bn)\int \frac{-2d-3ex}{6x^4}\,dx \\ &= -\frac{1}{6}\left(\frac{2d}{x^3}+\frac{3e}{x^2}\right)(a+b\log(cx^n)) - \frac{1}{6}(bn)\int \frac{-2d-3ex}{x^4}\,dx \\ &= -\frac{1}{6}\left(\frac{2d}{x^3}+\frac{3e}{x^2}\right)(a+b\log(cx^n)) - \frac{1}{6}(bn)\int \left(-\frac{2d}{x^4}-\frac{3e}{x^3}\right)dx \\ &= -\frac{bdn}{9x^3} - \frac{ben}{4x^2} - \frac{1}{6}\left(\frac{2d}{x^3}+\frac{3e}{x^2}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.02, size = 47, normalized size = 0.82

$$-\frac{6a(2d+3ex)+bn(4d+9ex)+6b(2d+3ex)\log(cx^n)}{36x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/36*(6*a*(2*d + 3*e*x) + b*n*(4*d + 9*e*x) + 6*b*(2*d + 3*e*x)*Log[c*x^n]
)/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 235, normalized size = 4.12

method	result
risch	$-\frac{b(3ex+2d)\ln(x^n)}{6x^3} - \frac{-9i\pi bex\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)+9i\pi bex\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+9i\pi bex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2-9i\pi be}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*b*(3*e*x+2*d)/x^3*ln(x^n)-1/36*(-9*I*Pi*b*e*x*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+9*I*Pi*b*e*x*csgn(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b*e*x*csgn(I*x^n)
*csgn(I*c*x^n)^2-9*I*Pi*b*e*x*csgn(I*c*x^n)^3+18*ln(c)*b*e*x+9*b*e*n*x+18*a
*e*x-6*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*I*Pi*b*d*csgn(I*c)*cs
gn(I*c*x^n)^2+6*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-6*I*Pi*b*d*csgn(I*c*x^
n)^3+12*d*b*ln(c)+4*b*d*n+12*a*d)/x^3
```

Maxima [A]
time = 0.28, size = 60, normalized size = 1.05

$$-\frac{bne}{4\,x^2} - \frac{be\log(cx^n)}{2\,x^2} - \frac{bdn}{9\,x^3} - \frac{ae}{2\,x^2} - \frac{bd\log(cx^n)}{3\,x^3} - \frac{ad}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*e/x^2 - 1/2*b*e*log(c*x^n)/x^2 - 1/9*b*d*n/x^3 - 1/2*a*e/x^2 - 1/3
*b*d*log(c*x^n)/x^3 - 1/3*a*d/x^3
```

Fricas [A]
time = 0.33, size = 59, normalized size = 1.04

$$-\frac{4\,bdn + 9\,(bn + 2\,a)xe + 12\,ad + 6\,(3\,bxe + 2\,bd)\log\left(c\right) + 6\,(3\,bnxe + 2\,bdn)\log\left(x\right)}{36\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/36*(4*b*d*n + 9*(b*n + 2*a)*x*e + 12*a*d + 6*(3*b*x*e + 2*b*d)*log(c) +
6*(3*b*n*x*e + 2*b*d*n)*log(x))/x^3
```

Sympy [A]
time = 0.37, size = 68, normalized size = 1.19

$$-\frac{ad}{3x^3} - \frac{ae}{2x^2} - \frac{bdn}{9x^3} - \frac{bd\log\left(cx^n\right)}{3x^3} - \frac{ben}{4x^2} - \frac{be\log\left(cx^n\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d/(3*x**3) - a*e/(2*x**2) - b*d*n/(9*x**3) - b*d*log(c*x**n)/(3*x**3) -
b*e*n/(4*x**2) - b*e*log(c*x**n)/(2*x**2)
```

Giac [A]
time = 1.85, size = 58, normalized size = 1.02

$$-\frac{18\,bnxe\log\left(x\right) + 9\,bnxe + 18\,bxe\log\left(c\right) + 12\,bdn\log\left(x\right) + 4\,bdn + 18\,axe + 12\,bd\log\left(c\right) + 12\,ad}{36\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] -1/36*(18*b*n*x*e*log(x) + 9*b*n*x*e + 18*b*x*e*log(c) + 12*b*d*n*log(x) +
4*b*d*n + 18*a*x*e + 12*b*d*log(c) + 12*a*d)/x^3
```

Mupad [B]
time = 3.47, size = 49, normalized size = 0.86

$$-\frac{2\,a\,d + x\,\left(3\,a\,e + \frac{3\,b\,e\,n}{2}\right) + \frac{2\,b\,d\,n}{3}}{6\,x^3} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{3} + \frac{b\,e\,x}{2}\right)}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x))/x^4,x)
```

```
[Out] - (2*a*d + x*(3*a*e + (3*b*e*n)/2) + (2*b*d*n)/3)/(6*x^3) - (log(c*x^n)*((b
*d)/3 + (b*e*x)/2))/x^3
```

3.9 $\int x^3(d+ex)^2(a+b\log(cx^n))\,dx$

Optimal. Leaf size=74

$$-\frac{1}{16}bd^2nx^4-\frac{2}{25}bdenx^5-\frac{1}{36}be^2nx^6+\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))$$

```
[Out] -1/16*b*d^2*n*x^4-2/25*b*d*e*n*x^5-1/36*b*e^2*n*x^6+1/60*(10*e^2*x^6+24*d*e
*x^5+15*d^2*x^4)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.190$, Rules used = {45, 2371, 12, 14}

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))-\frac{1}{16}bd^2nx^4-\frac{2}{25}bdenx^5-\frac{1}{36}be^2nx^6$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d^2*n*x^4) - (2*b*d*e*n*x^5)/25 - (b*e^2*n*x^6)/36 + ((15*d^2*x^4
+ 24*d*e*x^5 + 10*e^2*x^6)*(a + b*Log[c*x^n]))/60
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^3(d+ex)^2(a+b\log(cx^n))\,dx = \frac{1}{60}(15d^2x^4+24dex^5+10e^2x^6)(a+b\log(cx^n)) - (bn)\int \frac{1}{60}x^3(15d^2+$$
$$= \frac{1}{60}(15d^2x^4+24dex^5+10e^2x^6)(a+b\log(cx^n)) - \frac{1}{60}(bn)\int x^3(15d^2+$$
$$= \frac{1}{60}(15d^2x^4+24dex^5+10e^2x^6)(a+b\log(cx^n)) - \frac{1}{60}(bn)\int (15d^2x^3+$$
$$= -\frac{1}{16}bd^2nx^4 - \frac{2}{25}bdenx^5 - \frac{1}{36}be^2nx^6 + \frac{1}{60}(15d^2x^4+24dex^5+10e^2x^6)$$

Mathematica [A]
time = 0.04, size = 81, normalized size = 1.09

$$\frac{x^4(60a(15d^2+24dex+10e^2x^2)-bn(225d^2+288dex+100e^2x^2)+60b(15d^2+24dex+10e^2x^2)\log(cx^n))}{3600}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^4*(60*a*(15*d^2 + 24*d*e*x + 10*e^2*x^2) - b*n*(225*d^2 + 288*d*e*x + 10
0*e^2*x^2) + 60*b*(15*d^2 + 24*d*e*x + 10*e^2*x^2)*Log[c*x^n]))/3600
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 7.22, size = 432, normalized size = 5.84

method	result
risch	$\frac{b\,x^4(10e^2x^2+24dex+15d^2)\ln(x^n)}{60} - \frac{i\pi b\,d^2x^4\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{8} + \frac{i\pi b\,e^2x^6\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{12} + \frac{i\pi bde\,x^5\mathrm{csgn}(ic)}{5}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/60*b*x^4*(10*e^2*x^2+24*d*e*x+15*d^2)*ln(x^n)-1/8*I*Pi*b*d^2*x^4*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+1/12*I*Pi*b*e^2*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2
+1/5*I*Pi*b*d*e*x^5*csgn(I*c)*csgn(I*c*x^n)^2+1/5*I*Pi*b*d*e*x^5*csgn(I*x^n
)*csgn(I*c*x^n)^2+1/6*ln(c)*b*e^2*x^6-1/36*b*e^2*n*x^6+1/6*x^6*a*e^2-1/5*I*
Pi*b*d*e*x^5*csgn(I*c*x^n)^3-1/5*I*Pi*b*d*e*x^5*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)-1/12*I*Pi*b*e^2*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/12*I*Pi*
b*e^2*x^6*csgn(I*c)*csgn(I*c*x^n)^2+2/5*ln(c)*b*d*e*x^5-2/25*b*d*e*n*x^5+2/
5*a*d*e*x^5-1/8*I*Pi*b*d^2*x^4*csgn(I*c*x^n)^3+1/8*I*Pi*b*d^2*x^4*csgn(I*x^
```

```
n)*csgn(I*c*x^n)^2+1/8*I*Pi*b*d^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-1/12*I*Pi*b
*e^2*x^6*csgn(I*c*x^n)^3+1/4*ln(c)*b*d^2*x^4-1/16*b*d^2*n*x^4+1/4*x^4*a*d^2
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.35

$$-\frac{1}{36}\,bnx^6e^2-\frac{2}{25}\,bdnx^5e+\frac{1}{6}\,bx^6e^2\log\left(cx^n\right)+\frac{2}{5}\,bdx^5e\log\left(cx^n\right)-\frac{1}{16}\,bd^2nx^4+\frac{1}{6}\,ax^6e^2+\frac{2}{5}\,adx^5e+\frac{1}{4}\,bd^2x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*n*x^6*e^2 - 2/25*b*d*n*x^5*e + 1/6*b*x^6*e^2*log(c*x^n) + 2/5*b*d*x
^5*e*log(c*x^n) - 1/16*b*d^2*n*x^4 + 1/6*a*x^6*e^2 + 2/5*a*d*x^5*e + 1/4*b*
d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4
```

Fricas [A]
time = 0.35, size = 114, normalized size = 1.54

$$-\frac{1}{36}\,(bn-6\,a)x^6e^2-\frac{2}{25}\,(bdn-5\,ad)x^5e-\frac{1}{16}\,(bd^2n-4\,ad^2)x^4+\frac{1}{60}\,(10\,bx^6e^2+24\,bdx^5e+15\,bd^2x^4)\log\left(c\right)+\frac{1}{60}\,(10\,bnx^6e^2+24\,bdnx^5e+15\,bd^2nx^4)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/36*(b*n - 6*a)*x^6*e^2 - 2/25*(b*d*n - 5*a*d)*x^5*e - 1/16*(b*d^2*n - 4*
a*d^2)*x^4 + 1/60*(10*b*x^6*e^2 + 24*b*d*x^5*e + 15*b*d^2*x^4)*log(c) + 1/6
0*(10*b*n*x^6*e^2 + 24*b*d*n*x^5*e + 15*b*d^2*n*x^4)*log(x)
```

Sympy [A]
time = 0.60, size = 121, normalized size = 1.64

$$\frac{ad^2x^4}{4}+\frac{2adex^5}{5}+\frac{ae^2x^6}{6}-\frac{bd^2nx^4}{16}+\frac{bd^2x^4\log\left(cx^n\right)}{4}-\frac{2bdenx^5}{25}+\frac{2bdex^5\log\left(cx^n\right)}{5}-\frac{be^2nx^6}{36}+\frac{be^2x^6\log\left(cx^n\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**4/4 + 2*a*d*e*x**5/5 + a*e**2*x**6/6 - b*d**2*n*x**4/16 + b*d**2*
x**4*log(c*x**n)/4 - 2*b*d*e*n*x**5/25 + 2*b*d*e*x**5*log(c*x**n)/5 - b*e**
2*n*x**6/36 + b*e**2*x**6*log(c*x**n)/6
```

Giac [A]
time = 2.89, size = 123, normalized size = 1.66

$$\frac{1}{6}\,bnx^6e^2\log\left(x\right)+\frac{2}{5}\,bdnx^5e\log\left(x\right)-\frac{1}{36}\,bnx^6e^2-\frac{2}{25}\,bdnx^5e+\frac{1}{6}\,bx^6e^2\log\left(c\right)+\frac{2}{5}\,bdx^5e\log\left(c\right)+\frac{1}{4}\,bd^2nx^4\log\left(x\right)-\frac{1}{16}\,bd^2nx^4+\frac{1}{6}\,ax^6e^2+\frac{2}{5}\,adx^5e+\frac{1}{4}\,bd^2x^4\log\left(c\right)+\frac{1}{4}\,ad^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/6*b*n*x^6*e^2*log(x) + 2/5*b*d*n*x^5*e*log(x) - 1/36*b*n*x^6*e^2 - 2/25*b
*d*n*x^5*e + 1/6*b*x^6*e^2*log(c) + 2/5*b*d*x^5*e*log(c) + 1/4*b*d^2*n*x^4*
log(x) - 1/16*b*d^2*n*x^4 + 1/6*a*x^6*e^2 + 2/5*a*d*x^5*e + 1/4*b*d^2*x^4*l
og(c) + 1/4*a*d^2*x^4
```

Mupad [B]
time = 3.69, size = 82, normalized size = 1.11

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^4}{4}+\frac{2\,b\,d\,e\,x^5}{5}+\frac{b\,e^2\,x^6}{6}\right)+\frac{d^2\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{e^2\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{2\,d\,e\,x^5\,\left(5\,a-b\,n\right)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)*((b*d^2*x^4)/4 + (b*e^2*x^6)/6 + (2*b*d*e*x^5)/5) + (d^2*x^4*(4*
a - b*n))/16 + (e^2*x^6*(6*a - b*n))/36 + (2*d*e*x^5*(5*a - b*n))/25
```

3.10 $\int x^2(d+ex)^2 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=74

$$-\frac{1}{9}bd^2nx^3-\frac{1}{8}bdenx^4-\frac{1}{25}be^2nx^5+\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))$$

```
[Out] -1/9*b*d^2*n*x^3-1/8*b*d*e*n*x^4-1/25*b*e^2*n*x^5+1/30*(6*e^2*x^5+15*d*e*x^
4+10*d^2*x^3)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2371, 12, 14}

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))-\frac{1}{9}bd^2nx^3-\frac{1}{8}bdenx^4-\frac{1}{25}be^2nx^5$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^2*n*x^3) - (b*d*e*n*x^4)/8 - (b*e^2*n*x^5)/25 + ((10*d^2*x^3 + 15
*d*e*x^4 + 6*e^2*x^5)*(a + b*Log[c*x^n]))/30
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{30}x^2\left(10d^2+\right.$$
$$=\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{30}(bn)\int x^2\left(10d^2+\right.$$
$$=\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{30}(bn)\int\left(10d^2x^2+\right.$$
$$=-\frac{1}{9}bd^2nx^3-\frac{1}{8}bdenx^4-\frac{1}{25}be^2nx^5+\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a\ldots$$

Mathematica [A]
time = 0.03, size = 81, normalized size = 1.09

$$\frac{x^3(60a(10d^2+15dex+6e^2x^2)-bn(200d^2+225dex+72e^2x^2)+60b(10d^2+15dex+6e^2x^2)\log\left(cx^n\right))}{1800}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^3*(60*a*(10*d^2 + 15*d*e*x + 6*e^2*x^2) - b*n*(200*d^2 + 225*d*e*x + 72*
e^2*x^2) + 60*b*(10*d^2 + 15*d*e*x + 6*e^2*x^2)*Log[c*x^n]))/1800
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 1.81, size = 432, normalized size = 5.84

method	result
risch	$\frac{b\,x^3(6e^2x^2+15dex+10d^2)\ln(x^n)}{30}-\frac{i\pi bde\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{4}+\frac{i\pi b\,e^2x^5\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{10}-\frac{i\pi b\,e^2x^5\mathrm{csgn}(ic)\mathrm{csg}\ldots}{10}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/30*b*x^3*(6*e^2*x^2+15*d*e*x+10*d^2)*ln(x^n)-1/4*I*Pi*b*d*e*x^4*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+1/10*I*Pi*b*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^2-1/
10*I*Pi*b*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/6*I*Pi*b*d^2*x^3*cs
gn(I*c*x^n)^3+1/5*ln(c)*b*e^2*x^5-1/25*b*e^2*n*x^5+1/5*x^5*a*e^2+1/10*I*Pi*
b*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4*I*Pi*b*d*e*x^4*csgn(I*c)*csgn(I*c
*x^n)^2-1/6*I*Pi*b*d^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*I*Pi*b*d
*e*x^4*csgn(I*c*x^n)^3+1/2*ln(c)*b*d*e*x^4-1/8*b*d*e*n*x^4+1/2*x^4*a*d*e+1/
6*I*Pi*b*d^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4*I*Pi*b*d*e*x^4*csgn(I*x^n)
```

```
*csgn(I*c*x^n)^2+1/6*I*Pi*b*d^2*x^3*csgn(I*c)*csgn(I*c*x^n)^2-1/10*I*Pi*b*e
^2*x^5*csgn(I*c*x^n)^3+1/3*ln(c)*b*d^2*x^3-1/9*b*d^2*n*x^3+1/3*x^3*a*d^2
```

Maxima [A]
time = 0.28, size = 100, normalized size = 1.35

$$-\frac{1}{25}\,bnx^5e^2-\frac{1}{8}\,bdnx^4e+\frac{1}{5}\,bx^5e^2\log\left(cx^n\right)+\frac{1}{2}\,bdx^4e\log\left(cx^n\right)-\frac{1}{9}\,bd^2nx^3+\frac{1}{5}\,ax^5e^2+\frac{1}{2}\,adx^4e+\frac{1}{3}\,bd^2x^3\log\left(cx^n\right)+\frac{1}{3}\,ad^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*n*x^5*e^2 - 1/8*b*d*n*x^4*e + 1/5*b*x^5*e^2*log(c*x^n) + 1/2*b*d*x^
4*e*log(c*x^n) - 1/9*b*d^2*n*x^3 + 1/5*a*x^5*e^2 + 1/2*a*d*x^4*e + 1/3*b*d^
2*x^3*log(c*x^n) + 1/3*a*d^2*x^3
```

Fricas [A]
time = 0.36, size = 114, normalized size = 1.54

$$-\frac{1}{25}\,(bn-5\,a)x^5e^2-\frac{1}{8}\,(bdn-4\,ad)x^4e-\frac{1}{9}\,\left(bd^2n-3\,ad^2\right)x^3+\frac{1}{30}\,\left(6\,bx^5e^2+15\,bdx^4e+10\,bd^2x^3\right)\log\left(c\right)+\frac{1}{30}\,\left(6\,bnx^5e^2+15\,bdnx^4e+10\,bd^2nx^3\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/25*(b*n - 5*a)*x^5*e^2 - 1/8*(b*d*n - 4*a*d)*x^4*e - 1/9*(b*d^2*n - 3*a*
d^2)*x^3 + 1/30*(6*b*x^5*e^2 + 15*b*d*x^4*e + 10*b*d^2*x^3)*log(c) + 1/30*(
6*b*n*x^5*e^2 + 15*b*d*n*x^4*e + 10*b*d^2*n*x^3)*log(x)
```

Sympy [A]
time = 0.41, size = 116, normalized size = 1.57

$$\frac{ad^2x^3}{3}+\frac{adex^4}{2}+\frac{ae^2x^5}{5}-\frac{bd^2nx^3}{9}+\frac{bd^2x^3\log\left(cx^n\right)}{3}-\frac{bdenx^4}{8}+\frac{bdex^4\log\left(cx^n\right)}{2}-\frac{be^2nx^5}{25}+\frac{be^2x^5\log\left(cx^n\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**3/3 + a*d*e*x**4/2 + a*e**2*x**5/5 - b*d**2*n*x**3/9 + b*d**2*x**
3*log(c*x**n)/3 - b*d*e*n*x**4/8 + b*d*e*x**4*log(c*x**n)/2 - b*e**2*n*x**5
/25 + b*e**2*x**5*log(c*x**n)/5
```

Giac [A]
time = 1.99, size = 123, normalized size = 1.66

$$\frac{1}{5}\,bnx^5e^2\log\left(x\right)+\frac{1}{2}\,bdnx^4e\log\left(x\right)-\frac{1}{25}\,bnx^5e^2-\frac{1}{8}\,bdnx^4e+\frac{1}{5}\,bx^5e^2\log\left(c\right)+\frac{1}{2}\,bdx^4e\log\left(c\right)+\frac{1}{3}\,bd^2nx^3\log\left(x\right)-\frac{1}{9}\,bd^2nx^3+\frac{1}{5}\,ax^5e^2+\frac{1}{2}\,adx^4e+\frac{1}{3}\,bd^2x^3\log\left(c\right)+\frac{1}{3}\,ad^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/5*b*n*x^5*e^2*log(x) + 1/2*b*d*n*x^4*e*log(x) - 1/25*b*n*x^5*e^2 - 1/8*b*
d*n*x^4*e + 1/5*b*x^5*e^2*log(c) + 1/2*b*d*x^4*e*log(c) + 1/3*b*d^2*n*x^3*l
og(x) - 1/9*b*d^2*n*x^3 + 1/5*a*x^5*e^2 + 1/2*a*d*x^4*e + 1/3*b*d^2*x^3*log
(c) + 1/3*a*d^2*x^3
```

Mupad [B]
time = 3.49, size = 82, normalized size = 1.11

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^3}{3}+\frac{b\,d\,e\,x^4}{2}+\frac{b\,e^2\,x^5}{5}\right)+\frac{d^2\,x^3\,\left(3\,a-b\,n\right)}{9}+\frac{e^2\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{d\,e\,x^4\,\left(4\,a-b\,n\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)*((b*d^2*x^3)/3 + (b*e^2*x^5)/5 + (b*d*e*x^4)/2) + (d^2*x^3*(3*a
- b*n))/9 + (e^2*x^5*(5*a - b*n))/25 + (d*e*x^4*(4*a - b*n))/8
```

3.11 $\int x(d+ex)^2 (a+b\log(cx^n)) \, dx$

Optimal. Leaf size=74

$$-\frac{1}{4}bd^2nx^2-\frac{2}{9}bdenx^3-\frac{1}{16}be^2nx^4+\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log(cx^n))$$

```
[Out] -1/4*b*d^2*n*x^2-2/9*b*d*e*n*x^3-1/16*b*e^2*n*x^4+1/12*(3*e^2*x^4+8*d*e*x^3
+6*d^2*x^2)*(a+b*ln(c*x^n))
```

Rubi [A]

time = 0.04, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {45, 2371, 12, 14}

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log(cx^n))-\frac{1}{4}bd^2nx^2-\frac{2}{9}bdenx^3-\frac{1}{16}be^2nx^4$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d^2*n*x^2) - (2*b*d*e*n*x^3)/9 - (b*e^2*n*x^4)/16 + ((6*d^2*x^2 + 8
*d*e*x^3 + 3*e^2*x^4)*(a + b*Log[c*x^n]))/12
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{12}x\left(6d^2+8dex\right.$$
$$=\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}(bn)\int x\left(6d^2+8dex\right.$$
$$=\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}(bn)\int\left(6d^2x+8dex^2\right.$$
$$=-\frac{1}{4}bd^2nx^2-\frac{2}{9}bdenx^3-\frac{1}{16}be^2nx^4+\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b$$

Mathematica [A]
time = 0.03, size = 81, normalized size = 1.09

$$\frac{1}{144}x^2\left(12a\left(6d^2+8dex+3e^2x^2\right)-bn\left(36d^2+32dex+9e^2x^2\right)+12b\left(6d^2+8dex+3e^2x^2\right)\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(12*a*(6*d^2 + 8*d*e*x + 3*e^2*x^2) - b*n*(36*d^2 + 32*d*e*x + 9*e^2*x
^2) + 12*b*(6*d^2 + 8*d*e*x + 3*e^2*x^2)*Log[c*x^n]))/144
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.88, size = 432, normalized size = 5.84

method	result
risch	$\frac{b\,x^2\left(3e^2x^2+8dex+6d^2\right)\ln\left(x^n\right)}{12}-\frac{i\pi b\,d^2x^2\mathrm{csgn}\left(ic\,x^n\right)^3}{4}+\frac{i\pi b\,e^2x^4\mathrm{csgn}\left(ix^n\right)\mathrm{csgn}\left(ic\,x^n\right)^2}{8}+\frac{i\pi b\,d^2x^2\mathrm{csgn}\left(ix^n\right)\mathrm{csgn}\left(ic\,x^n\right)^2}{4}+\ i\pi$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/12*b*x^2*(3*e^2*x^2+8*d*e*x+6*d^2)*ln(x^n)-1/4*I*Pi*b*d^2*x^2*csgn(I*c*x^
n)^3+1/8*I*Pi*b*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4*I*Pi*b*d^2*x^2*csgn
(I*x^n)*csgn(I*c*x^n)^2+1/3*I*Pi*b*d*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/4*ln
(c)*b*e^2*x^4-1/16*b*e^2*n*x^4+1/4*x^4*a*e^2-1/3*I*Pi*b*d*e*x^3*csgn(I*c*x^
n)^3-1/3*I*Pi*b*d*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/8*I*Pi*b*e^2*
x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*Pi*b*d*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^
2+2/3*ln(c)*b*d*e*x^3-2/9*b*d*e*n*x^3+2/3*x^3*a*d*e-1/4*I*Pi*b*d^2*x^2*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/8*I*Pi*b*e^2*x^4*csgn(I*c*x^n)^3-1/8*I*Pi
```

```
*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I*Pi*b*d^2*x^2*csgn(I*c)
*csgn(I*c*x^n)^2+1/2*ln(c)*b*d^2*x^2-1/4*b*d^2*n*x^2+1/2*x^2*a*d^2
```

Maxima [A]
time = 0.26, size = 100, normalized size = 1.35

$$-\frac{1}{16}\,bnx^4e^2-\frac{2}{9}\,bdnx^3e+\frac{1}{4}\,bx^4e^2\log\left(cx^n\right)+\frac{2}{3}\,bdx^3e\log\left(cx^n\right)-\frac{1}{4}\,bd^2nx^2+\frac{1}{4}\,ax^4e^2+\frac{2}{3}\,adx^3e+\frac{1}{2}\,bd^2x^2\log\left(cx^n\right)+\frac{1}{2}\,ad^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*n*x^4*e^2 - 2/9*b*d*n*x^3*e + 1/4*b*x^4*e^2*log(c*x^n) + 2/3*b*d*x^
3*e*log(c*x^n) - 1/4*b*d^2*n*x^2 + 1/4*a*x^4*e^2 + 2/3*a*d*x^3*e + 1/2*b*d^
2*x^2*log(c*x^n) + 1/2*a*d^2*x^2
```

Fricas [A]
time = 0.37, size = 114, normalized size = 1.54

$$-\frac{1}{16}\,(bn-4\,a)x^4e^2-\frac{2}{9}\,(bdn-3\,ad)x^3e-\frac{1}{4}\,(bd^2n-2\,ad^2)x^2+\frac{1}{12}\,(3\,bx^4e^2+8\,bdx^3e+6\,bd^2x^2)\log\left(c\right)+\frac{1}{12}\,(3\,bnx^4e^2+8\,bdnx^3e+6\,bd^2nx^2)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/16*(b*n - 4*a)*x^4*e^2 - 2/9*(b*d*n - 3*a*d)*x^3*e - 1/4*(b*d^2*n - 2*a*
d^2)*x^2 + 1/12*(3*b*x^4*e^2 + 8*b*d*x^3*e + 6*b*d^2*x^2)*log(c) + 1/12*(3*
b*n*x^4*e^2 + 8*b*d*n*x^3*e + 6*b*d^2*n*x^2)*log(x)
```

Sympy [A]
time = 0.28, size = 121, normalized size = 1.64

$$\frac{ad^2x^2}{2}+\frac{2adex^3}{3}+\frac{ae^2x^4}{4}-\frac{bd^2nx^2}{4}+\frac{bd^2x^2\log\left(cx^n\right)}{2}-\frac{2bdenx^3}{9}+\frac{2bdex^3\log\left(cx^n\right)}{3}-\frac{be^2nx^4}{16}+\frac{be^2x^4\log\left(cx^n\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**2/2 + 2*a*d*e*x**3/3 + a*e**2*x**4/4 - b*d**2*n*x**2/4 + b*d**2*x
**2*log(c*x**n)/2 - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 - b*e**2*
n*x**4/16 + b*e**2*x**4*log(c*x**n)/4
```

Giac [A]
time = 2.46, size = 123, normalized size = 1.66

$$\frac{1}{4}\,bnx^4e^2\log\left(x\right)+\frac{2}{3}\,bdnx^3e\log\left(x\right)-\frac{1}{16}\,bnx^4e^2-\frac{2}{9}\,bdnx^3e+\frac{1}{4}\,bx^4e^2\log\left(c\right)+\frac{2}{3}\,bdx^3e\log\left(c\right)+\frac{1}{2}\,bd^2nx^2\log\left(x\right)-\frac{1}{4}\,bd^2nx^2+\frac{1}{4}\,ax^4e^2+\frac{2}{3}\,adx^3e+\frac{1}{2}\,bd^2x^2\log\left(c\right)+\frac{1}{2}\,ad^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/4*b*n*x^4*e^2*log(x) + 2/3*b*d*n*x^3*e*log(x) - 1/16*b*n*x^4*e^2 - 2/9*b*
d*n*x^3*e + 1/4*b*x^4*e^2*log(c) + 2/3*b*d*x^3*e*log(c) + 1/2*b*d^2*n*x^2*l
og(x) - 1/4*b*d^2*n*x^2 + 1/4*a*x^4*e^2 + 2/3*a*d*x^3*e + 1/2*b*d^2*x^2*log
(c) + 1/2*a*d^2*x^2
```

Mupad [B]
time = 3.63, size = 82, normalized size = 1.11

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^2}{2}+\frac{2\,b\,d\,e\,x^3}{3}+\frac{b\,e^2\,x^4}{4}\right)+\frac{d^2\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^2\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{2\,d\,e\,x^3\,\left(3\,a-b\,n\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)*((b*d^2*x^2)/2 + (b*e^2*x^4)/4 + (2*b*d*e*x^3)/3) + (d^2*x^2*(2*
a - b*n))/4 + (e^2*x^4*(4*a - b*n))/16 + (2*d*e*x^3*(3*a - b*n))/9
```

3.12 $\int (d+ex)^2 (a+b\log(cx^n)) \, dx$

Optimal. Leaf size=70

$$-bd^2nx - \frac{1}{2}bdenx^2 - \frac{1}{9}be^2nx^3 - \frac{bd^3n\log(x)}{3e} + \frac{(d+ex)^3 (a+b\log(cx^n))}{3e}$$

```
[Out] -b*d^2*n*x-1/2*b*d*e*n*x^2-1/9*b*e^2*n*x^3-1/3*b*d^3*n*ln(x)/e+1/3*(e*x+d)^
3*(a+b*ln(c*x^n))/e
```

Rubi [A]
time = 0.03, antiderivative size = 70, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {32, 2350, 12, 45}

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e} - \frac{bd^3n\log(x)}{3e} - bd^2nx - \frac{1}{2}bdenx^2 - \frac{1}{9}be^2nx^3$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d^2*n*x) - (b*d*e*n*x^2)/2 - (b*e^2*n*x^3)/9 - (b*d^3*n*Log[x])/(3*e) +
 ((d + e*x)^3*(a + b*Log[c*x^n]))/(3*e)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 32

```
Int[((a_.) + (b_.)*(x_))^(m_), x_Symbol] :> Simp[(a + b*x)^(m + 1)/(b*(m +
1)), x] /; FreeQ[{a, b, m}, x] && NeQ[m, -1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex)^2 (a+b\log(cx^n))\,dx &= \frac{(d+ex)^3(a+b\log(cx^n))}{3e} - (bn)\int \frac{(d+ex)^3}{3ex}\,dx\\ &= \frac{(d+ex)^3(a+b\log(cx^n))}{3e} - \frac{(bn)\int \frac{(d+ex)^3}{x}\,dx}{3e}\\ &= \frac{(d+ex)^3(a+b\log(cx^n))}{3e} - \frac{(bn)\int \left(3d^2e+\frac{d^3}{x}+3de^2x+e^3x^2\right)dx}{3e}\\ &= -bd^2nx - \frac{1}{2}bdenx^2 - \frac{1}{9}be^2nx^3 - \frac{bd^3n\log(x)}{3e} + \frac{(d+ex)^3(a+b\log(cx^n))}{3e}\end{aligned}$$

Mathematica [A]
time = 0.03, size = 77, normalized size = 1.10

$$\frac{1}{18}x\left(6a\left(3d^2+3dex+e^2x^2\right)-bn\left(18d^2+9dex+2e^2x^2\right)+6b\left(3d^2+3dex+e^2x^2\right)\log(cx^n)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(6*a*(3*d^2 + 3*d*e*x + e^2*x^2) - b*n*(18*d^2 + 9*d*e*x + 2*e^2*x^2) +
6*b*(3*d^2 + 3*d*e*x + e^2*x^2)*Log[c*x^n]))/18
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 414, normalized size = 5.91

method	result
risch	$\frac{(ex+d)^3 b\ln(x^n)}{3e} - \frac{ie^2\pi b x^3 \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)}{6} - \frac{i\pi b d^2 \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)x}{2} - \frac{ie\pi bd x^2\operatorname{csgn}(icx^n)^3}{2} + \frac{ie^2\pi}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*(e*x+d)^3*b/e*ln(x^n)-1/6*I*e^2*Pi*b*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-1/2*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-1/2*I*e*Pi*b*d*x
^2*csgn(I*c*x^n)^3+1/6*I*e^2*Pi*b*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*Pi*
b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x-1/6*I*e^2*Pi*b*x^3*csgn(I*c*x^n)^3-1/2*
I*Pi*b*d^2*csgn(I*c*x^n)^3*x+1/6*I*e^2*Pi*b*x^3*csgn(I*c)*csgn(I*c*x^n)^2-1
/2*I*e*Pi*b*d*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*e*Pi*b*d*x^2*cs
gn(I*c)*csgn(I*c*x^n)^2+1/2*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2*x+1/2*I*e*
Pi*b*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*ln(c)*b*e^2*x^3-1/9*b*e^2*n*x^3+
ln(c)*b*d*e*x^2+1/3*a*e^2*x^3-1/2*b*d*e*n*x^2-1/3*b*d^3*n*ln(x)/e+ln(c)*b*d
^2*x+a*d*e*x^2-b*d^2*n*x+a*d^2*x
```

Maxima [A]
time = 0.28, size = 90, normalized size = 1.29

$$-\frac{1}{9}bnx^3e^2 - \frac{1}{2}bdnx^2e + \frac{1}{3}bx^3e^2\log(cx^n) + bdx^2e\log(cx^n) - bd^2nx + \frac{1}{3}ax^3e^2 + adx^2e + bd^2x\log(cx^n) + ad^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/9*b*n*x^3*e^2 - 1/2*b*d*n*x^2*e + 1/3*b*x^3*e^2*log(c*x^n) + b*d*x^2*e*l
og(c*x^n) - b*d^2*n*x + 1/3*a*x^3*e^2 + a*d*x^2*e + b*d^2*x*log(c*x^n) + a*
d^2*x
```

Fricas [A]
time = 0.35, size = 106, normalized size = 1.51

$$-\frac{1}{9}(bn-3a)x^3e^2 - \frac{1}{2}(bdn-2ad)x^2e - (bd^2n-ad^2)x + \frac{1}{3}(bx^3e^2 + 3bdx^2e + 3bd^2x)\log(c) + \frac{1}{3}(bnx^3e^2 + 3bdnx^2e + 3bd^2nx)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/9*(b*n - 3*a)*x^3*e^2 - 1/2*(b*d*n - 2*a*d)*x^2*e - (b*d^2*n - a*d^2)*x
+ 1/3*(b*x^3*e^2 + 3*b*d*x^2*e + 3*b*d^2*x)*log(c) + 1/3*(b*n*x^3*e^2 + 3*b
*d*n*x^2*e + 3*b*d^2*n*x)*log(x)
```

Sympy [A]
time = 0.19, size = 102, normalized size = 1.46

$$ad^2x + adex^2 + \frac{ae^2x^3}{3} - bd^2nx + bd^2x\log(cx^n) - \frac{bdenx^2}{2} + bdex^2\log(cx^n) - \frac{be^2nx^3}{9} + \frac{be^2x^3\log(cx^n)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x + a*d*e*x**2 + a*e**2*x**3/3 - b*d**2*n*x + b*d**2*x*log(c*x**n) -
 b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**3/9 + b*e**2*x**3*lo
g(c*x**n)/3
```

Giac [A]
time = 2.24, size = 109, normalized size = 1.56

$$\frac{1}{3}bnx^3e^2\log(x) + bdnx^2e\log(x) - \frac{1}{9}bnx^3e^2 - \frac{1}{2}bdnx^2e + \frac{1}{3}bx^3e^2\log(c) + bdx^2e\log(c) + bd^2nx\log(x) - bd^2nx + \frac{1}{3}ax^3e^2 + adx^2e + bd^2x\log(c) + ad^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/3*b*n*x^3*e^2*log(x) + b*d*n*x^2*e*log(x) - 1/9*b*n*x^3*e^2 - 1/2*b*d*n*x
^2*e + 1/3*b*x^3*e^2*log(c) + b*d*x^2*e*log(c) + b*d^2*n*x*log(x) - b*d^2*n
*x + 1/3*a*x^3*e^2 + a*d*x^2*e + b*d^2*x*log(c) + a*d^2*x
```

Mupad [B]
time = 3.61, size = 73, normalized size = 1.04

$$\ln\left(c\,x^n\right)\,\left(b\,d^2\,x+b\,d\,e\,x^2+\frac{b\,e^2\,x^3}{3}\right)+\frac{e^2\,x^3\,\left(3\,a-b\,n\right)}{9}+d^2\,x\,\left(a-b\,n\right)+\frac{d\,e\,x^2\,\left(2\,a-b\,n\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)*((b*e^2*x^3)/3 + b*d^2*x + b*d*e*x^2) + (e^2*x^3*(3*a - b*n))/9
+ d^2*x*(a - b*n) + (d*e*x^2*(2*a - b*n))/2
```

3.13 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=80

$$-\frac{1}{4}bn(4d+ex)^2-\frac{1}{2}bd^2n\log^2(x)+2dex(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))+d^2\log(x)(a+b\log(cx^n))$$

```
[Out] -1/4*b*n*(e*x+4*d)^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x*(a+b*ln(c*x^n))+1/2*e^2*x^
2*(a+b*ln(c*x^n))+d^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {45, 2372, 2338}

$$d^2\log(x)(a+b\log(cx^n))+2dex(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))-\frac{1}{2}bd^2n\log^2(x)-\frac{1}{4}bn(4d+ex)^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/4*(b*n*(4*d + e*x)^2) - (b*d^2*n*Log[x]^2)/2 + 2*d*e*x*(a + b*Log[c*x^n]
) + (e^2*x^2*(a + b*Log[c*x^n]))/2 + d^2*Log[x]*(a + b*Log[c*x^n])
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\left(4dex+e^2x^2+2d^2\log(x)\right)(a+b\log(cx^n))-(bn)\int\left(\frac{1}{2}e(4d+ex)+\right.$$
$$= -\frac{1}{4}bn(4d+ex)^2+\frac{1}{2}\left(4dex+e^2x^2+2d^2\log(x)\right)(a+b\log(cx^n))-\left(bd^2n\right.$$
$$= -\frac{1}{4}bn(4d+ex)^2-\frac{1}{2}bd^2n\log^2(x)+\frac{1}{2}\left(4dex+e^2x^2+2d^2\log(x)\right)(a+b\log$$

Mathematica [A]
time = 0.03, size = 83, normalized size = 1.04

$$2adex-2bdenx-\frac{1}{4}be^2nx^2+2bdex\log(cx^n)+\frac{1}{2}e^2x^2(a+b\log(cx^n))+\frac{d^2(a+b\log(cx^n))^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] 2*a*d*e*x - 2*b*d*e*n*x - (b*e^2*n*x^2)/4 + 2*b*d*e*x*Log[c*x^n] + (e^2*x^2
*(a + b*Log[c*x^n]))/2 + (d^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 410, normalized size = 5.12

method	result
risch	$\left(\frac{x^2be^2}{2}+2bdex+b\,d^2\ln(x)\right)\ln(x^n)-\frac{b\,d^2n\ln(x)^2}{2}-i\pi bdex\mathrm{csgn}(ic\,x^n)^3+i\pi bdex\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] (1/2*x^2*b*e^2+2*b*d*e*x+b*d^2*ln(x))*ln(x^n)-1/2*b*d^2*n*ln(x)^2-I*Pi*b*d*
e*x*csgn(I*c*x^n)^3+I*Pi*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I*Pi*b*e^2
*x^2*csgn(I*c*x^n)^3-I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I
*Pi*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*ln(x)*Pi*b*d^2*csgn(I*c)*cs
gn(I*c*x^n)^2-1/2*I*ln(x)*Pi*b*d^2*csgn(I*c*x^n)^3+1/2*I*ln(x)*Pi*b*d^2*csg
n(I*x^n)*csgn(I*c*x^n)^2+1/2*ln(c)*b*e^2*x^2-1/4*b*e^2*n*x^2+2*ln(c)*b*d*e*
x+1/2*a*e^2*x^2-2*b*d*e*n*x+2*a*d*e*x-1/4*I*Pi*b*e^2*x^2*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)-1/2*I*ln(x)*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+
1/4*I*Pi*b*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*e*x*csgn(I*c)*csgn(I*
c*x^n)^2+ln(x)*ln(c)*b*d^2+a*d^2*ln(x)
```

Maxima [A]
time = 0.29, size = 84, normalized size = 1.05

$$-\frac{1}{4}\,bnx^2e^2-2\,bdnxe+\frac{1}{2}\,bx^2e^2\log(cx^n)+2\,bdxe\log(cx^n)+\frac{1}{2}\,ax^2e^2+2\,adxe+\frac{bd^2\log(cx^n)^2}{2\,n}+ad^2\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*x^2*e^2 - 2*b*d*n*x*e + 1/2*b*x^2*e^2*log(c*x^n) + 2*b*d*x*e*log(c
*x^n) + 1/2*a*x^2*e^2 + 2*a*d*x*e + 1/2*b*d^2*log(c*x^n)^2/n + a*d^2*log(x)
```

Fricas [A]
time = 0.36, size = 94, normalized size = 1.18

$$\frac{1}{2}\,bd^2n\log\left(x\right)^2-\frac{1}{4}\left(bn-2\,a\right)x^2e^2-2\left(bdn-ad\right)xe+\frac{1}{2}\left(bx^2e^2+4\,bdxe\right)\log\left(c\right)+\frac{1}{2}\left(bnx^2e^2+4\,bdnxe+2\,bd^2\log\left(c\right)+2\,ad^2\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*b*d^2*n*log(x)^2 - 1/4*(b*n - 2*a)*x^2*e^2 - 2*(b*d*n - a*d)*x*e + 1/2*
(b*x^2*e^2 + 4*b*d*x*e)*log(c) + 1/2*(b*n*x^2*e^2 + 4*b*d*n*x*e + 2*b*d^2*l
og(c) + 2*a*d^2)*log(x)
```

Sympy [A]
time = 0.30, size = 131, normalized size = 1.64

$$\begin{cases}\frac{ad^2\log\left(cx^n\right)}{n}+2adex+\frac{ae^2x^2}{2}+\frac{bd^2\log\left(cx^n\right)^2}{2n}-2bdenx+2bdex\log\left(cx^n\right)-\frac{be^2nx^2}{4}+\frac{be^2x^2\log\left(cx^n\right)}{2} & \text{for}\: n\neq 0\\ \left(a+b\log\left(c\right)\right)\left(d^2\log\left(x\right)+2dex+\frac{e^2x^2}{2}\right) & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise((a*d**2*log(c*x**n)/n + 2*a*d*e*x + a*e**2*x**2/2 + b*d**2*log(c*
x**n)**2/(2*n) - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n*x**2/4 + b*
e**2*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(d**2*log(x) + 2*d*e*x
+ e**2*x**2/2), True))
```

Giac [A]
time = 2.23, size = 100, normalized size = 1.25

$$\frac{1}{2}\,bnx^2e^2\log\left(x\right)+2\,bdnxe\log\left(x\right)+\frac{1}{2}\,bd^2n\log\left(x\right)^2-\frac{1}{4}\,bnx^2e^2-2\,bdnxe+\frac{1}{2}\,bx^2e^2\log\left(c\right)+2\,bdxe\log\left(c\right)+bd^2\log\left(c\right)\log\left(x\right)+\frac{1}{2}\,ax^2e^2+2\,adxe+ad^2\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*n*x^2*e^2*log(x) + 2*b*d*n*x*e*log(x) + 1/2*b*d^2*n*log(x)^2 - 1/4*b*
n*x^2*e^2 - 2*b*d*n*x*e + 1/2*b*x^2*e^2*log(c) + 2*b*d*x*e*log(c) + b*d^2*l
og(c)*log(x) + 1/2*a*x^2*e^2 + 2*a*d*x*e + a*d^2*log(x)
```

Mupad [B]
time = 3.57, size = 75, normalized size = 0.94

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e^2\,x^2}{2}+2\,b\,d\,e\,x\right)+\frac{e^2\,x^2\,\left(2\,a-b\,n\right)}{4}+a\,d^2\,\ln\left(x\right)+\frac{b\,d^2\,{\ln\left(c\,x^n\right)}^2}{2\,n}+2\,d\,e\,x\,\left(a-b\,n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^2)/x,x)
```

```
[Out] log(c*x^n)*((b*e^2*x^2)/2 + 2*b*d*e*x) + (e^2*x^2*(2*a - b*n))/4 + a*d^2*lo
g(x) + (b*d^2*log(c*x^n)^2)/(2*n) + 2*d*e*x*(a - b*n)
```

3.14 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=78

$$-\frac{bd^2n}{x}-be^2nx-bden\log^2(x)-\frac{d^2(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))+2de\log(x)(a+b\log(cx^n))$$

```
[Out] -b*d^2*n/x-b*e^2*n*x-b*d*e*n*ln(x)^2-d^2*(a+b*ln(c*x^n))/x+e^2*x*(a+b*ln(c*
x^n))+2*d*e*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 78, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {45, 2372, 2338}

$$-\frac{d^2(a+b\log(cx^n))}{x}+2de\log(x)(a+b\log(cx^n))+e^2x(a+b\log(cx^n))-\frac{bd^2n}{x}-bden\log^2(x)-be^2nx$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^2*n)/x) - b*e^2*n*x - b*d*e*n*Log[x]^2 - (d^2*(a + b*Log[c*x^n]))/x
+ e^2*x*(a + b*Log[c*x^n]) + 2*d*e*Log[x]*(a + b*Log[c*x^n])
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^2} dx = -\left(\frac{d^2}{x} - e^2x - 2de\log(x)\right)(a+b\log(cx^n)) - (bn)\int \left(e^2 - \frac{d^2}{x^2} + \frac{2de\log}{x}\right.$$
$$= -\frac{bd^2n}{x} - be^2nx - \left(\frac{d^2}{x} - e^2x - 2de\log(x)\right)(a+b\log(cx^n)) - (2bden)\int$$
$$= -\frac{bd^2n}{x} - be^2nx - bden\log^2(x) - \left(\frac{d^2}{x} - e^2x - 2de\log(x)\right)(a+b\log(cx^{\cdot}$$

Mathematica [A]
time = 0.04, size = 76, normalized size = 0.97

$$-\frac{bd^2n}{x} + ae^2x - be^2nx + be^2x\log(cx^n) - \frac{d^2(a+b\log(cx^n))}{x} + \frac{de(a+b\log(cx^n))^2}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^2*n)/x) + a*e^2*x - b*e^2*n*x + b*e^2*x*Log[c*x^n] - (d^2*(a + b*Log
[c*x^n]))/x + (d*e*(a + b*Log[c*x^n])^2)/(b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 419, normalized size = 5.37

method	result
risch	$-\frac{b(-2dex\ln(x)-e^2x^2+d^2)\ln(x^n)}{x} - \frac{-i\pi b e^2x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2-2i\ln(x)\pi bde\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2x-i\pi b e^2x^2\mathrm{csgn}(ic)\mathrm{csgn}(i}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b*(-2*d*e*x*ln(x)-e^2*x^2+d^2)/x*ln(x^n)-1/2*(-I*Pi*b*e^2*x^2*csgn(I*x^n)*
csgn(I*c*x^n)^2-2*I*ln(x)*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x-I*Pi*b*e^2*x
^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*
e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*e^2*x^2*csgn(I*
c*x^n)^3-I*Pi*b*d^2*csgn(I*c*x^n)^3+2*I*ln(x)*Pi*b*d*e*csgn(I*c*x^n)^3*x-2*
I*ln(x)*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x+2*I*ln(x)*Pi*b*d*e*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*x+2*b*d*e*n*ln(x)^2*x-4*ln(x)*ln(c)*b*d*e*x-2*ln
(c)*b*e^2*x^2+2*b*e^2*n*x^2-4*ln(x)*a*d*e*x-2*a*e^2*x^2+2*d^2*b*ln(c)+2*b*d
^2*n+2*a*d^2)/x
```

Maxima [A]
time = 0.28, size = 82, normalized size = 1.05

$$-bnxe^2 + bxe^2\log(cx^n) + \frac{bde\log(cx^n)^2}{n} + 2\,ade\log(x) - \frac{bd^2n}{x} + axe^2 - \frac{bd^2\log(cx^n)}{x} - \frac{ad^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] -b*n*x*e^2 + b*x*e^2*log(c*x^n) + b*d*e*log(c*x^n)^2/n + 2*a*d*e*log(x) - b
*d^2*n/x + a*x*e^2 - b*d^2*log(c*x^n)/x - a*d^2/x
```

Fricas [A]
time = 0.35, size = 95, normalized size = 1.22

$$\frac{bdnxe\log(x)^2 - bd^2n - (bn-a)x^2e^2 - ad^2 + (bx^2e^2 - bd^2)\log(c) + (bnx^2e^2 + 2\,bdxe\log(c) - bd^2n + 2\,adxe)\log(x)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] (b*d*n*x*e*log(x)^2 - b*d^2*n - (b*n - a)*x^2*e^2 - a*d^2 + (b*x^2*e^2 - b*
d^2)*log(c) + (b*n*x^2*e^2 + 2*b*d*x*e*log(c) - b*d^2*n + 2*a*d*x*e)*log(x)
)/x
```

Sympy [A]
time = 0.38, size = 112, normalized size = 1.44

$$\begin{cases} -\frac{ad^2}{x} + \frac{2ade\log(cx^n)}{n} + ae^2x - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} + \frac{bde\log(cx^n)^2}{n} - be^2nx + be^2x\log(cx^n) & \text{for}\ n \neq 0 \\ (a + b\log(c))\left(-\frac{d^2}{x} + 2de\log(x) + e^2x\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Piecewise((-a*d**2/x + 2*a*d*e*log(c*x**n)/n + a*e**2*x - b*d**2*n/x - b*d*
*2*log(c*x**n)/x + b*d*e*log(c*x**n)**2/n - b*e**2*n*x + b*e**2*x*log(c*x**
n), Ne(n, 0)), ((a + b*log(c))*(-d**2/x + 2*d*e*log(x) + e**2*x), True))
```

Giac [A]
time = 2.00, size = 101, normalized size = 1.29

$$\frac{bdnxe\log(x)^2 + bnx^2e^2\log(x) + 2\,bdxe\log(c)\log(x) - bnx^2e^2 + bx^2e^2\log(c) - bd^2n\log(x) + 2\,adxe\log(x) - bd^2n + ax^2e^2 - bd^2\log(c) - ad^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] (b*d*n*x*e*log(x)^2 + b*n*x^2*e^2*log(x) + 2*b*d*x*e*log(c)*log(x) - b*n*x^
2*e^2 + b*x^2*e^2*log(c) - b*d^2*n*log(x) + 2*a*d*x*e*log(x) - b*d^2*n + a*
x^2*e^2 - b*d^2*log(c) - a*d^2)/x
```

Mupad [B]
time = 3.66, size = 99, normalized size = 1.27

$$\ln(x)\,\left(2\,a\,d\,e+2\,b\,d\,e\,n\right)-\frac{a\,d^2+b\,d^2\,n}{x}-\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2+2\,b\,d\,e\,x+b\,e^2\,x^2}{x}-2\,b\,e^2\,x\right)+e^2\,x\,\left(a-b\,n\right)+\frac{b\,d\,e\,\ln\left(c\,x^n\right)^2}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^2)/x^2,x)
```

```
[Out] log(x)*(2*a*d*e + 2*b*d*e*n) - (a*d^2 + b*d^2*n)/x - log(c*x^n)*((b*d^2 + b
*e^2*x^2 + 2*b*d*e*x)/x - 2*b*e^2*x) + e^2*x*(a - b*n) + (b*d*e*log(c*x^n)^
2)/n
```

3.15 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=84

$$-\frac{bn(d+4ex)^2}{4x^2}-\frac{1}{2}be^2n\log^2(x)-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))}{x}+e^2\log(x)(a+b\log(cx^n))$$

```
[Out] -1/4*b*n*(4*e*x+d)^2/x^2-1/2*b*e^2*n*ln(x)^2-1/2*d^2*(a+b*ln(c*x^n))/x^2-2*
d*e*(a+b*ln(c*x^n))/x+e^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {45, 2372, 37, 2338}

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))}{x}+e^2\log(x)(a+b\log(cx^n))-\frac{bn(d+4ex)^2}{4x^2}-\frac{1}{2}be^2n\log^2(x)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*n*(d + 4*e*x)^2)/x^2 - (b*e^2*n*Log[x]^2)/2 - (d^2*(a + b*Log[c*x^n
]))/(2*x^2) - (2*d*e*(a + b*Log[c*x^n]))/x + e^2*Log[x]*(a + b*Log[c*x^n])
```

Rule 37

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n + 2, 0] && NeQ[m, -
1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx &= -\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{4de}{x}-2e^2\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\left(-\frac{d(d+4ex)}{2x^3}+\right.\\ &= -\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{4de}{x}-2e^2\log(x)\right)\left(a+b\log\left(cx^n\right)\right)+\frac{1}{2}(bdn)\int\frac{d+4ex}{x^3}\,dx-\\ &= -\frac{bn(d+4ex)^2}{4x^2}-\frac{1}{2}be^2n\log^2(x)-\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{4de}{x}-2e^2\log(x)\right)(a+b\log(\end{aligned}$$

Mathematica [A]
time = 0.04, size = 84, normalized size = 1.00

$$-\frac{bd^2n}{4x^2}-\frac{2bden}{x}-\frac{d^2\left(a+b\log\left(cx^n\right)\right)}{2x^2}-\frac{2de\left(a+b\log\left(cx^n\right)\right)}{x}+\frac{e^2\left(a+b\log\left(cx^n\right)\right)^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^2*n)/x^2 - (2*b*d*e*n)/x - (d^2*(a + b*Log[c*x^n]))/(2*x^2) - (2*
d*e*(a + b*Log[c*x^n]))/x + (e^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 418, normalized size = 4.98

method	result
risch	$-\frac{b\left(-2e^2\ln(x)x^2+4dex+d^2\right)\ln(x^n)}{2x^2}-\frac{-4i\pi bdex\,\mathrm{csgn}(ic\,x^n)^3-4i\pi bdex\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)-i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}($

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(-2*e^2*ln(x)*x^2+4*d*e*x+d^2)/x^2*ln(x^n)-1/4*(-4*I*Pi*b*d*e*x*csgn
(I*c*x^n)^3-4*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*d^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-I*P
i*b*d^2*csgn(I*c*x^n)^3+I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*ln(x)*Pi
*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^2-2*I*ln(x)*Pi*b*e^2*csgn(I*x^
n)*csgn(I*c*x^n)^2*x^2+4*I*Pi*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*ln(x)
*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*x^2+4*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*c*x
```

```
^n)^2+2*I*ln(x)*Pi*b*e^2*csgn(I*c*x^n)^3*x^2+2*e^2*b*n*ln(x)^2*x^2-4*ln(x)*
ln(c)*b*e^2*x^2-4*ln(x)*a*e^2*x^2+8*ln(c)*b*d*e*x+8*b*d*e*n*x+2*d^2*b*ln(c)
+8*a*d*e*x+b*d^2*n+2*a*d^2)/x^2
```

Maxima [A]
time = 0.27, size = 91, normalized size = 1.08

$$-\frac{2\,bdne}{x}-\frac{2\,bde\log\left(cx^{n}\right)}{x}+\frac{be^{2}\log\left(cx^{n}\right)^{2}}{2\,n}+ae^{2}\log\left(x\right)-\frac{bd^{2}n}{4\,x^{2}}-\frac{2\,ade}{x}-\frac{bd^{2}\log\left(cx^{n}\right)}{2\,x^{2}}-\frac{ad^{2}}{2\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] -2*b*d*n*e/x - 2*b*d*e*log(c*x^n)/x + 1/2*b*e^2*log(c*x^n)^2/n + a*e^2*log(
x) - 1/4*b*d^2*n/x^2 - 2*a*d*e/x - 1/2*b*d^2*log(c*x^n)/x^2 - 1/2*a*d^2/x^2
```

Fricas [A]
time = 0.36, size = 99, normalized size = 1.18

$$\frac{2\,bnx^{2}e^{2}\log\left(x\right)^{2}-bd^{2}n-2\,ad^{2}-8\,(bdn+ad)xe-2\,(4\,bdxe+bd^{2})\log\left(c\right)-2\,(4\,bdnxe-2\,bx^{2}e^{2}\log\left(c\right)+bd^{2}n-2\,ax^{2}e^{2})\log\left(x\right)}{4\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] 1/4*(2*b*n*x^2*e^2*log(x)^2 - b*d^2*n - 2*a*d^2 - 8*(b*d*n + a*d)*x*e - 2*(
4*b*d*x*e + b*d^2)*log(c) - 2*(4*b*d*n*x*e - 2*b*x^2*e^2*log(c) + b*d^2*n -
 2*a*x^2*e^2)*log(x))/x^2
```

Sympy [A]
time = 3.14, size = 99, normalized size = 1.18

$$-\frac{ad^{2}}{2x^{2}}-\frac{2ade}{x}+ae^{2}\log\left(x\right)+bd^{2}\left(-\frac{n}{4x^{2}}-\frac{\log\left(cx^{n}\right)}{2x^{2}}\right)+2bde\left(-\frac{n}{x}-\frac{\log\left(cx^{n}\right)}{x}\right)-be^{2}\left(\begin{cases}-\log\left(c\right)\log\left(x\right) & \text{for}\: n=0\\-\frac{\log\left(cx^{n}\right)^{2}}{2n} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] -a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x**2) - log(c*
x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piecewise((-log(c
)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Giac [A]
time = 1.72, size = 105, normalized size = 1.25

$$\frac{2\,bnx^{2}e^{2}\log\left(x\right)^{2}-8\,bdnxe\log\left(x\right)+4\,bx^{2}e^{2}\log\left(c\right)\log\left(x\right)-8\,bdnxe-8\,bdxe\log\left(c\right)-2\,bd^{2}n\log\left(x\right)+4\,ax^{2}e^{2}\log\left(x\right)-bd^{2}n-8\,adxe-2\,bd^{2}\log\left(c\right)-2\,ad^{2}}{4\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] 1/4*(2*b*n*x^2*e^2*log(x)^2 - 8*b*d*n*x*e*log(x) + 4*b*x^2*e^2*log(c)*log(x
) - 8*b*d*n*x*e - 8*b*d*x*e*log(c) - 2*b*d^2*n*log(x) + 4*a*x^2*e^2*log(x)
- b*d^2*n - 8*a*d*x*e - 2*b*d^2*log(c) - 2*a*d^2)/x^2
```

Mupad [B]
time = 3.69, size = 99, normalized size = 1.18

$$\ln(x)\left(a\,e^2+\frac{3\,b\,e^2\,n}{2}\right)-\frac{a\,d^2+x\,(4\,a\,d\,e+4\,b\,d\,e\,n)+\frac{b\,d^2\,n}{2}}{2\,x^2}-\frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{2}+2\,b\,d\,e\,x+\frac{3\,b\,e^2\,x^2}{2}\right)}{x^2}+\frac{b\,e^2\ln(c\,x^n)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^2)/x^3,x)
```

```
[Out] log(x)*(a*e^2 + (3*b*e^2*n)/2) - (a*d^2 + x*(4*a*d*e + 4*b*d*e*n) + (b*d^2*
n)/2)/(2*x^2) - (log(c*x^n)*((b*d^2)/2 + (3*b*e^2*x^2)/2 + 2*b*d*e*x))/x^2
+ (b*e^2*log(c*x^n)^2)/(2*n)
```

3.16 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=75

$$-\frac{bd^2n}{9x^3}-\frac{bden}{2x^2}-\frac{be^2n}{x}+\frac{be^3n\log(x)}{3d}-\frac{(d+ex)^3\,(a+b\log{(cx^n)})}{3dx^3}$$

```
[Out] -1/9*b*d^2*n/x^3-1/2*b*d*e*n/x^2-b*e^2*n/x+1/3*b*e^3*n*ln(x)/d-1/3*(e*x+d)^
3*(a+b*ln(c*x^n))/d/x^3
```

Rubi [A]
time = 0.05, antiderivative size = 75, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {37, 2372, 12, 45}

$$-\frac{(d+ex)^3\,(a+b\log{(cx^n)})}{3dx^3}-\frac{bd^2n}{9x^3}+\frac{be^3n\log(x)}{3d}-\frac{bden}{2x^2}-\frac{be^2n}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^2*n)/x^3 - (b*d*e*n)/(2*x^2) - (b*e^2*n)/x + (b*e^3*n*Log[x])/(3*
d) - ((d + e*x)^3*(a + b*Log[c*x^n]))/(3*d*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 37

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n + 2, 0] && NeQ[m, -
1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx &= -\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}-(bn)\int -\frac{(d+ex)^3}{3dx^4}\,dx\\ &= -\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}+\frac{(bn)\int \frac{(d+ex)^3}{x^4}\,dx}{3d}\\ &= -\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}+\frac{(bn)\int \left(\frac{d^3}{x^4}+\frac{3d^2e}{x^3}+\frac{3de^2}{x^2}+\frac{e^3}{x}\right)dx}{3d}\\ &= -\frac{bd^2n}{9x^3}-\frac{bden}{2x^2}-\frac{be^2n}{x}+\frac{be^3n\log(x)}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}\end{aligned}$$

Mathematica [A]
time = 0.03, size = 76, normalized size = 1.01

$$-\frac{6a(d^2+3dex+3e^2x^2)+bn(2d^2+9dex+18e^2x^2)+6b(d^2+3dex+3e^2x^2)\log(cx^n)}{18x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/18*(6*a*(d^2 + 3*d*e*x + 3*e^2*x^2) + b*n*(2*d^2 + 9*d*e*x + 18*e^2*x^2)
 + 6*b*(d^2 + 3*d*e*x + 3*e^2*x^2)*Log[c*x^n])/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 401, normalized size = 5.35

method	result
risch	$-\frac{b(3e^2x^2+3dex+d^2)\ln(x^n)}{3x^3}-\frac{9i\pi bdex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-9i\pi b\,e^2x^2\mathrm{csgn}(ic\,x^n)^3+3i\pi b\,d^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-9i\pi bdex\,\mathrm{csgn}($

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(3*e^2*x^2+3*d*e*x+d^2)/x^3*ln(x^n)-1/18*(9*I*Pi*b*d*e*x*csgn(I*c)*c
sgn(I*c*x^n)^2-9*I*Pi*b*e^2*x^2*csgn(I*c*x^n)^3+3*I*Pi*b*d^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2-9*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+18*ln(c)*b
*e^2*x^2+18*b*e^2*n*x^2+18*a*e^2*x^2+9*I*Pi*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^
n)^2-3*I*Pi*b*d^2*csgn(I*c*x^n)^3-9*I*Pi*b*e^2*x^2*csgn(I*c)*csgn(I*x^n)*cs
```

```
gn(I*c*x^n)-3*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+18*ln(c)*b*d*e
*x+9*b*d*e*n*x+18*a*d*e*x+3*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b*e
^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)
^2-9*I*Pi*b*d*e*x*csgn(I*c*x^n)^3+6*d^2*b*ln(c)+2*b*d^2*n+6*a*d^2)/x^3
```

Maxima [A]
time = 0.29, size = 100, normalized size = 1.33

$$-\frac{bne^2}{x}-\frac{bdne}{2\,x^2}-\frac{be^2\log\left(cx^n\right)}{x}-\frac{bde\log\left(cx^n\right)}{x^2}-\frac{bd^2n}{9\,x^3}-\frac{ae^2}{x}-\frac{ade}{x^2}-\frac{bd^2\log\left(cx^n\right)}{3\,x^3}-\frac{ad^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] -b*n*e^2/x - 1/2*b*d*n*e/x^2 - b*e^2*log(c*x^n)/x - b*d*e*log(c*x^n)/x^2 -
1/9*b*d^2*n/x^3 - a*e^2/x - a*d*e/x^2 - 1/3*b*d^2*log(c*x^n)/x^3 - 1/3*a*d^
2/x^3
```

Fricas [A]
time = 0.35, size = 98, normalized size = 1.31

$$-\frac{2\,bd^2n+18\,(bn+a)x^2e^2+6\,ad^2+9\,(bdn+2\,ad)xe+6\,(3\,bx^2e^2+3\,bdxe+bd^2)\log\left(c\right)+6\,(3\,bnx^2e^2+3\,bdnxe+bd^2n)\log\left(x\right)}{18\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/18*(2*b*d^2*n + 18*(b*n + a)*x^2*e^2 + 6*a*d^2 + 9*(b*d*n + 2*a*d)*x*e +
 6*(3*b*x^2*e^2 + 3*b*d*x*e + b*d^2)*log(c) + 6*(3*b*n*x^2*e^2 + 3*b*d*n*x*
e + b*d^2*n)*log(x))/x^3
```

Sympy [A]
time = 0.38, size = 104, normalized size = 1.39

$$-\frac{ad^2}{3x^3}-\frac{ade}{x^2}-\frac{ae^2}{x}-\frac{bd^2n}{9x^3}-\frac{bd^2\log\left(cx^n\right)}{3x^3}-\frac{bden}{2x^2}-\frac{bde\log\left(cx^n\right)}{x^2}-\frac{be^2n}{x}-\frac{be^2\log\left(cx^n\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d**2/(3*x**3) - a*d*e/x**2 - a*e**2/x - b*d**2*n/(9*x**3) - b*d**2*log(c
*x**n)/(3*x**3) - b*d*e*n/(2*x**2) - b*d*e*log(c*x**n)/x**2 - b*e**2*n/x -
b*e**2*log(c*x**n)/x
```

Giac [A]
time = 2.87, size = 108, normalized size = 1.44

$$-\frac{18\,bnx^2e^2\log\left(x\right)+18\,bdnxe\log\left(x\right)+18\,bnx^2e^2+9\,bdnxe+18\,bx^2e^2\log\left(c\right)+18\,bdxe\log\left(c\right)+6\,bd^2n\log\left(x\right)+2\,bd^2n+18\,ax^2e^2+18\,adxe+6\,bd^2\log\left(c\right)+6\,ad^2}{18\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] -1/18*(18*b*n*x^2*e^2*log(x) + 18*b*d*n*x*e*log(x) + 18*b*n*x^2*e^2 + 9*b*d
*n*x*e + 18*b*x^2*e^2*log(c) + 18*b*d*x*e*log(c) + 6*b*d^2*n*log(x) + 2*b*d
^2*n + 18*a*x^2*e^2 + 18*a*d*x*e + 6*b*d^2*log(c) + 6*a*d^2)/x^3
```

Mupad [B]
time = 3.59, size = 82, normalized size = 1.09

$$-\frac{x^2\left(3\,a\,e^2+3\,b\,e^2\,n\right)+a\,d^2+x\left(3\,a\,d\,e+\frac{3\,b\,d\,e\,n}{2}\right)+\frac{b\,d^2\,n}{3}}{3\,x^3}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{3}+b\,d\,e\,x+b\,e^2\,x^2\right)}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^2)/x^4,x)
```

```
[Out] - (x^2*(3*a*e^2 + 3*b*e^2*n) + a*d^2 + x*(3*a*d*e + (3*b*d*e*n)/2) + (b*d^2
*n)/3)/(3*x^3) - (log(c*x^n)*((b*d^2)/3 + b*e^2*x^2 + b*d*e*x))/x^3
```

3.17 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=95

$$-\frac{bd^2n}{16x^4}-\frac{2bden}{9x^3}-\frac{be^2n}{4x^2}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

```
[Out] -1/16*b*d^2*n/x^4-2/9*b*d*e*n/x^3-1/4*b*e^2*n/x^2-1/4*d^2*(a+b*ln(c*x^n))/x
^4-2/3*d*e*(a+b*ln(c*x^n))/x^3-1/2*e^2*(a+b*ln(c*x^n))/x^2
```

Rubi [A]
time = 0.05, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}-\frac{bd^2n}{16x^4}-\frac{2bden}{9x^3}-\frac{be^2n}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d^2*n)/x^4 - (2*b*d*e*n)/(9*x^3) - (b*e^2*n)/(4*x^2) - (d^2*(a + b
*Log[c*x^n]))/(4*x^4) - (2*d*e*(a + b*Log[c*x^n]))/(3*x^3) - (e^2*(a + b*Lo
g[c*x^n]))/(2*x^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx &= -\frac{1}{12}\left(\frac{3d^2}{x^4}+\frac{8de}{x^3}+\frac{6e^2}{x^2}\right)(a+b\log(cx^n))-(bn)\int\frac{-3d^2-8dex-6e^2x\\ &= -\frac{1}{12}\left(\frac{3d^2}{x^4}+\frac{8de}{x^3}+\frac{6e^2}{x^2}\right)(a+b\log(cx^n))-\frac{1}{12}(bn)\int\frac{-3d^2-8dex-6e}{x^5}\\ &= -\frac{1}{12}\left(\frac{3d^2}{x^4}+\frac{8de}{x^3}+\frac{6e^2}{x^2}\right)(a+b\log(cx^n))-\frac{1}{12}(bn)\int\left(-\frac{3d^2}{x^5}-\frac{8de}{x^4}-\right.\\ &= -\frac{bd^2n}{16x^4}-\frac{2bden}{9x^3}-\frac{be^2n}{4x^2}-\frac{1}{12}\left(\frac{3d^2}{x^4}+\frac{8de}{x^3}+\frac{6e^2}{x^2}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.03, size = 80, normalized size = 0.84

$$-\frac{12a(3d^2+8dex+6e^2x^2)+bn(9d^2+32dex+36e^2x^2)+12b(3d^2+8dex+6e^2x^2)\log(cx^n)}{144x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/144*(12*a*(3*d^2 + 8*d*e*x + 6*e^2*x^2) + b*n*(9*d^2 + 32*d*e*x + 36*e^2
*x^2) + 12*b*(3*d^2 + 8*d*e*x + 6*e^2*x^2)*Log[c*x^n])/x^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 403, normalized size = 4.24

method	result
risch	$-\frac{b(6e^2x^2+8dex+3d^2)\ln(x^n)}{12x^4}-\frac{18i\pi b\,d^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+36i\pi b\,e^2x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+48i\pi bdex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/12*b*(6*e^2*x^2+8*d*e*x+3*d^2)/x^4*ln(x^n)-1/144*(18*I*Pi*b*d^2*csgn(I*x
^n)*csgn(I*c*x^n)^2+36*I*Pi*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+48*I*Pi*b
*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2-18*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+72*ln(c)*b*e^2*x^2+36*b*e^2*n*x^2+72*a*e^2*x^2+36*I*Pi*b*e^2*x^2*cs
gn(I*c)*csgn(I*c*x^n)^2-36*I*Pi*b*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
```

```
n)-18*I*Pi*b*d^2*csgn(I*c*x^n)^3-36*I*Pi*b*e^2*x^2*csgn(I*c*x^n)^3+96*ln(c)
*b*d*e*x+32*b*d*e*n*x+96*a*d*e*x-48*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+48*I*Pi*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-48*I*Pi*b*d*e*x*csgn(
I*c*x^n)^3+18*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+36*d^2*b*ln(c)+9*b*d^2*n
+36*a*d^2)/x^4
```

Maxima [A]
time = 0.28, size = 100, normalized size = 1.05

$$-\frac{bne^2}{4\,x^2}-\frac{2\,bdne}{9\,x^3}-\frac{be^2\log\left(cx^n\right)}{2\,x^2}-\frac{2\,bde\log\left(cx^n\right)}{3\,x^3}-\frac{bd^2n}{16\,x^4}-\frac{ae^2}{2\,x^2}-\frac{2\,ade}{3\,x^3}-\frac{bd^2\log\left(cx^n\right)}{4\,x^4}-\frac{ad^2}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*e^2/x^2 - 2/9*b*d*n*e/x^3 - 1/2*b*e^2*log(c*x^n)/x^2 - 2/3*b*d*e*l
og(c*x^n)/x^3 - 1/16*b*d^2*n/x^4 - 1/2*a*e^2/x^2 - 2/3*a*d*e/x^3 - 1/4*b*d^
2*log(c*x^n)/x^4 - 1/4*a*d^2/x^4
```

Fricas [A]
time = 0.35, size = 102, normalized size = 1.07

$$-\frac{9\,bd^2n+36\,(bn+2\,a)x^2e^2+36\,ad^2+32\,(bdn+3\,ad)xe+12\,(6\,bx^2e^2+8\,bdxe+3\,bd^2)\log\left(c\right)+12\,(6\,bnx^2e^2+8\,bdnxe+3\,bd^2n)\log\left(x\right)}{144\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] -1/144*(9*b*d^2*n + 36*(b*n + 2*a)*x^2*e^2 + 36*a*d^2 + 32*(b*d*n + 3*a*d)*
x*e + 12*(6*b*x^2*e^2 + 8*b*d*x*e + 3*b*d^2)*log(c) + 12*(6*b*n*x^2*e^2 + 8
*b*d*n*x*e + 3*b*d^2*n)*log(x))/x^4
```

Sympy [A]
time = 0.52, size = 122, normalized size = 1.28

$$-\frac{ad^2}{4x^4}-\frac{2ade}{3x^3}-\frac{ae^2}{2x^2}-\frac{bd^2n}{16x^4}-\frac{bd^2\log\left(cx^n\right)}{4x^4}-\frac{2bden}{9x^3}-\frac{2bde\log\left(cx^n\right)}{3x^3}-\frac{be^2n}{4x^2}-\frac{be^2\log\left(cx^n\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] -a*d**2/(4*x**4) - 2*a*d*e/(3*x**3) - a*e**2/(2*x**2) - b*d**2*n/(16*x**4)
- b*d**2*log(c*x**n)/(4*x**4) - 2*b*d*e*n/(9*x**3) - 2*b*d*e*log(c*x**n)/(3
*x**3) - b*e**2*n/(4*x**2) - b*e**2*log(c*x**n)/(2*x**2)
```

Giac [A]
time = 2.13, size = 108, normalized size = 1.14

$$-\frac{72\,bnx^2e^2\log\left(x\right)+96\,bdnxe\log\left(x\right)+36\,bnx^2e^2+32\,bdnxe+72\,bx^2e^2\log\left(c\right)+96\,bdxe\log\left(c\right)+36\,bd^2n\log\left(x\right)+9\,bd^2n+72\,ax^2e^2+96\,adxe+36\,bd^2\log\left(c\right)+36\,ad^2}{144\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

```
[Out] -1/144*(72*b*n*x^2*e^2*log(x) + 96*b*d*n*x*e*log(x) + 36*b*n*x^2*e^2 + 32*b
*d*n*x*e + 72*b*x^2*e^2*log(c) + 96*b*d*x*e*log(c) + 36*b*d^2*n*log(x) + 9*
b*d^2*n + 72*a*x^2*e^2 + 96*a*d*x*e + 36*b*d^2*log(c) + 36*a*d^2)/x^4
```

Mupad [B]
time = 3.73, size = 85, normalized size = 0.89

$$-\frac{x^2\,\left(6\,a\,e^2+3\,b\,e^2\,n\right)+3\,a\,d^2+x\,\left(8\,a\,d\,e+\frac{8\,b\,d\,e\,n}{3}\right)+\frac{3\,b\,d^2\,n}{4}}{12\,x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{4}+\frac{2\,b\,d\,e\,x}{3}+\frac{b\,e^2\,x^2}{2}\right)}{x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^2)/x^5,x)
```

```
[Out] - (x^2*(6*a*e^2 + 3*b*e^2*n) + 3*a*d^2 + x*(8*a*d*e + (8*b*d*e*n)/3) + (3*b
*d^2*n)/4)/(12*x^4) - (log(c*x^n)*((b*d^2)/4 + (b*e^2*x^2)/2 + (2*b*d*e*x)/
3))/x^4
```

3.18 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=95

$$-\frac{bd^2n}{25x^5}-\frac{bden}{8x^4}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{de(a+b\log(cx^n))}{2x^4}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

```
[Out] -1/25*b*d^2*n/x^5-1/8*b*d*e*n/x^4-1/9*b*e^2*n/x^3-1/5*d^2*(a+b*ln(c*x^n))/x
^5-1/2*d*e*(a+b*ln(c*x^n))/x^4-1/3*e^2*(a+b*ln(c*x^n))/x^3
```

Rubi [A]
time = 0.05, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.190$, Rules used = {45, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{de(a+b\log(cx^n))}{2x^4}-\frac{e^2(a+b\log(cx^n))}{3x^3}-\frac{bd^2n}{25x^5}-\frac{bden}{8x^4}-\frac{be^2n}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d^2*n)/x^5 - (b*d*e*n)/(8*x^4) - (b*e^2*n)/(9*x^3) - (d^2*(a + b*L
og[c*x^n]))/(5*x^5) - (d*e*(a + b*Log[c*x^n]))/(2*x^4) - (e^2*(a + b*Log[c*
x^n]))/(3*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^6}\,dx &= -\frac{1}{30}\left(\frac{6d^2}{x^5}+\frac{15de}{x^4}+\frac{10e^2}{x^3}\right)(a+b\log(cx^n))-(bn)\int\frac{-6d^2-15dex-1}{30x^6}\\ &= -\frac{1}{30}\left(\frac{6d^2}{x^5}+\frac{15de}{x^4}+\frac{10e^2}{x^3}\right)(a+b\log(cx^n))-\frac{1}{30}(bn)\int\frac{-6d^2-15dex-}{x^6}\\ &= -\frac{1}{30}\left(\frac{6d^2}{x^5}+\frac{15de}{x^4}+\frac{10e^2}{x^3}\right)(a+b\log(cx^n))-\frac{1}{30}(bn)\int\left(-\frac{6d^2}{x^6}-\frac{15de}{x^5}\right.\\ &= -\frac{bd^2n}{25x^5}-\frac{bden}{8x^4}-\frac{be^2n}{9x^3}-\frac{1}{30}\left(\frac{6d^2}{x^5}+\frac{15de}{x^4}+\frac{10e^2}{x^3}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.03, size = 80, normalized size = 0.84

$$-\frac{60a(6d^2+15dex+10e^2x^2)+bn(72d^2+225dex+200e^2x^2)+60b(6d^2+15dex+10e^2x^2)\log(cx^n)}{1800x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/1800*(60*a*(6*d^2 + 15*d*e*x + 10*e^2*x^2) + b*n*(72*d^2 + 225*d*e*x + 2
00*e^2*x^2) + 60*b*(6*d^2 + 15*d*e*x + 10*e^2*x^2)*Log[c*x^n])/x^5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 403, normalized size = 4.24

method	result
risch	$-\frac{b(10e^2x^2+15dex+6d^2)\ln(x^n)}{30x^5}-\frac{-300i\pi b\,e^2x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)-180i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)-450i\pi bdex}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/30*b*(10*e^2*x^2+15*d*e*x+6*d^2)/x^5*ln(x^n)-1/1800*(-300*I*Pi*b*e^2*x^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-180*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-450*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+180*I*Pi*
b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+600*ln(c)*b*e^2*x^2+200*b*e^2*n*x^2+600*a*e
^2*x^2-450*I*Pi*b*d*e*x*csgn(I*c*x^n)^3-300*I*Pi*b*e^2*x^2*csgn(I*c*x^n)^3-
```

```
180*I*Pi*b*d^2*csgn(I*c*x^n)^3+300*I*Pi*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)
^2+900*ln(c)*b*d*e*x+225*b*d*e*n*x+900*a*d*e*x+450*I*Pi*b*d*e*x*csgn(I*x^n)
*csgn(I*c*x^n)^2+450*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2+300*I*Pi*b*e^2*
x^2*csgn(I*c)*csgn(I*c*x^n)^2+180*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+36
0*d^2*b*ln(c)+72*b*d^2*n+360*a*d^2)/x^5
```

Maxima [A]
time = 0.26, size = 100, normalized size = 1.05

$$-\frac{bne^2}{9\,x^3}-\frac{bdne}{8\,x^4}-\frac{be^2\log\left(cx^n\right)}{3\,x^3}-\frac{bde\log\left(cx^n\right)}{2\,x^4}-\frac{bd^2n}{25\,x^5}-\frac{ae^2}{3\,x^3}-\frac{ade}{2\,x^4}-\frac{bd^2\log\left(cx^n\right)}{5\,x^5}-\frac{ad^2}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*e^2/x^3 - 1/8*b*d*n*e/x^4 - 1/3*b*e^2*log(c*x^n)/x^3 - 1/2*b*d*e*l
og(c*x^n)/x^4 - 1/25*b*d^2*n/x^5 - 1/3*a*e^2/x^3 - 1/2*a*d*e/x^4 - 1/5*b*d^
2*log(c*x^n)/x^5 - 1/5*a*d^2/x^5
```

Fricas [A]
time = 0.36, size = 102, normalized size = 1.07

$$-\frac{72\,bd^2n+200\,(bn+3\,a)x^2e^2+360\,ad^2+225\,(bdn+4\,ad)xe+60\,(10\,bx^2e^2+15\,bdxe+6\,bd^2)\log\left(c\right)+60\,(10\,bnx^2e^2+15\,bdnxe+6\,bd^2n)\log\left(x\right)}{1800\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/1800*(72*b*d^2*n + 200*(b*n + 3*a)*x^2*e^2 + 360*a*d^2 + 225*(b*d*n + 4*
a*d)*x*e + 60*(10*b*x^2*e^2 + 15*b*d*x*e + 6*b*d^2)*log(c) + 60*(10*b*n*x^2
*e^2 + 15*b*d*n*x*e + 6*b*d^2*n)*log(x))/x^5
```

Sympy [A]
time = 0.73, size = 117, normalized size = 1.23

$$-\frac{ad^2}{5x^5}-\frac{ade}{2x^4}-\frac{ae^2}{3x^3}-\frac{bd^2n}{25x^5}-\frac{bd^2\log\left(cx^n\right)}{5x^5}-\frac{bden}{8x^4}-\frac{bde\log\left(cx^n\right)}{2x^4}-\frac{be^2n}{9x^3}-\frac{be^2\log\left(cx^n\right)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] -a*d**2/(5*x**5) - a*d*e/(2*x**4) - a*e**2/(3*x**3) - b*d**2*n/(25*x**5) -
b*d**2*log(c*x**n)/(5*x**5) - b*d*e*n/(8*x**4) - b*d*e*log(c*x**n)/(2*x**4)
 - b*e**2*n/(9*x**3) - b*e**2*log(c*x**n)/(3*x**3)
```

Giac [A]
time = 1.51, size = 108, normalized size = 1.14

$$-\frac{600\,bnx^2e^2\log\left(x\right)+900\,bdnxe\log\left(x\right)+200\,bnx^2e^2+225\,bdnxe+600\,bx^2e^2\log\left(c\right)+900\,bdxe\log\left(c\right)+360\,bd^2n\log\left(x\right)+72\,bd^2n+600\,ax^2e^2+900\,adxe+360\,bd^2\log\left(c\right)+360\,ad^2}{1800\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] -1/1800*(600*b*n*x^2*e^2*log(x) + 900*b*d*n*x*e*log(x) + 200*b*n*x^2*e^2 +
225*b*d*n*x*e + 600*b*x^2*e^2*log(c) + 900*b*d*x*e*log(c) + 360*b*d^2*n*log
(x) + 72*b*d^2*n + 600*a*x^2*e^2 + 900*a*d*x*e + 360*b*d^2*log(c) + 360*a*d
^2)/x^5
```

Mupad [B]
time = 3.63, size = 85, normalized size = 0.89

$$-\frac{x^2\,\left(10\,a\,e^2+\frac{10\,b\,e^2\,n}{3}\right)+6\,a\,d^2+x\,\left(15\,a\,d\,e+\frac{15\,b\,d\,e\,n}{4}\right)+\frac{6\,b\,d^2\,n}{5}}{30\,x^5}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{5}+\frac{b\,d\,e\,x}{2}+\frac{b\,e^2\,x^2}{3}\right)}{x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^2)/x^6,x)
```

```
[Out] - (x^2*(10*a*e^2 + (10*b*e^2*n)/3) + 6*a*d^2 + x*(15*a*d*e + (15*b*d*e*n)/4
) + (6*b*d^2*n)/5)/(30*x^5) - (log(c*x^n)*((b*d^2)/5 + (b*e^2*x^2)/3 + (b*d
*e*x)/2))/x^5
```

3.19 $\int x^3(d+ex)^3 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=100

$$-\frac{1}{16}bd^3nx^4-\frac{3}{25}bd^2enx^5-\frac{1}{12}bde^2nx^6-\frac{1}{49}be^3nx^7+\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log(c$$

```
[Out] -1/16*b*d^3*n*x^4-3/25*b*d^2*e*n*x^5-1/12*b*d*e^2*n*x^6-1/49*b*e^3*n*x^7+1/
140*(20*e^3*x^7+70*d*e^2*x^6+84*d^2*e*x^5+35*d^3*x^4)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2371, 12, 14}

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log(cx^n))-\frac{1}{16}bd^3nx^4-\frac{3}{25}bd^2enx^5-\frac{1}{12}bde^2nx^6-\frac{1}{49}be^3nx^7$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d^3*n*x^4) - (3*b*d^2*e*n*x^5)/25 - (b*d*e^2*n*x^6)/12 - (b*e^3*n*
x^7)/49 + ((35*d^3*x^4 + 84*d^2*e*x^5 + 70*d*e^2*x^6 + 20*e^3*x^7)*(a + b*L
og[c*x^n]))/140
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int$$
$$=\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{140}(bn$$
$$=\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{140}(bn$$
$$=-\frac{1}{16}bd^3nx^4-\frac{3}{25}bd^2enx^5-\frac{1}{12}bde^2nx^6-\frac{1}{49}be^3nx^7+\frac{1}{140}(35d^3x^4+84$$

Mathematica [A]
time = 0.04, size = 133, normalized size = 1.33

$$-\frac{1}{16}bd^3nx^4-\frac{3}{25}bd^2enx^5-\frac{1}{12}bde^2nx^6-\frac{1}{49}be^3nx^7+\frac{1}{4}d^3x^4(a+b\log(cx^n))+\frac{3}{5}d^2ex^5(a+b\log(cx^n))+\frac{1}{2}de^2x^6(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d^3*n*x^4) - (3*b*d^2*e*n*x^5)/25 - (b*d*e^2*n*x^6)/12 - (b*e^3*n*
x^7)/49 + (d^3*x^4*(a + b*Log[c*x^n]))/4 + (3*d^2*e*x^5*(a + b*Log[c*x^n]))
/5 + (d*e^2*x^6*(a + b*Log[c*x^n]))/2 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 119.10, size = 600, normalized size = 6.00

method	result
risch	$\frac{x^4 a\, d^3}{4}+\frac{x^7 a\, e^3}{7}-\frac{i\pi b\, d^3 x^4 \mathrm{csgn}(ic\, x^n)^3}{8}-\frac{i\pi b\, e^3 x^7 \mathrm{csgn}(ic\, x^n)^3}{14}-\frac{3i\pi b\, d^2 e\, x^5 \mathrm{csgn}(ic\, x^n)^3}{10}+\frac{i\pi b\, e^3 x^7 \mathrm{csgn}(ic)\mathrm{csgn}(ic\, x^n)^2}{14}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*a*d^3+1/7*x^7*a*e^3-1/8*I*Pi*b*d^3*x^4*csgn(I*c*x^n)^3-3/10*I*Pi*b*
d^2*e*x^5*csgn(I*c*x^n)^3+1/14*I*Pi*b*e^3*x^7*csgn(I*c)*csgn(I*c*x^n)^2+1/1
4*I*Pi*b*e^3*x^7*csgn(I*x^n)*csgn(I*c*x^n)^2-1/14*I*Pi*b*e^3*x^7*csgn(I*c*x
^n)^3+1/4*I*Pi*b*d*e^2*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b*d^3*x^4*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3/10*I*Pi*b*d^2*e*x^5*csgn(I*c)*csgn(I*c
*x^n)^2+3/10*I*Pi*b*d^2*e*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2-1/16*b*d^3*n*x^4-
1/49*b*e^3*n*x^7-3/25*b*d^2*e*n*x^5-1/12*b*d*e^2*n*x^6+1/4*I*Pi*b*d*e^2*x^6
```

```
*csgn(I*c)*csgn(I*c*x^n)^2+3/5*ln(c)*b*d^2*e*x^5+1/2*ln(c)*b*d*e^2*x^6-1/4*
I*Pi*b*d*e^2*x^6*csgn(I*c*x^n)^3+1/8*I*Pi*b*d^3*x^4*csgn(I*x^n)*csgn(I*c*x^
n)^2+1/8*I*Pi*b*d^3*x^4*csgn(I*c)*csgn(I*c*x^n)^2-3/10*I*Pi*b*d^2*e*x^5*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*I*Pi*b*d*e^2*x^6*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+1/140*b*x^4*(20*e^3*x^3+70*d*e^2*x^2+84*d^2*e*x+35*d^3)*ln(x
^n)-1/14*I*Pi*b*e^3*x^7*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*ln(c)*b*d^3
*x^4+1/7*ln(c)*b*e^3*x^7+1/2*a*d*e^2*x^6+3/5*a*d^2*e*x^5
```

Maxima [A]
time = 0.27, size = 140, normalized size = 1.40

$$-\frac{1}{49}\,bnx^7e^3-\frac{1}{12}\,bdnx^6e^2-\frac{3}{25}\,bd^2nx^5e+\frac{1}{7}\,bx^7e^3\log\left(cx^n\right)+\frac{1}{2}\,bdx^6e^2\log\left(cx^n\right)+\frac{3}{5}\,bd^2x^5e\log\left(cx^n\right)-\frac{1}{16}\,bd^3nx^4+\frac{1}{7}\,ax^7e^3+\frac{1}{2}\,adx^6e^2+\frac{3}{5}\,ad^2x^5e+\frac{1}{4}\,bd^3x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^3x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/49*b*n*x^7*e^3 - 1/12*b*d*n*x^6*e^2 - 3/25*b*d^2*n*x^5*e + 1/7*b*x^7*e^3
*log(c*x^n) + 1/2*b*d*x^6*e^2*log(c*x^n) + 3/5*b*d^2*x^5*e*log(c*x^n) - 1/1
6*b*d^3*n*x^4 + 1/7*a*x^7*e^3 + 1/2*a*d*x^6*e^2 + 3/5*a*d^2*x^5*e + 1/4*b*d
^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4
```

Fricas [A]
time = 0.35, size = 157, normalized size = 1.57

$$-\frac{1}{49}\,(bn-7\,a)x^7e^3-\frac{1}{12}\,(bdn-6\,ad)x^6e^2-\frac{3}{25}\,(bd^2n-5\,ad^2)x^5e-\frac{1}{16}\,(bd^3n-4\,ad^3)x^4+\frac{1}{140}\,(20\,bx^7e^3+70\,bdx^6e^2+84\,bd^2x^5e+35\,bd^3x^4)\log\left(c\right)+\frac{1}{140}\,(20\,bnx^7e^3+70\,bdnx^6e^2+84\,bd^2nx^5e+35\,bd^3nx^4)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/49*(b*n - 7*a)*x^7*e^3 - 1/12*(b*d*n - 6*a*d)*x^6*e^2 - 3/25*(b*d^2*n -
5*a*d^2)*x^5*e - 1/16*(b*d^3*n - 4*a*d^3)*x^4 + 1/140*(20*b*x^7*e^3 + 70*b*
d*x^6*e^2 + 84*b*d^2*x^5*e + 35*b*d^3*x^4)*log(c) + 1/140*(20*b*n*x^7*e^3 +
 70*b*d*n*x^6*e^2 + 84*b*d^2*n*x^5*e + 35*b*d^3*n*x^4)*log(x)
```

Sympy [A]
time = 0.86, size = 170, normalized size = 1.70

$$\frac{ad^3x^4}{4}+\frac{3ad^2ex^5}{5}+\frac{ade^2x^6}{2}+\frac{ae^3x^7}{7}-\frac{bd^3nx^4}{16}+\frac{bd^3x^4\log\left(cx^n\right)}{4}-\frac{3bd^2enx^5}{25}+\frac{3bd^2ex^5\log\left(cx^n\right)}{5}-\frac{bde^2nx^6}{12}+\frac{bde^2x^6\log\left(cx^n\right)}{2}-\frac{be^3nx^7}{49}+\frac{be^3x^7\log\left(cx^n\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**4/4 + 3*a*d**2*e*x**5/5 + a*d*e**2*x**6/2 + a*e**3*x**7/7 - b*d**
3*n*x**4/16 + b*d**3*x**4*log(c*x**n)/4 - 3*b*d**2*e*n*x**5/25 + 3*b*d**2*e
*x**5*log(c*x**n)/5 - b*d*e**2*n*x**6/12 + b*d*e**2*x**6*log(c*x**n)/2 - b*
e**3*n*x**7/49 + b*e**3*x**7*log(c*x**n)/7
```

Giac [A]
time = 2.22, size = 173, normalized size = 1.73

$$\frac{1}{7}bnx^7e^3\log(x)+\frac{1}{2}bdnx^6e^2\log(x)+\frac{3}{5}bd^2nx^5e\log(x)-\frac{1}{49}bnx^7e^3-\frac{1}{12}bdnx^6e^2-\frac{3}{25}bd^2nx^5e+\frac{1}{7}bx^7e^3\log(c)+\frac{1}{2}bdx^6e^2\log(c)+\frac{3}{5}bd^2x^5e\log(c)+\frac{1}{4}bd^3nx^4\log(x)-\frac{1}{16}bd^3nx^4+\frac{1}{7}ax^7e^3+\frac{1}{2}adx^6e^2+\frac{3}{5}ad^2x^5e+\frac{1}{4}bd^3x^4\log(c)+\frac{1}{4}ad^3x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/7*b*n*x^7*e^3*log(x) + 1/2*b*d*n*x^6*e^2*log(x) + 3/5*b*d^2*n*x^5*e*log(x
) - 1/49*b*n*x^7*e^3 - 1/12*b*d*n*x^6*e^2 - 3/25*b*d^2*n*x^5*e + 1/7*b*x^7*
e^3*log(c) + 1/2*b*d*x^6*e^2*log(c) + 3/5*b*d^2*x^5*e*log(c) + 1/4*b*d^3*n*
x^4*log(x) - 1/16*b*d^3*n*x^4 + 1/7*a*x^7*e^3 + 1/2*a*d*x^6*e^2 + 3/5*a*d^2
*x^5*e + 1/4*b*d^3*x^4*log(c) + 1/4*a*d^3*x^4
```

Mupad [B]
time = 3.58, size = 113, normalized size = 1.13

$$\ln(c\,x^n)\,\left(\frac{b\,d^3\,x^4}{4}+\frac{3\,b\,d^2\,e\,x^5}{5}+\frac{b\,d\,e^2\,x^6}{2}+\frac{b\,e^3\,x^7}{7}\right)+\frac{d^3\,x^4\,(4\,a-b\,n)}{16}+\frac{e^3\,x^7\,(7\,a-b\,n)}{49}+\frac{3\,d^2\,e\,x^5\,(5\,a-b\,n)}{25}+\frac{d\,e^2\,x^6\,(6\,a-b\,n)}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

```
[Out] log(c*x^n)*((b*d^3*x^4)/4 + (b*e^3*x^7)/7 + (3*b*d^2*e*x^5)/5 + (b*d*e^2*x^
6)/2) + (d^3*x^4*(4*a - b*n))/16 + (e^3*x^7*(7*a - b*n))/49 + (3*d^2*e*x^5*
(5*a - b*n))/25 + (d*e^2*x^6*(6*a - b*n))/12
```

3.20 $\int x^2(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=100

$$-\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6+\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log(cx^n$$

```
[Out] -1/9*b*d^3*n*x^3-3/16*b*d^2*e*n*x^4-3/25*b*d*e^2*n*x^5-1/36*b*e^3*n*x^6+1/6
0*(10*e^3*x^6+36*d*e^2*x^5+45*d^2*e*x^4+20*d^3*x^3)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2371, 12, 14}

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^4)/16 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*n
*x^6)/36 + ((20*d^3*x^3 + 45*d^2*e*x^4 + 36*d*e^2*x^5 + 10*e^3*x^6)*(a + b*
Log[c*x^n]))/60
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^2(d+ex)^3\,(a+b\log{(cx^n)})\;dx = \frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log{(cx^n)})-(bn)\int \frac{1}{6}$$
$$= \frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log{(cx^n)})-\frac{1}{60}(bn)\int$$
$$= \frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log{(cx^n)})-\frac{1}{60}(bn)\int$$
$$= -\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6+\frac{1}{60}\left(20d^3x^3+45d^2\right.$$

Mathematica [A]
time = 0.04, size = 133, normalized size = 1.33

$$-\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6+\frac{1}{3}d^3x^3(a+b\log{(cx^n)})+\frac{3}{4}d^2ex^4(a+b\log{(cx^n)})+\frac{3}{5}de^2x^5(a+b\log{(cx^n)})+\frac{1}{6}e^3x^6(a+b\log{(cx^n)})$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^4)/16 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*n
*x^6)/36 + (d^3*x^3*(a + b*Log[c*x^n]))/3 + (3*d^2*e*x^4*(a + b*Log[c*x^n])
)/4 + (3*d*e^2*x^5*(a + b*Log[c*x^n]))/5 + (e^3*x^6*(a + b*Log[c*x^n]))/6
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 91.93, size = 600, normalized size = 6.00

method	result
risch	$\frac{\ln(c)b\,d^3x^3}{3}+\frac{\ln(c)b\,e^3x^6}{6}+\frac{x^6a\,e^3}{6}+\frac{x^3a\,d^3}{3}+\frac{3\ln(c)bd\,e^2x^5}{5}+\frac{3\ln(c)b\,d^2e\,x^4}{4}+\frac{b\,x^3\left(10e^3x^3+36d\,e^2x^2+45d^2ex+20d^3\right)\ln(x}{60}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*ln(c)*b*d^3*x^3+1/6*ln(c)*b*e^3*x^6+1/6*x^6*a*e^3+1/3*x^3*a*d^3+3/5*ln(
c)*b*d*e^2*x^5+3/4*ln(c)*b*d^2*e*x^4+1/60*b*x^3*(10*e^3*x^3+36*d*e^2*x^2+45
*d^2*e*x+20*d^3)*ln(x^n)+3/10*I*Pi*b*d*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^2+3/
10*I*Pi*b*d*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2+3/4*x^4*a*d^2*e+3/5*x^5*a*d
*e^2+3/8*I*Pi*b*d^2*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+3/8*I*Pi*b*d^2*e*x^4*cs
gn(I*x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*d^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-1/12*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/36*b*e^3*n*
```

```
x^6-1/9*b*d^3*n*x^3+1/12*I*Pi*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-3/8*I*P
i*b*d^2*e*x^4*csgn(I*c*x^n)^3-3/10*I*Pi*b*d*e^2*x^5*csgn(I*c*x^n)^3-3/16*b*
d^2*e*n*x^4-3/25*b*d*e^2*n*x^5+1/6*I*Pi*b*d^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2
+1/6*I*Pi*b*d^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/12*I*Pi*b*e^3*x^6*csgn(I*
c)*csgn(I*c*x^n)^2-3/10*I*Pi*b*d*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)-3/8*I*Pi*b*d^2*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/12*I*Pi*b*e^3*
x^6*csgn(I*c*x^n)^3-1/6*I*Pi*b*d^3*x^3*csgn(I*c*x^n)^3
```

Maxima [A]
time = 0.28, size = 140, normalized size = 1.40

$$-\frac{1}{36}\,bnx^6e^3-\frac{3}{25}\,bdnx^5e^2-\frac{3}{16}\,bd^2nx^4e+\frac{1}{6}\,bx^6e^3\log\left(cx^n\right)+\frac{3}{5}\,bdx^5e^2\log\left(cx^n\right)+\frac{3}{4}\,bd^2x^4e\log\left(cx^n\right)-\frac{1}{9}\,bd^3nx^3+\frac{1}{6}\,ax^6e^3+\frac{3}{5}\,adx^5e^2+\frac{3}{4}\,ad^2x^4e+\frac{1}{3}\,bd^3x^3\log\left(cx^n\right)+\frac{1}{3}\,ad^3x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*n*x^6*e^3 - 3/25*b*d*n*x^5*e^2 - 3/16*b*d^2*n*x^4*e + 1/6*b*x^6*e^3
*log(c*x^n) + 3/5*b*d*x^5*e^2*log(c*x^n) + 3/4*b*d^2*x^4*e*log(c*x^n) - 1/9
*b*d^3*n*x^3 + 1/6*a*x^6*e^3 + 3/5*a*d*x^5*e^2 + 3/4*a*d^2*x^4*e + 1/3*b*d^
3*x^3*log(c*x^n) + 1/3*a*d^3*x^3
```

Fricas [A]
time = 0.35, size = 157, normalized size = 1.57

$$-\frac{1}{36}\,(bn-6\,a)x^6e^3-\frac{3}{25}\,(bdn-5\,ad)x^5e^2-\frac{3}{16}\,(bd^2n-4\,ad^2)x^4e-\frac{1}{9}\,(bd^3n-3\,ad^3)x^3+\frac{1}{60}\,\left(10\,bx^6e^3+36\,bdx^5e^2+45\,bd^2x^4e+20\,bd^3x^3\right)\log\left(c\right)+\frac{1}{60}\,\left(10\,bnx^6e^3+36\,bdnx^5e^2+45\,bd^2nx^4e+20\,bd^3nx^3\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/36*(b*n - 6*a)*x^6*e^3 - 3/25*(b*d*n - 5*a*d)*x^5*e^2 - 3/16*(b*d^2*n -
4*a*d^2)*x^4*e - 1/9*(b*d^3*n - 3*a*d^3)*x^3 + 1/60*(10*b*x^6*e^3 + 36*b*d*
x^5*e^2 + 45*b*d^2*x^4*e + 20*b*d^3*x^3)*log(c) + 1/60*(10*b*n*x^6*e^3 + 36
*b*d*n*x^5*e^2 + 45*b*d^2*n*x^4*e + 20*b*d^3*n*x^3)*log(x)
```

Sympy [A]
time = 0.61, size = 175, normalized size = 1.75

$$\frac{ad^3x^3}{3}+\frac{3ad^2ex^4}{4}+\frac{3ade^2x^5}{5}+\frac{ae^3x^6}{6}-\frac{bd^3nx^3}{9}+\frac{bd^3x^3\log\left(cx^n\right)}{3}-\frac{3bd^2enx^4}{16}+\frac{3bd^2ex^4\log\left(cx^n\right)}{4}-\frac{3bde^2nx^5}{25}+\frac{3bde^2x^5\log\left(cx^n\right)}{5}-\frac{be^3nx^6}{36}+\frac{be^3x^6\log\left(cx^n\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**3/3 + 3*a*d**2*e*x**4/4 + 3*a*d*e**2*x**5/5 + a*e**3*x**6/6 - b*d
**3*n*x**3/9 + b*d**3*x**3*log(c*x**n)/3 - 3*b*d**2*e*n*x**4/16 + 3*b*d**2*
e*x**4*log(c*x**n)/4 - 3*b*d*e**2*n*x**5/25 + 3*b*d*e**2*x**5*log(c*x**n)/5
 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6
```

Giac [A]
time = 1.77, size = 173, normalized size = 1.73

$$\frac{1}{6}bnx^6e^3\log(x)+\frac{3}{5}bdnx^5e^2\log(x)+\frac{3}{4}bd^2nx^4e\log(x)-\frac{1}{36}bnx^6e^3-\frac{3}{25}bdnx^5e^2-\frac{3}{16}bd^2nx^4e+\frac{1}{6}bx^6e^3\log(c)+\frac{3}{5}bdx^5e^2\log(c)+\frac{3}{4}bd^2x^4e\log(c)+\frac{1}{3}bd^3nx^3\log(x)-\frac{1}{9}bd^3nx^3+\frac{1}{6}ax^6e^3+\frac{3}{5}adx^5e^2+\frac{3}{4}ad^2x^4e+\frac{1}{3}bd^3x^3\log(c)+\frac{1}{3}ad^3x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/6*b*n*x^6*e^3*log(x) + 3/5*b*d*n*x^5*e^2*log(x) + 3/4*b*d^2*n*x^4*e*log(x
) - 1/36*b*n*x^6*e^3 - 3/25*b*d*n*x^5*e^2 - 3/16*b*d^2*n*x^4*e + 1/6*b*x^6*
e^3*log(c) + 3/5*b*d*x^5*e^2*log(c) + 3/4*b*d^2*x^4*e*log(c) + 1/3*b*d^3*n*
x^3*log(x) - 1/9*b*d^3*n*x^3 + 1/6*a*x^6*e^3 + 3/5*a*d*x^5*e^2 + 3/4*a*d^2*
x^4*e + 1/3*b*d^3*x^3*log(c) + 1/3*a*d^3*x^3
```

Mupad [B]
time = 3.64, size = 113, normalized size = 1.13

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^3}{3}+\frac{3\,b\,d^2\,e\,x^4}{4}+\frac{3\,b\,d\,e^2\,x^5}{5}+\frac{b\,e^3\,x^6}{6}\right)+\frac{d^3\,x^3\,\left(3\,a-b\,n\right)}{9}+\frac{e^3\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{3\,d^2\,e\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{3\,d\,e^2\,x^5\,\left(5\,a-b\,n\right)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

```
[Out] log(c*x^n)*((b*d^3*x^3)/3 + (b*e^3*x^6)/6 + (3*b*d^2*e*x^4)/4 + (3*b*d*e^2*
x^5)/5) + (d^3*x^3*(3*a - b*n))/9 + (e^3*x^6*(6*a - b*n))/36 + (3*d^2*e*x^4
*(4*a - b*n))/16 + (3*d*e^2*x^5*(5*a - b*n))/25
```

3.21 $\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=122

$$\frac{bd^4nx}{5e}+\frac{3}{20}bd^3nx^2+\frac{1}{15}bd^2enx^3+\frac{1}{80}bde^2nx^4-\frac{bn(d+ex)^5}{25e^2}+\frac{bd^5n\log(x)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a$$

```
[Out] 1/5*b*d^4*n*x/e+3/20*b*d^3*n*x^2+1/15*b*d^2*e*n*x^3+1/80*b*d*e^2*n*x^4-1/25
*b*n*(e*x+d)^5/e^2+1/20*b*d^5*n*ln(x)/e^2-1/20*(5*d*(e*x+d)^4/e^2-4*(e*x+d)
^5/e^2)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.210, Rules used = {45, 2371, 12, 81}

$$-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)+\frac{bd^5n\log(x)}{20e^2}+\frac{bd^4nx}{5e}+\frac{3}{20}bd^3nx^2+\frac{1}{15}bd^2enx^3+\frac{1}{80}bde^2nx^4-\frac{bn(d+ex)^5}{25e^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (b*d^4*n*x)/(5*e) + (3*b*d^3*n*x^2)/20 + (b*d^2*e*n*x^3)/15 + (b*d*e^2*n*x^
4)/80 - (b*n*(d + e*x)^5)/(25*e^2) + (b*d^5*n*Log[x])/(20*e^2) - (((5*d*(d
+ e*x)^4)/e^2 - (4*(d + e*x)^5)/e^2)*(a + b*Log[c*x^n]))/20
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x(d+ex)^3(a+b\log(cx^n))\,dx = -\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))-(bn)\int\frac{(d+ex)^4(\cdots}{20e\cdots}$$

$$= -\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))-\frac{(bn)\int\frac{(d+ex)^4(-d+4\cdots}{x}}{20e^2}$$

$$= -\frac{bn(d+ex)^5}{25e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))+\frac{(bd\cdots}{\cdots}$$

$$= -\frac{bn(d+ex)^5}{25e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))+\frac{(bd\cdots}{\cdots}$$

$$= \frac{bd^4nx}{5e}+\frac{3}{20}bd^3nx^2+\frac{1}{15}bd^2enx^3+\frac{1}{80}bde^2nx^4-\frac{bn(d+ex)^5}{25e^2}+\frac{bd^5n\log\cdots}{20e^2\cdots}$$

Mathematica [A]
time = 0.08, size = 130, normalized size = 1.07

$$-\frac{1}{4}bd^3nx^2-\frac{1}{3}bd^2enx^3-\frac{3}{16}bde^2nx^4-\frac{1}{25}be^3nx^5+\frac{1}{2}d^3x^2(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{4}de^2x^4(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d^3*n*x^2) - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^4)/16 - (b*e^3*n*x^
5)/25 + (d^3*x^2*(a + b*Log[c*x^n]))/2 + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*
d*e^2*x^4*(a + b*Log[c*x^n]))/4 + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 598, normalized size = 4.90

method	result
risch	$\frac{x^5ae^3}{5}+\frac{3x^4ade^2}{4}+x^3ad^2e+\frac{3i\pi bde^2x^4\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2}{8}+\frac{i\pi bd^2ex^3\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2}{2}-\frac{i\pi be^3x^5\mathrm{csgn}(ic)\mathrm{csgn}(i\cdots}{10}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/5*x^5*a*e^3+3/4*x^4*a*d*e^2+x^3*a*d^2*e+1/5*ln(c)*b*e^3*x^5+1/2*ln(c)*b*d
^3*x^2-1/4*I*Pi*b*d^3*x^2*csgn(I*c*x^n)^3+1/20*b*x^2*(4*e^3*x^3+15*d*e^2*x^
2+20*d^2*e*x+10*d^3)*ln(x^n)+1/2*a*d^3*x^2+3/8*I*Pi*b*d*e^2*x^4*csgn(I*x^n)
*csgn(I*c*x^n)^2+3/8*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*Pi*b*
d^2*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/10*I*Pi*b*e^3*x^5*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)-1/2*I*Pi*b*d^2*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-3/8*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*I*Pi*b*d^3*x^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*Pi*b*d^2*e*x^3*csgn(I*c)*csgn(I
*c*x^n)^2-1/10*I*Pi*b*e^3*x^5*csgn(I*c*x^n)^3+ln(c)*b*d^2*e*x^3+3/4*ln(c)*b
*d*e^2*x^4-1/2*I*Pi*b*d^2*e*x^3*csgn(I*c*x^n)^3+1/10*I*Pi*b*e^3*x^5*csgn(I*
c)*csgn(I*c*x^n)^2-1/4*b*d^3*n*x^2-1/3*b*d^2*e*n*x^3-3/16*b*d*e^2*n*x^4-1/2
5*b*e^3*n*x^5+1/4*I*Pi*b*d^3*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/4*I*Pi*b*d^3*x
^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3/8*I*Pi*b*d*e^2*x^4*csgn(I*c*x^n)^3+1/10*I*
Pi*b*e^3*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2
```

Maxima [A]
time = 0.27, size = 138, normalized size = 1.13

$$-\frac{1}{25}\,bnx^5e^3 - \frac{3}{16}\,bdnx^4e^2 - \frac{1}{3}\,bd^2nx^3e + \frac{1}{5}\,bx^5e^3\log\left(cx^n\right) + \frac{3}{4}\,bdx^4e^2\log\left(cx^n\right) + bd^2x^3e\log\left(cx^n\right) - \frac{1}{4}\,bd^3nx^2 + \frac{1}{5}\,ax^5e^3 + \frac{3}{4}\,adx^4e^2 + ad^2x^3e + \frac{1}{2}\,bd^3x^2\log\left(cx^n\right) + \frac{1}{2}\,ad^3x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*n*x^5*e^3 - 3/16*b*d*n*x^4*e^2 - 1/3*b*d^2*n*x^3*e + 1/5*b*x^5*e^3*
log(c*x^n) + 3/4*b*d*x^4*e^2*log(c*x^n) + b*d^2*x^3*e*log(c*x^n) - 1/4*b*d^
3*n*x^2 + 1/5*a*x^5*e^3 + 3/4*a*d*x^4*e^2 + a*d^2*x^3*e + 1/2*b*d^3*x^2*log
(c*x^n) + 1/2*a*d^3*x^2
```

Fricas [A]
time = 0.35, size = 157, normalized size = 1.29

$$-\frac{1}{25}\,{\left(bn - 5\,a\right)}x^5e^3 - \frac{3}{16}\,{\left(bdn - 4\,ad\right)}x^4e^2 - \frac{1}{3}\,{\left(bd^2n - 3\,ad^2\right)}x^3e - \frac{1}{4}\,{\left(bd^3n - 2\,ad^3\right)}x^2 + \frac{1}{20}\,{\left(4\,bx^5e^3 + 15\,bdx^4e^2 + 20\,bd^2x^3e + 10\,bd^3x^2\right)}\log\left(c\right) + \frac{1}{20}\,{\left(4\,bnx^5e^3 + 15\,bdnx^4e^2 + 20\,bd^2nx^3e + 10\,bd^3nx^2\right)}\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/25*(b*n - 5*a)*x^5*e^3 - 3/16*(b*d*n - 4*a*d)*x^4*e^2 - 1/3*(b*d^2*n - 3
*a*d^2)*x^3*e - 1/4*(b*d^3*n - 2*a*d^3)*x^2 + 1/20*(4*b*x^5*e^3 + 15*b*d*x^
4*e^2 + 20*b*d^2*x^3*e + 10*b*d^3*x^2)*log(c) + 1/20*(4*b*n*x^5*e^3 + 15*b*
d*n*x^4*e^2 + 20*b*d^2*n*x^3*e + 10*b*d^3*n*x^2)*log(x)
```

Sympy [A]
time = 0.42, size = 167, normalized size = 1.37

$$\frac{ad^3x^2}{2} + ad^2ex^3 + \frac{3ade^2x^4}{4} + \frac{ae^3x^5}{5} - \frac{bd^3nx^2}{4} + \frac{bd^3x^2\log\left(cx^n\right)}{2} - \frac{bd^2enx^3}{3} + bd^2ex^3\log\left(cx^n\right) - \frac{3bde^2nx^4}{16} + \frac{3bde^2x^4\log\left(cx^n\right)}{4} - \frac{be^3nx^5}{25} + \frac{be^3x^5\log\left(cx^n\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**2/2 + a*d**2*e*x**3 + 3*a*d*e**2*x**4/4 + a*e**3*x**5/5 - b*d**3*
n*x**2/4 + b*d**3*x**2*log(c*x**n)/2 - b*d**2*e*n*x**3/3 + b*d**2*e*x**3*lo
g(c*x**n) - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**n)/4 - b*e**3*n
*x**5/25 + b*e**3*x**5*log(c*x**n)/5
```

Giac [A]
time = 2.22, size = 170, normalized size = 1.39

$$\frac{1}{5}\,bnx^5e^3\log\left(x\right)+\frac{3}{4}\,bdnx^4e^2\log\left(x\right)+bd^2nx^3e\log\left(x\right)-\frac{1}{25}\,bnx^5e^3-\frac{3}{16}\,bdnx^4e^2-\frac{1}{3}\,bd^2nx^3e+\frac{1}{5}\,bx^5e^3\log\left(c\right)+\frac{3}{4}\,bdx^4e^2\log\left(c\right)+bd^2x^3e\log\left(c\right)+\frac{1}{2}\,bd^3nx^2\log\left(x\right)-\frac{1}{4}\,bd^3nx^2+\frac{1}{5}\,ax^5e^3+\frac{3}{4}\,adx^4e^2+ad^2x^3e+\frac{1}{2}\,bd^3x^2\log\left(c\right)+\frac{1}{2}\,ad^3x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/5*b*n*x^5*e^3*log(x) + 3/4*b*d*n*x^4*e^2*log(x) + b*d^2*n*x^3*e*log(x) -
1/25*b*n*x^5*e^3 - 3/16*b*d*n*x^4*e^2 - 1/3*b*d^2*n*x^3*e + 1/5*b*x^5*e^3*l
og(c) + 3/4*b*d*x^4*e^2*log(c) + b*d^2*x^3*e*log(c) + 1/2*b*d^3*n*x^2*log(x
) - 1/4*b*d^3*n*x^2 + 1/5*a*x^5*e^3 + 3/4*a*d*x^4*e^2 + a*d^2*x^3*e + 1/2*b
*d^3*x^2*log(c) + 1/2*a*d^3*x^2
```

Mupad [B]
time = 3.61, size = 112, normalized size = 0.92

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^2}{2}+b\,d^2\,e\,x^3+\frac{3\,b\,d\,e^2\,x^4}{4}+\frac{b\,e^3\,x^5}{5}\right)+\frac{d^3\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^3\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{d^2\,e\,x^3\,\left(3\,a-b\,n\right)}{3}+\frac{3\,d\,e^2\,x^4\,\left(4\,a-b\,n\right)}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

```
[Out] log(c*x^n)*((b*d^3*x^2)/2 + (b*e^3*x^5)/5 + b*d^2*e*x^3 + (3*b*d*e^2*x^4)/4
) + (d^3*x^2*(2*a - b*n))/4 + (e^3*x^5*(5*a - b*n))/25 + (d^2*e*x^3*(3*a -
b*n))/3 + (3*d*e^2*x^4*(4*a - b*n))/16
```

3.22 $\int (d+ex)^3 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=85

$$-bd^3nx-\frac{3}{4}bd^2enx^2-\frac{1}{3}bde^2nx^3-\frac{1}{16}be^3nx^4-\frac{bd^4n\log(x)}{4e}+\frac{(d+ex)^4(a+b\log(cx^n))}{4e}$$

```
[Out] -b*d^3*n*x-3/4*b*d^2*e*n*x^2-1/3*b*d*e^2*n*x^3-1/16*b*e^3*n*x^4-1/4*b*d^4*n
*ln(x)/e+1/4*(e*x+d)^4*(a+b*ln(c*x^n))/e
```

Rubi [A]
time = 0.03, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {32, 2350, 12, 45}

$$\frac{(d+ex)^4(a+b\log(cx^n))}{4e}-\frac{bd^4n\log(x)}{4e}-bd^3nx-\frac{3}{4}bd^2enx^2-\frac{1}{3}bde^2nx^3-\frac{1}{16}be^3nx^4$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d^3*n*x) - (3*b*d^2*e*n*x^2)/4 - (b*d*e^2*n*x^3)/3 - (b*e^3*n*x^4)/16 -
 (b*d^4*n*Log[x])/(4*e) + ((d + e*x)^4*(a + b*Log[c*x^n]))/(4*e)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 32

```
Int[((a_.) + (b_.)*(x_))^(m_), x_Symbol] :> Simp[(a + b*x)^(m + 1)/(b*(m +
1)), x] /; FreeQ[{a, b, m}, x] && NeQ[m, -1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$
\begin{aligned}
\int (d+ex)^3 (a+b\log(cx^n))\,dx &= \frac{(d+ex)^4 (a+b\log(cx^n))}{4e} - (bn)\int \frac{(d+ex)^4}{4ex}\,dx \\
&= \frac{(d+ex)^4 (a+b\log(cx^n))}{4e} - \frac{(bn)\int \frac{(d+ex)^4}{x}\,dx}{4e} \\
&= \frac{(d+ex)^4 (a+b\log(cx^n))}{4e} - \frac{(bn)\int \left(4d^3e + \frac{d^4}{x} + 6d^2e^2x + 4de^3x^2 + e^4x^3\right.}{4e} \\
&= -bd^3nx - \frac{3}{4}bd^2enx^2 - \frac{1}{3}bde^2nx^3 - \frac{1}{16}be^3nx^4 - \frac{bd^4n\log(x)}{4e} + \frac{(d+ex)^4 (}{}
\end{aligned}
$$

Mathematica [**A**]
time = 0.03, size = 110, normalized size = 1.29

$$\frac{1}{48}x\left(12a\left(4d^3+6d^2ex+4de^2x^2+e^3x^3\right)-bn\left(48d^3+36d^2ex+16de^2x^2+3e^3x^3\right)+12b\left(4d^3+6d^2ex+4de^2x^2+e^3x^3\right)\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(12*a*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2 + e^3*x^3) - b*n*(48*d^3 + 36*d^2
*e*x + 16*d*e^2*x^2 + 3*e^3*x^3) + 12*b*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2 +
e^3*x^3)*Log[c*x^n]))/48
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 571, normalized size = 6.72

method	result
risch	$\frac{a\,e^3x^4}{4} + xa\,d^3 + ad\,e^2x^3 + \frac{3a\,d^2e\,x^2}{2} + \frac{3\ln(c)b\,d^2e\,x^2}{2} + \ln(c)\,bd\,e^2x^3 - b\,d^3nx + \frac{(ex+d)^4b\ln(x^n)}{4e} + \ln(c)\,b$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*a*e^3*x^4+x*a*d^3+a*d*e^2*x^3+3/2*a*d^2*e*x^2+3/2*ln(c)*b*d^2*e*x^2+ln(
c)*b*d*e^2*x^3-1/8*I*e^3*Pi*b*x^4*csgn(I*c*x^n)^3-1/2*I*Pi*b*d^3*csgn(I*c*x
^n)^3*x-b*d^3*n*x+1/4*(e*x+d)^4*b/e*ln(x^n)+ln(c)*b*d^3*x+1/4*ln(c)*b*e^3*x
^4-1/2*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-1/8*I*e^3*Pi*b*x^4*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/16*b*e^3*n*x^4-1/2*I*e^2*Pi*b*d*x^3*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/4*I*e*Pi*b*d^2*x^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-3/4*b*d^2*e*n*x^2-1/3*b*d*e^2*n*x^3-1/4*b*d^4*n*ln(x)/e+1/
2*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2*x+1/2*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*
c*x^n)^2*x+1/8*I*e^3*Pi*b*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/8*I*e^3*Pi*b*x^4*
```

```
csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*e^2*Pi*b*d*x^3*csgn(I*c*x^n)^3-3/4*I*e*Pi
*b*d^2*x^2*csgn(I*c*x^n)^3+1/2*I*e^2*Pi*b*d*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1
/2*I*e^2*Pi*b*d*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+3/4*I*e*Pi*b*d^2*x^2*csgn(I
*c)*csgn(I*c*x^n)^2+3/4*I*e*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2
```

Maxima [A]
time = 0.26, size = 130, normalized size = 1.53

$$-\frac{1}{16}bnx^4e^3-\frac{1}{3}bdnx^3e^2-\frac{3}{4}bd^2nx^2e+\frac{1}{4}bx^4e^3\log(cx^n)+bdx^3e^2\log(cx^n)+\frac{3}{2}bd^2x^2e\log(cx^n)-bd^3nx+\frac{1}{4}ax^4e^3+adx^3e^2+\frac{3}{2}ad^2x^2e+bd^3x\log(cx^n)+ad^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*n*x^4*e^3 - 1/3*b*d*n*x^3*e^2 - 3/4*b*d^2*n*x^2*e + 1/4*b*x^4*e^3*l
og(c*x^n) + b*d*x^3*e^2*log(c*x^n) + 3/2*b*d^2*x^2*e*log(c*x^n) - b*d^3*n*x
 + 1/4*a*x^4*e^3 + a*d*x^3*e^2 + 3/2*a*d^2*x^2*e + b*d^3*x*log(c*x^n) + a*d
^3*x
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 149 vs. 2(73) = 146.
time = 0.34, size = 149, normalized size = 1.75

$$-\frac{1}{16}(bn-4a)x^4e^3-\frac{1}{3}(bdn-3ad)x^3e^2-\frac{3}{4}(bd^2n-2ad^2)x^2e-(bd^3n-ad^3)x+\frac{1}{4}(bx^4e^3+4bdx^3e^2+6bd^2x^2e+4bd^3x)\log(c)+\frac{1}{4}(bnx^4e^3+4bdnx^3e^2+6bd^2nx^2e+4bd^3nx)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/16*(b*n - 4*a)*x^4*e^3 - 1/3*(b*d*n - 3*a*d)*x^3*e^2 - 3/4*(b*d^2*n - 2*
a*d^2)*x^2*e - (b*d^3*n - a*d^3)*x + 1/4*(b*x^4*e^3 + 4*b*d*x^3*e^2 + 6*b*d
^2*x^2*e + 4*b*d^3*x)*log(c) + 1/4*(b*n*x^4*e^3 + 4*b*d*n*x^3*e^2 + 6*b*d^2
*n*x^2*e + 4*b*d^3*n*x)*log(x)
```

Sympy [A]
time = 0.29, size = 156, normalized size = 1.84

$$ad^3x+\frac{3ad^2ex^2}{2}+ade^2x^3+\frac{ae^3x^4}{4}-bd^3nx+bd^3x\log(cx^n)-\frac{3bd^2enx^2}{4}+\frac{3bd^2ex^2\log(cx^n)}{2}-\frac{bde^2nx^3}{3}+bde^2x^3\log(cx^n)-\frac{be^3nx^4}{16}+\frac{be^3x^4\log(cx^n)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x + 3*a*d**2*e*x**2/2 + a*d*e**2*x**3 + a*e**3*x**4/4 - b*d**3*n*x +
 b*d**3*x*log(c*x**n) - 3*b*d**2*e*n*x**2/4 + 3*b*d**2*e*x**2*log(c*x**n)/2
 - b*d*e**2*n*x**3/3 + b*d*e**2*x**3*log(c*x**n) - b*e**3*n*x**4/16 + b*e**
3*x**4*log(c*x**n)/4
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 159 vs. 2(73) = 146.
time = 1.91, size = 159, normalized size = 1.87

$$\frac{1}{4}bnx^4e^3\log(x) + bdnx^3e^2\log(x) + \frac{3}{2}bd^2nx^2e\log(x) - \frac{1}{16}bnx^4e^3 - \frac{1}{3}bdnx^3e^2 - \frac{3}{4}bd^2nx^2e + \frac{1}{4}bx^4e^3\log(c) + bdx^3e^2\log(c) + \frac{3}{2}bd^2x^2e\log(c) + bd^3nx\log(x) - bd^3nx + \frac{1}{4}ax^4e^3 + adx^3e^2 + \frac{3}{2}ad^2x^2e + bd^3x\log(c) + ad^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/4*b*n*x^4*e^3*log(x) + b*d*n*x^3*e^2*log(x) + 3/2*b*d^2*n*x^2*e*log(x) -
1/16*b*n*x^4*e^3 - 1/3*b*d*n*x^3*e^2 - 3/4*b*d^2*n*x^2*e + 1/4*b*x^4*e^3*lo
g(c) + b*d*x^3*e^2*log(c) + 3/2*b*d^2*x^2*e*log(c) + b*d^3*n*x*log(x) - b*d
^3*n*x + 1/4*a*x^4*e^3 + a*d*x^3*e^2 + 3/2*a*d^2*x^2*e + b*d^3*x*log(c) + a
*d^3*x
```

Mupad [B]
time = 3.57, size = 104, normalized size = 1.22

$$\ln(c\,x^n)\,\left(b\,d^3\,x + \frac{3\,b\,d^2\,e\,x^2}{2} + b\,d\,e^2\,x^3 + \frac{b\,e^3\,x^4}{4}\right) + \frac{e^3\,x^4\,(4\,a - b\,n)}{16} + d^3\,x\,(a - b\,n) + \frac{3\,d^2\,e\,x^2\,(2\,a - b\,n)}{4} + \frac{d\,e^2\,x^3\,(3\,a - b\,n)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))*(d + e*x)^3,x)
```

```
[Out] log(c*x^n)*((b*e^3*x^4)/4 + b*d^3*x + (3*b*d^2*e*x^2)/2 + b*d*e^2*x^3) + (e
^3*x^4*(4*a - b*n))/16 + d^3*x*(a - b*n) + (3*d^2*e*x^2*(2*a - b*n))/4 + (d
*e^2*x^3*(3*a - b*n))/3
```

3.23 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=122

$$-3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3-\frac{1}{2}bd^3n\log^2(x)+3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a$$

```
[Out] -3*b*d^2*e*n*x-3/4*b*d*e^2*n*x^2-1/9*b*e^3*n*x^3-1/2*b*d^3*n*ln(x)^2+3*d^2*
e*x*(a+b*ln(c*x^n))+3/2*d*e^2*x^2*(a+b*ln(c*x^n))+1/3*e^3*x^3*(a+b*ln(c*x^n
))+d^3*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {45, 2372, 2338}

$$d^3\log(x)(a+b\log(cx^n))+3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))-\frac{1}{2}bd^3n\log^2(x)-3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -3*b*d^2*e*n*x - (3*b*d*e^2*n*x^2)/4 - (b*e^3*n*x^3)/9 - (b*d^3*n*Log[x]^2)
/2 + 3*d^2*e*x*(a + b*Log[c*x^n]) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e
^3*x^3*(a + b*Log[c*x^n]))/3 + d^3*Log[x]*(a + b*Log[c*x^n])
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{6}\big(18d^2ex+9de^2x^2+2e^3x^3+6d^3\log(x)\big)\,(a+b\log(cx^n))-(bn)\int\bigg(\frac{1}{6}e$$
$$=\frac{1}{6}\big(18d^2ex+9de^2x^2+2e^3x^3+6d^3\log(x)\big)\,(a+b\log(cx^n))-(bd^3n)\int\frac{\mathrm{lo}}{}$$
$$=-3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3-\frac{1}{2}bd^3n\log^2(x)+\frac{1}{6}\big(18d^2ex+9de^2x^2$$

Mathematica [A]
time = 0.04, size = 123, normalized size = 1.01

$$3ad^2ex-3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3+3bd^2ex\log(cx^n)+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))+\frac{d^3(a+b\log(cx^n))^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] 3*a*d^2*e*x - 3*b*d^2*e*n*x - (3*b*d*e^2*n*x^2)/4 - (b*e^3*n*x^3)/9 + 3*b*d
^2*e*x*Log[c*x^n] + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3*(a + b*Lo
g[c*x^n]))/3 + (d^3*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.17, size = 579, normalized size = 4.75

method	result
risch	$\frac{3i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{2}+\frac{3i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{2}+\frac{3i\pi bd\,e^2x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{4}+a\,d^3\ln(x)+\frac{\ln(c)b\,e^3}{3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3/4*I*Pi*b*d*e^2*x^
2*csgn(I*x^n)*csgn(I*c*x^n)^2+a*d^3*ln(x)+1/3*ln(c)*b*e^3*x^3-1/6*I*Pi*b*e^
3*x^3*csgn(I*c*x^n)^3-1/2*I*ln(x)*Pi*b*d^3*csgn(I*c*x^n)^3+3/2*I*Pi*b*d^2*e
*x*csgn(I*x^n)*csgn(I*c*x^n)^2+3/2*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2
+3/2*a*d*e^2*x^2+3*a*d^2*e*x+3/4*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2
+1/3*a*e^3*x^3+ln(x)*ln(c)*b*d^3+3/2*ln(c)*b*d*e^2*x^2+3*ln(c)*b*d^2*e*x+(1
/3*x^3*b*e^3+3/2*x^2*b*d*e^2+3*b*d^2*e*x+b*d^3*ln(x))*ln(x^n)-1/2*I*ln(x)*P
i*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/9*b*e^3*n*x^3-3/4*I*Pi*b*d*e^
2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/2*I*Pi*b*d^2*e*x*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)-1/2*b*d^3*n*ln(x)^2-3*b*d^2*e*n*x-3/4*b*d*e^2*n*x^2+1
/2*I*ln(x)*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-3/2*I*Pi*b*d^2*e*x*csgn(I*c
*x^n)^3+1/6*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*e^3*x^3*csg
```

```
n(I*x^n)*csgn(I*c*x^n)^2-3/4*I*Pi*b*d*e^2*x^2*csgn(I*c*x^n)^3+1/2*I*ln(x)*P
i*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2
```

Maxima [A]
time = 0.27, size = 124, normalized size = 1.02

$$-\frac{1}{9}bnx^3e^3-\frac{3}{4}bdnx^2e^2-3bd^2nxe+\frac{1}{3}bx^3e^3\log(cx^n)+\frac{3}{2}bdx^2e^2\log(cx^n)+3bd^2xe\log(cx^n)+\frac{1}{3}ax^3e^3+\frac{3}{2}adx^2e^2+3ad^2xe+\frac{bd^3\log(cx^n)^2}{2n}+ad^3\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*x^3*e^3 - 3/4*b*d*n*x^2*e^2 - 3*b*d^2*n*x*e + 1/3*b*x^3*e^3*log(c*
x^n) + 3/2*b*d*x^2*e^2*log(c*x^n) + 3*b*d^2*x*e*log(c*x^n) + 1/3*a*x^3*e^3
+ 3/2*a*d*x^2*e^2 + 3*a*d^2*x*e + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x)
```

Fricas [A]
time = 0.35, size = 139, normalized size = 1.14

$$\frac{1}{2}bd^3n\log(x)^2-\frac{1}{9}(bn-3a)x^3e^3-\frac{3}{4}(bdn-2ad)x^2e^2-3(bd^2n-ad^2)xe+\frac{1}{6}(2bx^3e^3+9bdx^2e^2+18bd^2xe)\log(c)+\frac{1}{6}(2bnx^3e^3+9bdnx^2e^2+18bd^2nxe+6bd^3\log(c)+6ad^3)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*b*d^3*n*log(x)^2 - 1/9*(b*n - 3*a)*x^3*e^3 - 3/4*(b*d*n - 2*a*d)*x^2*e^
2 - 3*(b*d^2*n - a*d^2)*x*e + 1/6*(2*b*x^3*e^3 + 9*b*d*x^2*e^2 + 18*b*d^2*x
*e)*log(c) + 1/6*(2*b*n*x^3*e^3 + 9*b*d*n*x^2*e^2 + 18*b*d^2*n*x*e + 6*b*d^
3*log(c) + 6*a*d^3)*log(x)
```

Sympy [A]
time = 0.46, size = 199, normalized size = 1.63

$$\begin{cases} \frac{ad^3\log(cx^n)}{n}+3ad^2ex+\frac{3ade^2x^2}{2}+\frac{ae^3x^3}{3}+\frac{bd^3\log(cx^n)^2}{2n}-3bd^2enx+3bd^2ex\log(cx^n)-\frac{3bde^2nx^2}{4}+\frac{3bde^2x^2\log(cx^n)}{2}-\frac{be^3nx^3}{9}+\frac{be^3x^3\log(cx^n)}{3} & \text{for } n\neq 0 \\ (a+b\log(c))\left(d^3\log(x)+3d^2ex+\frac{3de^2x^2}{2}+\frac{e^3x^3}{3}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x + 3*a*d*e**2*x**2/2 + a*e**3
*x**3/3 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c
*x**n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*x**
3/9 + b*e**3*x**3*log(c*x**n)/3, Ne(n, 0)), ((a + b*log(c))*(d**3*log(x) +
3*d**2*e*x + 3*d*e**2*x**2/2 + e**3*x**3/3), True))
```

Giac [A]
time = 2.06, size = 150, normalized size = 1.23

$$\frac{1}{3}bnx^3e^3\log(x)+\frac{3}{2}bdnx^2e^2\log(x)+3bd^2nxe\log(x)+\frac{1}{2}bd^3n\log(x)^2-\frac{1}{9}bnx^3e^3-\frac{3}{4}bdnx^2e^2-3bd^2nxe+\frac{1}{3}bx^3e^3\log(c)+\frac{3}{2}bdx^2e^2\log(c)+3bd^2xe\log(c)+bd^3\log(c)\log(x)+\frac{1}{3}ax^3e^3+\frac{3}{2}adx^2e^2+3ad^2xe+ad^3\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/3*b*n*x^3*e^3*log(x) + 3/2*b*d*n*x^2*e^2*log(x) + 3*b*d^2*n*x*e*log(x) +
1/2*b*d^3*n*log(x)^2 - 1/9*b*n*x^3*e^3 - 3/4*b*d*n*x^2*e^2 - 3*b*d^2*n*x*e
+ 1/3*b*x^3*e^3*log(c) + 3/2*b*d*x^2*e^2*log(c) + 3*b*d^2*x*e*log(c) + b*d^
3*log(c)*log(x) + 1/3*a*x^3*e^3 + 3/2*a*d*x^2*e^2 + 3*a*d^2*x*e + a*d^3*log
(x)
```

Mupad [B]
time = 3.64, size = 106, normalized size = 0.87

$$\ln\left(c\,x^n\right)\,\left(3\,b\,d^2\,e\,x+\frac{3\,b\,d\,e^2\,x^2}{2}+\frac{b\,e^3\,x^3}{3}\right)+\frac{e^3\,x^3\,\left(3\,a-b\,n\right)}{9}+a\,d^3\,\ln\left(x\right)+\frac{b\,d^3\,{\ln\left(c\,x^n\right)}^2}{2\,n}+\frac{3\,d\,e^2\,x^2\,\left(2\,a-b\,n\right)}{4}+3\,d^2\,e\,x\,\left(a-b\,n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x,x)
```

```
[Out] log(c*x^n)*((b*e^3*x^3)/3 + 3*b*d^2*e*x + (3*b*d*e^2*x^2)/2) + (e^3*x^3*(3*
a - b*n))/9 + a*d^3*log(x) + (b*d^3*log(c*x^n)^2)/(2*n) + (3*d*e^2*x^2*(2*a
 - b*n))/4 + 3*d^2*e*x*(a - b*n)
```

3.24 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^2} dx$

Optimal. Leaf size=119

$$-\frac{bd^3n}{x}-3bde^2nx-\frac{1}{4}be^3nx^2-\frac{3}{2}bd^2en\log^2(x)-\frac{d^3(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log($$

```
[Out] -b*d^3*n/x-3*b*d*e^2*n*x-1/4*b*e^3*n*x^2-3/2*b*d^2*e*n*ln(x)^2-d^3*(a+b*ln(
c*x^n))/x+3*d*e^2*x*(a+b*ln(c*x^n))+1/2*e^3*x^2*(a+b*ln(c*x^n))+3*d^2*e*ln(
x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 119, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {45, 2372, 2338}

$$-\frac{d^3(a+b\log(cx^n))}{x}+3d^2e\log(x)(a+b\log(cx^n))+3de^2x(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))-\frac{bd^3n}{x}-\frac{3}{2}bd^2en\log^2(x)-3bde^2nx-\frac{1}{4}be^3nx^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^3*n)/x) - 3*b*d*e^2*n*x - (b*e^3*n*x^2)/4 - (3*b*d^2*e*n*Log[x]^2)/2
 - (d^3*(a + b*Log[c*x^n]))/x + 3*d*e^2*x*(a + b*Log[c*x^n]) + (e^3*x^2*(a
+ b*Log[c*x^n]))/2 + 3*d^2*e*Log[x]*(a + b*Log[c*x^n])
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{2}\left(\frac{2d^3}{x} - 6de^2x - e^3x^2 - 6d^2e\log(x)\right)(a+b\log(cx^n)) - (bn)\int \left(3de\right.$$
$$= -\frac{bd^3n}{x} - 3bde^2nx - \frac{1}{4}be^3nx^2 - \frac{1}{2}\left(\frac{2d^3}{x} - 6de^2x - e^3x^2 - 6d^2e\log(x)\right)(a$$
$$= -\frac{bd^3n}{x} - 3bde^2nx - \frac{1}{4}be^3nx^2 - \frac{3}{2}bd^2en\log^2(x) - \frac{1}{2}\left(\frac{2d^3}{x} - 6de^2x - e^3x^2\right.$$

Mathematica [A]
time = 0.05, size = 118, normalized size = 0.99

$$-\frac{bd^3n}{x} + 3ade^2x - 3bde^2nx - \frac{1}{4}be^3nx^2 + 3bde^2x\log(cx^n) - \frac{d^3(a+b\log(cx^n))}{x} + \frac{1}{2}e^3x^2(a+b\log(cx^n)) + \frac{3d^2e(a+b\log(cx^n))^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^3*n)/x) + 3*a*d*e^2*x - 3*b*d*e^2*n*x - (b*e^3*n*x^2)/4 + 3*b*d*e^2*
x*Log[c*x^n] - (d^3*(a + b*Log[c*x^n]))/x + (e^3*x^2*(a + b*Log[c*x^n]))/2
+ (3*d^2*e*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 588, normalized size = 4.94

method	result
risch	$-\frac{b(-e^3x^3-6d^2e\ln(x)x-6d\,e^2x^2+2d^3)\ln(x^n)}{2x} - \frac{-6i\pi bd\,e^2x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-2\ln(c)b\,e^3x^3-12\ln(x)\ln(c)b\,d^2ex+6e\,d^2bn\ln(x}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(-e^3*x^3-6*d^2*e*ln(x)*x-6*d*e^2*x^2+2*d^3)/x*ln(x^n)-1/4*(-I*Pi*b*
e^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^
2-6*I*Pi*b*d*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2*ln(c)*b*e^3*x^3-12*ln(x)
*ln(c)*b*d^2*e*x+6*e*d^2*b*n*ln(x)^2*x+4*a*d^3-12*ln(x)*a*d^2*e*x+I*Pi*b*e^
3*x^3*csgn(I*c*x^n)^3+2*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*d^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2-12*a*d*e^2*x^2-2*a*e^3*x^3+4*b*d^3*n+4*d^3*b*ln(
c)-12*ln(c)*b*d*e^2*x^2+6*I*ln(x)*Pi*b*d^2*e*csgn(I*c*x^n)^3*x+I*Pi*b*e^3*x
^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-6*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*
c*x^n)^2+6*I*ln(x)*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x+b*e^3*n
*x^3+6*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-6*I*ln(x)*Pi*b*
d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x-6*I*ln(x)*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c
*x^n)^2*x-2*I*Pi*b*d^3*csgn(I*c*x^n)^3+12*b*d*e^2*n*x^2-2*I*Pi*b*d^3*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*I*Pi*b*d*e^2*x^2*csgn(I*c*x^n)^3)/x
```

Maxima [A]
time = 0.28, size = 123, normalized size = 1.03

$$-\frac{1}{4}\,bnx^2e^3 - 3\,bdnxe^2 + \frac{1}{2}\,bx^2e^3\log\left(cx^n\right) + 3\,bdxe^2\log\left(cx^n\right) + \frac{3\,bd^2e\log\left(cx^n\right)^2}{2\,n} + 3\,ad^2e\log\left(x\right) - \frac{bd^3n}{x} + \frac{1}{2}\,ax^2e^3 + 3\,adxe^2 - \frac{bd^3\log\left(cx^n\right)}{x} - \frac{ad^3}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*x^2*e^3 - 3*b*d*n*x*e^2 + 1/2*b*x^2*e^3*log(c*x^n) + 3*b*d*x*e^2*l
og(c*x^n) + 3/2*b*d^2*e*log(c*x^n)^2/n + 3*a*d^2*e*log(x) - b*d^3*n/x + 1/2
*a*x^2*e^3 + 3*a*d*x*e^2 - b*d^3*log(c*x^n)/x - a*d^3/x
```

Fricas [A]
time = 0.36, size = 140, normalized size = 1.18

$$\frac{6\,bd^2nxe\log\left(x\right)^2 - 4\,bd^3n - (bn - 2\,a)x^3e^3 - 4\,ad^3 - 12\,(bdn - ad)x^2e^2 + 2\,(bx^3e^3 + 6\,bdx^2e^2 - 2\,bd^3)\log\left(c\right) + 2\,(bnx^3e^3 + 6\,bdnx^2e^2 + 6\,bd^2xe\log\left(c\right) - 2\,bd^3n + 6\,ad^2xe)\log\left(x\right)}{4\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] 1/4*(6*b*d^2*n*x*e*log(x)^2 - 4*b*d^3*n - (b*n - 2*a)*x^3*e^3 - 4*a*d^3 - 1
2*(b*d*n - a*d)*x^2*e^2 + 2*(b*x^3*e^3 + 6*b*d*x^2*e^2 - 2*b*d^3)*log(c) +
2*(b*n*x^3*e^3 + 6*b*d*n*x^2*e^2 + 6*b*d^2*x*e*log(c) - 2*b*d^3*n + 6*a*d^2
*x*e)*log(x))/x
```

Sympy [A]
time = 0.52, size = 182, normalized size = 1.53

$$\begin{cases} -\frac{ad^3}{x} + \frac{3ad^2e\log\left(cx^n\right)}{n} + 3ade^2x + \frac{ae^3x^2}{2} - \frac{bd^3n}{x} - \frac{bd^3\log\left(cx^n\right)}{x} + \frac{3bd^2e\log\left(cx^n\right)^2}{2n} - 3bde^2nx + 3bde^2x\log\left(cx^n\right) - \frac{be^3nx^2}{4} + \frac{be^3x^2\log\left(cx^n\right)}{2} & \text{for}\: n \neq 0 \\ \left(a + b\log\left(c\right)\right)\left(-\frac{d^3}{x} + 3d^2e\log\left(x\right) + 3de^2x + \frac{e^3x^2}{2}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Piecewise((-a*d**3/x + 3*a*d**2*e*log(c*x**n)/n + 3*a*d*e**2*x + a*e**3*x**
2/2 - b*d**3*n/x - b*d**3*log(c*x**n)/x + 3*b*d**2*e*log(c*x**n)**2/(2*n) -
 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n) - b*e**3*n*x**2/4 + b*e**3*x**2*
log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(-d**3/x + 3*d**2*e*log(x) + 3*d*
e**2*x + e**3*x**2/2), True))
```

Giac [A]
time = 2.18, size = 154, normalized size = 1.29

$$\frac{6\,bd^2nxe\log\left(x\right)^2 + 2\,bnx^3e^3\log\left(x\right) + 12\,bdnx^2e^2\log\left(x\right) + 12\,bd^2xe\log\left(c\right)\log\left(x\right) - bnx^3e^3 - 12\,bdnx^2e^2 + 2\,bx^3e^3\log\left(c\right) + 12\,bdx^2e^2\log\left(c\right) - 4\,bd^3n\log\left(x\right) + 12\,ad^2xe\log\left(x\right) - 4\,bd^3n + 2\,ax^3e^3 + 12\,adx^2e^2 - 4\,bd^3\log\left(c\right) - 4\,ad^3}{4\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] 1/4*(6*b*d^2*n*x*e*log(x)^2 + 2*b*n*x^3*e^3*log(x) + 12*b*d*n*x^2*e^2*log(x
) + 12*b*d^2*x*e*log(c)*log(x) - b*n*x^3*e^3 - 12*b*d*n*x^2*e^2 + 2*b*x^3*e
^3*log(c) + 12*b*d*x^2*e^2*log(c) - 4*b*d^3*n*log(x) + 12*a*d^2*x*e*log(x)
- 4*b*d^3*n + 2*a*x^3*e^3 + 12*a*d*x^2*e^2 - 4*b*d^3*log(c) - 4*a*d^3)/x
```

Mupad [B]
time = 3.65, size = 154, normalized size = 1.29

$$\ln(x)\ (3\,a\,d^2\,e+3\,b\,d^2\,e\,n)-\ln(c\,x^n)\ \left(\frac{b\,d^3+3\,b\,d^2\,e\,x+3\,b\,d\,e^2\,x^2+b\,e^3\,x^3}{x}-\frac{\frac{3\,b\,e^3\,x^3}{2}+6\,b\,d\,e^2\,x^2}{x}\right)-\frac{a\,d^3+b\,d^3\,n}{x}+\frac{e^3\,x^2\,(2\,a-b\,n)}{4}+3\,d\,e^2\,x\,(a-b\,n)+\frac{3\,b\,d^2\,e\ln(c\,x^n)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^2,x)
```

```
[Out] log(x)*(3*a*d^2*e + 3*b*d^2*e*n) - log(c*x^n)*((b*d^3 + b*e^3*x^3 + 3*b*d^2
*e*x + 3*b*d*e^2*x^2)/x - ((3*b*e^3*x^3)/2 + 6*b*d*e^2*x^2)/x) - (a*d^3 + b
*d^3*n)/x + (e^3*x^2*(2*a - b*n))/4 + 3*d*e^2*x*(a - b*n) + (3*b*d^2*e*log(
c*x^n)^2)/(2*n)
```

3.25 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=118

$$-\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}-be^3nx-\frac{3}{2}bde^2n\log^2(x)-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))+$$

```
[Out] -1/4*b*d^3*n/x^2-3*b*d^2*e*n/x-b*e^3*n*x-3/2*b*d*e^2*n*ln(x)^2-1/2*d^3*(a+b
*ln(c*x^n))/x^2-3*d^2*e*(a+b*ln(c*x^n))/x+e^3*x*(a+b*ln(c*x^n))+3*d*e^2*ln(
x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 118, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {45, 2372, 2338}

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2\log(x)\,(a+b\log(cx^n))+e^3x(a+b\log(cx^n))-\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}-\frac{3}{2}bde^2n\log^2(x)-be^3nx$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^3*n)/x^2 - (3*b*d^2*e*n)/x - b*e^3*n*x - (3*b*d*e^2*n*Log[x]^2)/2
 - (d^3*(a + b*Log[c*x^n]))/(2*x^2) - (3*d^2*e*(a + b*Log[c*x^n]))/x + e^3*
x*(a + b*Log[c*x^n]) + 3*d*e^2*Log[x]*(a + b*Log[c*x^n])
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = -\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{6d^2e}{x}-2e^3x-6de^2\log(x)\right)(a+b\log(cx^n))-(bn)\int\left(e^3-\right.$$

$$= -\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}-be^3nx-\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{6d^2e}{x}-2e^3x-6de^2\log(x)\right)(a+b$$

$$= -\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}-be^3nx-\frac{3}{2}bde^2n\log^2(x)-\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{6d^2e}{x}-2e^3x-6d\right.$$

Mathematica [A]
time = 0.06, size = 115, normalized size = 0.97

$$-\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}+ae^3x-be^3nx+be^3x\log(cx^n)-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+\frac{3de^2(a+b\log(cx^n))^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^3*n)/x^2 - (3*b*d^2*e*n)/x + a*e^3*x - b*e^3*n*x + b*e^3*x*Log[c*
x^n] - (d^3*(a + b*Log[c*x^n]))/(2*x^2) - (3*d^2*e*(a + b*Log[c*x^n]))/x +
(3*d*e^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 586, normalized size = 4.97

method	result
risch	$-\frac{b(-6de^2\ln(x)x^2-2e^3x^3+6d^2ex+d^3)\ln(x^n)}{2x^2}-\frac{6i\pi b d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2+6i\pi b d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2-4\ln(c)be^3x^3+2}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(-6*d*e^2*ln(x)*x^2-2*e^3*x^3+6*d^2*e*x+d^3)/x^2*ln(x^n)-1/4*(-I*Pi*
b*d^3*csgn(I*c*x^n)^3-4*ln(c)*b*e^3*x^3+6*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*c
*x^n)^2+6*I*ln(x)*Pi*b*d*e^2*csgn(I*c*x^n)^3*x^2+2*I*Pi*b*e^3*x^3*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+2*a*d^3+I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+I*P
i*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*Pi*b*e^3*x^3*csgn(I*c*x^n)^3+12*a*d
^2*e*x-4*a*e^3*x^3+b*d^3*n+2*d^3*b*ln(c)-12*ln(x)*ln(c)*b*d*e^2*x^2+6*e^2*d
*b*n*ln(x)^2*x^2+6*I*Pi*b*d^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+12*ln(c)*b*d^
2*e*x-12*ln(x)*a*d*e^2*x^2+4*b*e^3*n*x^3+6*I*ln(x)*Pi*b*d*e^2*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)*x^2+12*b*d^2*e*n*x-I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-2*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*e^3*x^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2-6*I*Pi*b*d^2*e*x*csgn(I*c*x^n)^3-6*I*ln(x)*Pi*b*
d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^2-6*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)-6*I*ln(x)*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*x^2)/x^2
```

Maxima [A]
time = 0.28, size = 123, normalized size = 1.04

$$-bnxe^3 - \frac{3\,bd^2ne}{x} + bxe^3\log\left(cx^n\right) - \frac{3\,bd^2e\log\left(cx^n\right)}{x} + \frac{3\,bde^2\log\left(cx^n\right)^2}{2\,n} + 3\,ade^2\log\left(x\right) - \frac{bd^3n}{4\,x^2} + axe^3 - \frac{3\,ad^2e}{x} - \frac{bd^3\log\left(cx^n\right)}{2\,x^2} - \frac{ad^3}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] -b*n*x*e^3 - 3*b*d^2*n*e/x + b*x*e^3*log(c*x^n) - 3*b*d^2*e*log(c*x^n)/x +
3/2*b*d*e^2*log(c*x^n)^2/n + 3*a*d*e^2*log(x) - 1/4*b*d^3*n/x^2 + a*x*e^3 -
 3*a*d^2*e/x - 1/2*b*d^3*log(c*x^n)/x^2 - 1/2*a*d^3/x^2
```

Fricas [A]
time = 0.35, size = 143, normalized size = 1.21

$$\frac{6\,bdnx^2e^2\log\left(x\right)^2 - bd^3n - 4\,(bn-a)x^3e^3 - 2\,ad^3 - 12\,(bd^2n + ad^2)xe + 2\,(2\,bx^3e^3 - 6\,bd^2xe - bd^3)\log\left(c\right) + 2\,(2\,bnx^3e^3 - 6\,bd^2nxe + 6\,bdx^2e^2\log\left(c\right) - bd^3n + 6\,adx^2e^2)\log\left(x\right)}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] 1/4*(6*b*d*n*x^2*e^2*log(x)^2 - b*d^3*n - 4*(b*n - a)*x^3*e^3 - 2*a*d^3 - 1
2*(b*d^2*n + a*d^2)*x*e + 2*(2*b*x^3*e^3 - 6*b*d^2*x*e - b*d^3)*log(c) + 2*
(2*b*n*x^3*e^3 - 6*b*d^2*n*x*e + 6*b*d*x^2*e^2*log(c) - b*d^3*n + 6*a*d*x^2
*e^2)*log(x))/x^2
```

Sympy [A]
time = 0.54, size = 182, normalized size = 1.54

$$\begin{cases} -\frac{ad^3}{2x^2} - \frac{3ad^2e}{x} + \frac{3ade^2\log\left(cx^n\right)}{n} + ae^3x - \frac{bd^3n}{4x^2} - \frac{bd^3\log\left(cx^n\right)}{2x^2} - \frac{3bd^2en}{x} - \frac{3bd^2e\log\left(cx^n\right)}{x} + \frac{3bde^2\log\left(cx^n\right)^2}{2n} - be^3nx + be^3x\log\left(cx^n\right) & \text{for}\ n \neq 0 \\ \left(a + b\log\left(c\right)\right)\left(-\frac{d^3}{2x^2} - \frac{3d^2e}{x} + 3de^2\log\left(x\right) + e^3x\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Piecewise((-a*d**3/(2*x**2) - 3*a*d**2*e/x + 3*a*d*e**2*log(c*x**n)/n + a*e
**3*x - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*e*n/x -
3*b*d**2*e*log(c*x**n)/x + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x + b
*e**3*x*log(c*x**n), Ne(n, 0)), ((a + b*log(c))*(-d**3/(2*x**2) - 3*d**2*e/
x + 3*d*e**2*log(x) + e**3*x), True))
```

Giac [A]
time = 2.22, size = 154, normalized size = 1.31

$$\frac{6\,bdnx^2e^2\log\left(x\right)^2 + 4\,bnx^3e^3\log\left(x\right) - 12\,bd^2nxe\log\left(x\right) + 12\,bdx^2e^2\log\left(c\right)\log\left(x\right) - 4\,bnx^3e^3 - 12\,bd^2nxe + 4\,bx^3e^3\log\left(c\right) - 12\,bd^2xe\log\left(c\right) - 2\,bd^3n\log\left(x\right) + 12\,adx^2e^2\log\left(x\right) - bd^3n + 4\,ax^3e^3 - 12\,ad^2xe - 2\,bd^3\log\left(c\right) - 2\,ad^3}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] 1/4*(6*b*d*n*x^2*e^2*log(x)^2 + 4*b*n*x^3*e^3*log(x) - 12*b*d^2*n*x*e*log(x
) + 12*b*d*x^2*e^2*log(c)*log(x) - 4*b*n*x^3*e^3 - 12*b*d^2*n*x*e + 4*b*x^3
*e^3*log(c) - 12*b*d^2*x*e*log(c) - 2*b*d^3*n*log(x) + 12*a*d*x^2*e^2*log(x
) - b*d^3*n + 4*a*x^3*e^3 - 12*a*d^2*x*e - 2*b*d^3*log(c) - 2*a*d^3)/x^2
```

Mupad [B]
time = 3.59, size = 139, normalized size = 1.18

$$\ln(x)\left(3\,a\,d\,e^2+\frac{9\,b\,d\,e^2\,n}{2}\right)-\ln(c\,x^n)\left(\frac{\frac{b\,d^3}{2}+3\,b\,d^2\,e\,x+\frac{9\,b\,d\,e^2\,x^2}{2}+2\,b\,e^3\,x^3}{x^2}-3\,b\,e^3\,x\right)-\frac{x\,(6\,a\,d^2\,e+6\,b\,d^2\,e\,n)+a\,d^3+\frac{b\,d^3\,n}{2}}{2\,x^2}+e^3\,x\,(a-b\,n)+\frac{3\,b\,d\,e^2\ln(c\,x^n)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^3,x)
```

```
[Out] log(x)*(3*a*d*e^2 + (9*b*d*e^2*n)/2) - log(c*x^n)*(((b*d^3)/2 + 2*b*e^3*x^3
 + 3*b*d^2*e*x + (9*b*d*e^2*x^2)/2)/x^2 - 3*b*e^3*x) - (x*(6*a*d^2*e + 6*b*
d^2*e*n) + a*d^3 + (b*d^3*n)/2)/(2*x^2) + e^3*x*(a - b*n) + (3*b*d*e^2*log(
c*x^n)^2)/(2*n)
```

3.26 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=126

$$-\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{1}{2}be^3n\log^2(x)-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}$$

```
[Out] -1/9*b*d^3*n/x^3-3/4*b*d^2*e*n/x^2-3*b*d*e^2*n/x-1/2*b*e^3*n*ln(x)^2-1/3*d^
3*(a+b*ln(c*x^n))/x^3-3/2*d^2*e*(a+b*ln(c*x^n))/x^2-3*d*e^2*(a+b*ln(c*x^n))
/x+e^3*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 126, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2372, 14, 2338}

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)(a+b\log(cx^n))-\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{1}{2}be^3n\log^2(x)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^3*n)/x^3 - (3*b*d^2*e*n)/(4*x^2) - (3*b*d*e^2*n)/x - (b*e^3*n*Log
[x]^2)/2 - (d^3*(a + b*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/
(2*x^2) - (3*d*e^2*(a + b*Log[c*x^n]))/x + e^3*Log[x]*(a + b*Log[c*x^n])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{1}{6}\left(\frac{2d^3}{x^3}+\frac{9d^2e}{x^2}+\frac{18de^2}{x}-6e^3\log(x)\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d(\right.$$

$$= -\frac{1}{6}\left(\frac{2d^3}{x^3}+\frac{9d^2e}{x^2}+\frac{18de^2}{x}-6e^3\log(x)\right)(a+b\log(cx^n))+\frac{1}{6}(bdn)\int\frac{2d^2}{}$$

$$= -\frac{1}{2}be^3n\log^2(x)-\frac{1}{6}\left(\frac{2d^3}{x^3}+\frac{9d^2e}{x^2}+\frac{18de^2}{x}-6e^3\log(x)\right)(a+b\log(cx^n))$$

$$= -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{1}{2}be^3n\log^2(x)-\frac{1}{6}\left(\frac{2d^3}{x^3}+\frac{9d^2e}{x^2}+\frac{18de^2}{x}-\right.$$

Mathematica [A]
time = 0.06, size = 122, normalized size = 0.97

$$-\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+\frac{e^3(a+b\log(cx^n))^2}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^3*n)/x^3 - (3*b*d^2*e*n)/(4*x^2) - (3*b*d*e^2*n)/x - (d^3*(a + b*
Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2) - (3*d*e^2*(a +
 b*Log[c*x^n]))/x + (e^3*(a + b*Log[c*x^n])^2)/(2*b*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 589, normalized size = 4.67

method	result
risch	$-\frac{b(-6e^3\ln(x)x^3+18d\,e^2x^2+9d^2ex+2d^3)\ln(x^n)}{6x^3}-\frac{27i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+27i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+54i\pi bd\,e^2x}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*b*(-6*e^3*ln(x)*x^3+18*d*e^2*x^2+9*d^2*e*x+2*d^3)/x^3*ln(x^n)-1/36*(-6
*I*Pi*b*d^3*csgn(I*c*x^n)^3+12*a*d^3+108*a*d*e^2*x^2+54*a*d^2*e*x+4*b*d^3*n
+12*d^3*b*ln(c)+54*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+27*I*Pi*b*d^2
*e*x*csgn(I*c)*csgn(I*c*x^n)^2+54*I*Pi*b*d*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n
```

```
)^2-18*I*ln(x)*Pi*b*e^3*csgn(I*c)*csgn(I*c*x^n)^2*x^3-18*I*ln(x)*Pi*b*e^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2*x^3+27*I*Pi*b*d^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^
2+108*ln(c)*b*d*e^2*x^2+54*ln(c)*b*d^2*e*x-36*ln(x)*ln(c)*b*e^3*x^3+18*e^3*
b*n*ln(x)^2*x^3-36*ln(x)*a*e^3*x^3+6*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+6
*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+18*I*ln(x)*Pi*b*e^3*csgn(I*c*x^n)^3
*x^3-54*I*Pi*b*d*e^2*x^2*csgn(I*c*x^n)^3+27*b*d^2*e*n*x+108*b*d*e^2*n*x^2-2
7*I*Pi*b*d^2*e*x*csgn(I*c*x^n)^3-27*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)-54*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+18*I*ln
(x)*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^3-6*I*Pi*b*d^3*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n))/x^3
```

Maxima [A]
time = 0.30, size = 131, normalized size = 1.04

$$-\frac{3\,bdne^2}{x} - \frac{3\,bd^2ne}{4\,x^2} - \frac{3\,bde^2\log\left(cx^n\right)}{x} - \frac{3\,bd^2e\log\left(cx^n\right)}{2\,x^2} + \frac{be^3\log\left(cx^n\right)^2}{2\,n} + ae^3\log\left(x\right) - \frac{bd^3n}{9\,x^3} - \frac{3\,ade^2}{x} - \frac{3\,ad^2e}{2\,x^2} - \frac{bd^3\log\left(cx^n\right)}{3\,x^3} - \frac{ad^3}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] -3*b*d*n*e^2/x - 3/4*b*d^2*n*e/x^2 - 3*b*d*e^2*log(c*x^n)/x - 3/2*b*d^2*e*l
og(c*x^n)/x^2 + 1/2*b*e^3*log(c*x^n)^2/n + a*e^3*log(x) - 1/9*b*d^3*n/x^3 -
 3*a*d*e^2/x - 3/2*a*d^2*e/x^2 - 1/3*b*d^3*log(c*x^n)/x^3 - 1/3*a*d^3/x^3
```

Fricas [A]
time = 0.35, size = 144, normalized size = 1.14

$$\frac{18\,bnx^3e^3\log\left(x\right)^2 - 4\,bd^3n - 12\,ad^3 - 108\,(bdn + ad)x^2e^2 - 27\,(bd^2n + 2\,ad^2)xe - 6\,(18\,bdx^2e^2 + 9\,bd^2xe + 2\,bd^3)\log\left(c\right) - 6\,(18\,bdnx^2e^2 + 9\,bd^2nxe - 6\,bx^3e^3\log\left(c\right) + 2\,bd^3n - 6\,ax^3e^3)\log\left(x\right)}{36\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] 1/36*(18*b*n*x^3*e^3*log(x)^2 - 4*b*d^3*n - 12*a*d^3 - 108*(b*d*n + a*d)*x^
2*e^2 - 27*(b*d^2*n + 2*a*d^2)*x*e - 6*(18*b*d*x^2*e^2 + 9*b*d^2*x*e + 2*b*
d^3)*log(c) - 6*(18*b*d*n*x^2*e^2 + 9*b*d^2*n*x*e - 6*b*x^3*e^3*log(c) + 2*
b*d^3*n - 6*a*x^3*e^3)*log(x))/x^3
```

Sympy [A]
time = 3.80, size = 144, normalized size = 1.14

$$-\frac{ad^3}{3x^3} - \frac{3ad^2e}{2x^2} - \frac{3ade^2}{x} + ae^3\log\left(x\right) + bd^3\left(-\frac{n}{9x^3} - \frac{\log\left(cx^n\right)}{3x^3}\right) + 3bd^2e\left(-\frac{n}{4x^2} - \frac{\log\left(cx^n\right)}{2x^2}\right) + 3bde^2\left(-\frac{n}{x} - \frac{\log\left(cx^n\right)}{x}\right) - be^3\left(\begin{cases} -\log\left(c\right)\log\left(x\right) & \text{for}\: n = 0 \\ -\frac{\log\left(cx^n\right)^2}{2n} & \text{otherwise} \end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d**3/(3*x**3) - 3*a*d**2*e/(2*x**2) - 3*a*d*e**2/x + a*e**3*log(x) + b*d
**3*(-n/(9*x**3) - log(c*x**n)/(3*x**3)) + 3*b*d**2*e*(-n/(4*x**2) - log(c*
```

```
x**n)/(2*x**2)) + 3*b*d*e**2*(-n/x - log(c*x**n)/x) - b*e**3*Piecewise((-lo
g(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

<u>Giac</u> [A]
time = 1.83, size = 155, normalized size = 1.23

$$\frac{18\,bnx^3e^3\log\left(x\right)^2 - 108\,bdnx^2e^2\log\left(x\right) - 54\,bd^2nxe\log\left(x\right) + 36\,bx^3e^3\log\left(c\right)\log\left(x\right) - 108\,bdnx^2e^2 - 27\,bd^2nxe - 108\,bdx^2e^2\log\left(c\right) - 54\,bd^2xe\log\left(c\right) - 12\,bd^3n\log\left(x\right) + 36\,ax^3e^3\log\left(x\right) - 4\,bd^3n - 108\,adx^2e^2 - 54\,ad^2xe - 12\,bd^3\log\left(c\right) - 12\,ad^3}{36\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] 1/36*(18*b*n*x^3*e^3*log(x)^2 - 108*b*d*n*x^2*e^2*log(x) - 54*b*d^2*n*x*e*l
og(x) + 36*b*x^3*e^3*log(c)*log(x) - 108*b*d*n*x^2*e^2 - 27*b*d^2*n*x*e - 1
08*b*d*x^2*e^2*log(c) - 54*b*d^2*x*e*log(c) - 12*b*d^3*n*log(x) + 36*a*x^3*
e^3*log(x) - 4*b*d^3*n - 108*a*d*x^2*e^2 - 54*a*d^2*x*e - 12*b*d^3*log(c) -
 12*a*d^3)/x^3
```

<u>Mupad</u> [B]
time = 3.72, size = 136, normalized size = 1.08

$$\ln\left(x\right)\,\left(a\,e^3+\frac{11\,b\,e^3\,n}{6}\right)-\frac{x\,\left(9\,a\,d^2\,e+\frac{9\,b\,d^2\,e\,n}{2}\right)+2\,a\,d^3+x^2\,\left(18\,a\,d\,e^2+18\,b\,d\,e^2\,n\right)+\frac{2\,b\,d^3\,n}{3}}{6\,x^3}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{3}+\frac{3\,b\,d^2\,e\,x}{2}+3\,b\,d\,e^2\,x^2+\frac{11\,b\,e^3\,x^3}{6}\right)}{x^3}+\frac{b\,e^3\,{\ln\left(c\,x^n\right)}^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^4,x)
```

```
[Out] log(x)*(a*e^3 + (11*b*e^3*n)/6) - (x*(9*a*d^2*e + (9*b*d^2*e*n)/2) + 2*a*d^
3 + x^2*(18*a*d*e^2 + 18*b*d*e^2*n) + (2*b*d^3*n)/3)/(6*x^3) - (log(c*x^n)*
((b*d^3)/3 + (11*b*e^3*x^3)/6 + (3*b*d^2*e*x)/2 + 3*b*d*e^2*x^2))/x^3 + (b*
e^3*log(c*x^n)^2)/(2*n)
```

3.27 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=90

$$-\frac{bd^3n}{16x^4}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{4x^2}-\frac{be^3n}{x}+\frac{be^4n\log(x)}{4d}-\frac{(d+ex)^4\left(a+b\log\left(cx^n\right)\right)}{4dx^4}$$

```
[Out] -1/16*b*d^3*n/x^4-1/3*b*d^2*e*n/x^3-3/4*b*d*e^2*n/x^2-b*e^3*n/x+1/4*b*e^4*n
*ln(x)/d-1/4*(e*x+d)^4*(a+b*ln(c*x^n))/d/x^4
```

Rubi [A]
time = 0.05, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {37, 2372, 12, 45}

$$-\frac{(d+ex)^4\left(a+b\log\left(cx^n\right)\right)}{4dx^4}-\frac{bd^3n}{16x^4}-\frac{bd^2en}{3x^3}+\frac{be^4n\log(x)}{4d}-\frac{3bde^2n}{4x^2}-\frac{be^3n}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d^3*n)/x^4 - (b*d^2*e*n)/(3*x^3) - (3*b*d*e^2*n)/(4*x^2) - (b*e^3*
n)/x + (b*e^4*n*Log[x])/(4*d) - ((d + e*x)^4*(a + b*Log[c*x^n]))/(4*d*x^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 37

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n + 2, 0] && NeQ[m, -
1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^5}\,dx &= -\frac{(d+ex)^4(a+b\log(cx^n))}{4dx^4}-(bn)\int -\frac{(d+ex)^4}{4dx^5}\,dx\\ &= -\frac{(d+ex)^4(a+b\log(cx^n))}{4dx^4}+\frac{(bn)\int \frac{(d+ex)^4}{x^5}\,dx}{4d}\\ &= -\frac{(d+ex)^4(a+b\log(cx^n))}{4dx^4}+\frac{(bn)\int\left(\frac{d^4}{x^5}+\frac{4d^3e}{x^4}+\frac{6d^2e^2}{x^3}+\frac{4de^3}{x^2}+\frac{e^4}{x}\right)dx}{4d}\\ &= -\frac{bd^3n}{16x^4}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{4x^2}-\frac{be^3n}{x}+\frac{be^4n\log(x)}{4d}-\frac{(d+ex)^4(a+b\log(c}{4dx^4}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 109, normalized size = 1.21

$$-\frac{12a(d^3+4d^2ex+6de^2x^2+4e^3x^3)+bn(3d^3+16d^2ex+36de^2x^2+48e^3x^3)+12b(d^3+4d^2ex+6de^2x^2+4e^3x^3)\log(cx^n)}{48x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/48*(12*a*(d^3 + 4*d^2*e*x + 6*d*e^2*x^2 + 4*e^3*x^3) + b*n*(3*d^3 + 16*d
^2*e*x + 36*d*e^2*x^2 + 48*e^3*x^3) + 12*b*(d^3 + 4*d^2*e*x + 6*d*e^2*x^2 +
 4*e^3*x^3)*Log[c*x^n])/x^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 569, normalized size = 6.32

method	result
risch	$-\frac{b(4e^3x^3+6d\,e^2x^2+4d^2ex+d^3)\ln(x^n)}{4x^4}-\frac{24i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+24i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+36i\pi bd\,e^2x^2\mathrm{csgn}(ic)}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(4*e^3*x^3+6*d*e^2*x^2+4*d^2*e*x+d^3)/x^4*ln(x^n)-1/48*(-6*I*Pi*b*d^
3*csgn(I*c*x^n)^3+24*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*b*e^3
*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*b*e^3*x^3*csgn(I*c*x^n)^3+48*ln(c)
*b*e^3*x^3-24*I*Pi*b*d^2*e*x*csgn(I*c*x^n)^3+12*a*d^3+72*a*d*e^2*x^2+48*a*d
```

```
^2*e*x+48*a*e^3*x^3-36*I*Pi*b*d*e^2*x^2*csgn(I*c*x^n)^3+3*b*d^3*n+12*d^3*b*
ln(c)-36*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-24*I*Pi*b*d^2
*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+72*ln(c)*b*d*e^2*x^2+48*ln(c)*b*d^
2*e*x+24*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*b*d*e^2*x^2*csgn(
I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+36*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*b*d^2*e*x*csgn(I*x^
n)*csgn(I*c*x^n)^2+6*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+6*I*Pi*b*d^3*csgn
(I*x^n)*csgn(I*c*x^n)^2+48*b*e^3*n*x^3+16*b*d^2*e*n*x+36*b*d*e^2*n*x^2-6*I*
Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/x^4
```

Maxima [A]
time = 0.28, size = 140, normalized size = 1.56

$$-\frac{bne^3}{x}-\frac{3\,bdne^2}{4\,x^2}-\frac{bd^2ne}{3\,x^3}-\frac{be^3\log\left(cx^n\right)}{x}-\frac{3\,bde^2\log\left(cx^n\right)}{2\,x^2}-\frac{bd^2e\log\left(cx^n\right)}{x^3}-\frac{bd^3n}{16\,x^4}-\frac{ae^3}{x}-\frac{3\,ade^2}{2\,x^2}-\frac{ad^2e}{x^3}-\frac{bd^3\log\left(cx^n\right)}{4\,x^4}-\frac{ad^3}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] -b*n*e^3/x - 3/4*b*d*n*e^2/x^2 - 1/3*b*d^2*n*e/x^3 - b*e^3*log(c*x^n)/x - 3
/2*b*d*e^2*log(c*x^n)/x^2 - b*d^2*e*log(c*x^n)/x^3 - 1/16*b*d^3*n/x^4 - a*e
^3/x - 3/2*a*d*e^2/x^2 - a*d^2*e/x^3 - 1/4*b*d^3*log(c*x^n)/x^4 - 1/4*a*d^3
/x^4
```

Fricas [A]
time = 0.44, size = 141, normalized size = 1.57

$$-\frac{3\,bd^3n+48\,(bn+a)x^3e^3+12\,ad^3+36\,(bdn+2\,ad)x^2e^2+16\,(bd^2n+3\,ad^2)xe+12\,(4\,bx^3e^3+6\,bdx^2e^2+4\,bd^2xe+bd^3)\log\left(c\right)+12\,(4\,bnx^3e^3+6\,bdnx^2e^2+4\,bd^2nxe+bd^3n)\log\left(x\right)}{48\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] -1/48*(3*b*d^3*n + 48*(b*n + a)*x^3*e^3 + 12*a*d^3 + 36*(b*d*n + 2*a*d)*x^2
*e^2 + 16*(b*d^2*n + 3*a*d^2)*x*e + 12*(4*b*x^3*e^3 + 6*b*d*x^2*e^2 + 4*b*d
^2*x*e + b*d^3)*log(c) + 12*(4*b*n*x^3*e^3 + 6*b*d*n*x^2*e^2 + 4*b*d^2*n*x*
e + b*d^3*n)*log(x))/x^4
```

Sympy [A]
time = 0.53, size = 158, normalized size = 1.76

$$-\frac{ad^3}{4x^4}-\frac{ad^2e}{x^3}-\frac{3ade^2}{2x^2}-\frac{ae^3}{x}-\frac{bd^3n}{16x^4}-\frac{bd^3\log\left(cx^n\right)}{4x^4}-\frac{bd^2en}{3x^3}-\frac{bd^2e\log\left(cx^n\right)}{x^3}-\frac{3bde^2n}{4x^2}-\frac{3bde^2\log\left(cx^n\right)}{2x^2}-\frac{be^3n}{x}-\frac{be^3\log\left(cx^n\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] -a*d**3/(4*x**4) - a*d**2*e/x**3 - 3*a*d*e**2/(2*x**2) - a*e**3/x - b*d**3*
n/(16*x**4) - b*d**3*log(c*x**n)/(4*x**4) - b*d**2*e*n/(3*x**3) - b*d**2*e*
```

```
log(c*x**n)/x**3 - 3*b*d*e**2*n/(4*x**2) - 3*b*d*e**2*log(c*x**n)/(2*x**2)
- b*e**3*n/x - b*e**3*log(c*x**n)/x
```

Giac [A]
time = 2.30, size = 158, normalized size = 1.76

$$-\frac{48\,bnx^3e^3\log\left(x\right)+72\,bdnx^2e^2\log\left(x\right)+48\,bd^2nxe\log\left(x\right)+48\,bnx^3e^3+36\,bdnx^2e^2+16\,bd^2nxe+48\,bx^3e^3\log\left(c\right)+72\,bdx^2e^2\log\left(c\right)+48\,bd^2xe\log\left(c\right)+12\,bd^3n\log\left(x\right)+3\,bd^3n+48\,ax^3e^3+72\,adx^2e^2+48\,ad^2xe+12\,bd^3\log\left(c\right)+12\,ad^3}{48\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

```
[Out] -1/48*(48*b*n*x^3*e^3*log(x) + 72*b*d*n*x^2*e^2*log(x) + 48*b*d^2*n*x*e*log
(x) + 48*b*n*x^3*e^3 + 36*b*d*n*x^2*e^2 + 16*b*d^2*n*x*e + 48*b*x^3*e^3*log
(c) + 72*b*d*x^2*e^2*log(c) + 48*b*d^2*x*e*log(c) + 12*b*d^3*n*log(x) + 3*b
*d^3*n + 48*a*x^3*e^3 + 72*a*d*x^2*e^2 + 48*a*d^2*x*e + 12*b*d^3*log(c) + 1
2*a*d^3)/x^4
```

Mupad [B]
time = 3.71, size = 118, normalized size = 1.31

$$-\frac{x^3\,\left(4\,a\,e^3+4\,b\,e^3\,n\right)+x\,\left(4\,a\,d^2\,e+\frac{4\,b\,d^2\,e\,n}{3}\right)+a\,d^3+x^2\,\left(6\,a\,d\,e^2+3\,b\,d\,e^2\,n\right)+\frac{b\,d^3\,n}{4}}{4\,x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{4}+b\,d^2\,e\,x+\frac{3\,b\,d\,e^2\,x^2}{2}+b\,e^3\,x^3\right)}{x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^5,x)
```

```
[Out] - (x^3*(4*a*e^3 + 4*b*e^3*n) + x*(4*a*d^2*e + (4*b*d^2*e*n)/3) + a*d^3 + x^
2*(6*a*d*e^2 + 3*b*d*e^2*n) + (b*d^3*n)/4)/(4*x^4) - (log(c*x^n)*((b*d^3)/4
 + b*e^3*x^3 + b*d^2*e*x + (3*b*d*e^2*x^2)/2))/x^4
```

3.28 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=142

$$\frac{bd^2en}{80x^4}+\frac{bde^2n}{15x^3}+\frac{3be^3n}{20x^2}+\frac{be^4n}{5dx}-\frac{bn(d+ex)^5}{25d^2x^5}-\frac{be^5n\log(x)}{20d^2}-\frac{(d+ex)^4\,(a+b\log\,(cx^n))}{5dx^5}+\frac{e(d+ex)^4\,(a+b\log}{20d^2x^4}$$

```
[Out] 1/80*b*d^2*e*n/x^4+1/15*b*d*e^2*n/x^3+3/20*b*e^3*n/x^2+1/5*b*e^4*n/d/x-1/25
*b*n*(e*x+d)^5/d^2/x^5-1/20*b*e^5*n*ln(x)/d^2-1/5*(e*x+d)^4*(a+b*ln(c*x^n))
/d/x^5+1/20*e*(e*x+d)^4*(a+b*ln(c*x^n))/d^2/x^4
```

Rubi [A]
time = 0.07, antiderivative size = 142, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {47, 37, 2372, 12, 79, 45}

$$\frac{e(d+ex)^4\,(a+b\log\,(cx^n))}{20d^2x^4}-\frac{(d+ex)^4\,(a+b\log\,(cx^n))}{5dx^5}-\frac{be^5n\log(x)}{20d^2}-\frac{bn(d+ex)^5}{25d^2x^5}+\frac{bd^2en}{80x^4}+\frac{be^4n}{5dx}+\frac{bde^2n}{15x^3}+\frac{3be^3n}{20x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] (b*d^2*e*n)/(80*x^4) + (b*d*e^2*n)/(15*x^3) + (3*b*e^3*n)/(20*x^2) + (b*e^4
*n)/(5*d*x) - (b*n*(d + e*x)^5)/(25*d^2*x^5) - (b*e^5*n*Log[x])/(20*d^2) -
((d + e*x)^4*(a + b*Log[c*x^n]))/(5*d*x^5) + (e*(d + e*x)^4*(a + b*Log[c*x^
n]))/(20*d^2*x^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 37

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n + 2, 0] && NeQ[m, -
1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 47

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*(S
implify[m + n + 2]/((b*c - a*d)*(m + 1))), Int[(a + b*x)^Simplify[m + 1]*(c
 + d*x)^n, x], x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && I
LtQ[Simplify[m + n + 2], 0] && NeQ[m, -1] &&  !(LtQ[m, -1] && LtQ[n, -1] &&
 (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && (SumSimpler
Q[m, 1] ||  !SumSimplerQ[n, 1])
```

Rule 79

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/
(f*(p + 1)*(c*f - d*e))), x] - Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c
*f*(p + 1)))/(f*(p + 1)*(c*f - d*e)), Int[(c + d*x)^n*(e + f*x)^(p + 1), x]
, x] /; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || I
ntegerQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))
))
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{1}{20}\left(\frac{4(d+ex)^4}{dx^5}-\frac{e(d+ex)^4}{d^2x^4}\right)(a+b\log(cx^n))-(bn)\int \frac{(-4d+ex)(d}{20d^2x^6}$$

$$= -\frac{1}{20}\left(\frac{4(d+ex)^4}{dx^5}-\frac{e(d+ex)^4}{d^2x^4}\right)(a+b\log(cx^n))-\frac{(bn)\int \frac{(-4d+ex)(d+ex)^4}{x^6}}{20d^2}$$

$$= -\frac{bn(d+ex)^5}{25d^2x^5}-\frac{1}{20}\left(\frac{4(d+ex)^4}{dx^5}-\frac{e(d+ex)^4}{d^2x^4}\right)(a+b\log(cx^n))-\frac{(ben)}{}$$

$$= -\frac{bn(d+ex)^5}{25d^2x^5}-\frac{1}{20}\left(\frac{4(d+ex)^4}{dx^5}-\frac{e(d+ex)^4}{d^2x^4}\right)(a+b\log(cx^n))-\frac{(ben)}{}$$

$$= \frac{bd^2en}{80x^4}+\frac{bde^2n}{15x^3}+\frac{3be^3n}{20x^2}+\frac{be^4n}{5dx}-\frac{bn(d+ex)^5}{25d^2x^5}-\frac{be^5n\log(x)}{20d^2}-\frac{1}{20}\left(\frac{4(d}{d}\right.$$

Mathematica [A]

time = 0.04, size = 113, normalized size = 0.80

$$-\frac{60a(4d^3+15d^2ex+20de^2x^2+10e^3x^3)+bn(48d^3+225d^2ex+400de^2x^2+300e^3x^3)+60b(4d^3+15d^2ex+20de^2x^2+10e^3x^3)\log(cx^n)}{1200x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/1200*(60*a*(4*d^3 + 15*d^2*e*x + 20*d*e^2*x^2 + 10*e^3*x^3) + b*n*(48*d^
3 + 225*d^2*e*x + 400*d*e^2*x^2 + 300*e^3*x^3) + 60*b*(4*d^3 + 15*d^2*e*x +
 20*d*e^2*x^2 + 10*e^3*x^3)*Log[c*x^n])/x^5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 571, normalized size = 4.02

method	result
risch	$-\frac{b(10e^3x^3+20d\,e^2x^2+15d^2ex+4d^3)\ln(x^n)}{20x^5}-\frac{450i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+450i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+600i\pi bd\,e^2x}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/20*b*(10*e^3*x^3+20*d*e^2*x^2+15*d^2*e*x+4*d^3)/x^5*ln(x^n)-1/1200*(-120
*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-450*I*Pi*b*d^2*e*x*csgn(I*c
*x^n)^3+600*ln(c)*b*e^3*x^3+240*a*d^3-120*I*Pi*b*d^3*csgn(I*c*x^n)^3+1200*a
*d*e^2*x^2+900*a*d^2*e*x+600*a*e^3*x^3-300*I*Pi*b*e^3*x^3*csgn(I*c*x^n)^3+1
20*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+300*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I
*c*x^n)^2+48*b*d^3*n+300*I*Pi*b*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-600*I*P
i*b*d*e^2*x^2*csgn(I*c*x^n)^3+240*d^3*b*ln(c)-450*I*Pi*b*d^2*e*x*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-600*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+1200*ln(c)*b*d*e^2*x^2+900*ln(c)*b*d^2*e*x+600*I*Pi*b*d*e^2*x^2*csg
n(I*x^n)*csgn(I*c*x^n)^2+450*I*Pi*b*d^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+450
*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2-300*I*Pi*b*e^3*x^3*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+600*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+120*I*
Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+300*b*e^3*n*x^3+225*b*d^2*e*n*x+400*b*
d*e^2*n*x^2)/x^5
```

Maxima [A]
time = 0.29, size = 140, normalized size = 0.99

$$-\frac{bne^3}{4\,x^2}-\frac{bdne^2}{3\,x^3}-\frac{3\,bd^2ne}{16\,x^4}-\frac{be^3\log(cx^n)}{2\,x^2}-\frac{bde^2\log(cx^n)}{x^3}-\frac{3\,bd^2e\log(cx^n)}{4\,x^4}-\frac{bd^3n}{25\,x^5}-\frac{ae^3}{2\,x^2}-\frac{ade^2}{x^3}-\frac{3\,ad^2e}{4\,x^4}-\frac{bd^3\log(cx^n)}{5\,x^5}-\frac{ad^3}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*e^3/x^2 - 1/3*b*d*n*e^2/x^3 - 3/16*b*d^2*n*e/x^4 - 1/2*b*e^3*log(c
*x^n)/x^2 - b*d*e^2*log(c*x^n)/x^3 - 3/4*b*d^2*e*log(c*x^n)/x^4 - 1/25*b*d^
```

```
3*n/x^5 - 1/2*a*e^3/x^2 - a*d*e^2/x^3 - 3/4*a*d^2*e/x^4 - 1/5*b*d^3*log(c*x
^n)/x^5 - 1/5*a*d^3/x^5
```

Fricas [A]
time = 0.34, size = 145, normalized size = 1.02

$$-\frac{48\,bd^3n+300\,(bn+2\,a)x^3e^3+240\,ad^3+400\,(bdn+3\,ad)x^2e^2+225\,(bd^2n+4\,ad^2)xe+60\,(10\,bx^3e^3+20\,bdx^2e^2+15\,bd^2xe+4\,bd^3)\log\left(c\right)+60\,(10\,bnx^3e^3+20\,bdnx^2e^2+15\,bd^2nxe+4\,bd^3n)\log\left(x\right)}{1200\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/1200*(48*b*d^3*n + 300*(b*n + 2*a)*x^3*e^3 + 240*a*d^3 + 400*(b*d*n + 3*
a*d)*x^2*e^2 + 225*(b*d^2*n + 4*a*d^2)*x*e + 60*(10*b*x^3*e^3 + 20*b*d*x^2*
e^2 + 15*b*d^2*x*e + 4*b*d^3)*log(c) + 60*(10*b*n*x^3*e^3 + 20*b*d*n*x^2*e^
2 + 15*b*d^2*n*x*e + 4*b*d^3*n)*log(x))/x^5
```

Sympy [A]
time = 0.74, size = 168, normalized size = 1.18

$$-\frac{ad^3}{5x^5}-\frac{3ad^2e}{4x^4}-\frac{ade^2}{x^3}-\frac{ae^3}{2x^2}-\frac{bd^3n}{25x^5}-\frac{bd^3\log\left(cx^n\right)}{5x^5}-\frac{3bd^2en}{16x^4}-\frac{3bd^2e\log\left(cx^n\right)}{4x^4}-\frac{bde^2n}{3x^3}-\frac{bde^2\log\left(cx^n\right)}{x^3}-\frac{be^3n}{4x^2}-\frac{be^3\log\left(cx^n\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] -a*d**3/(5*x**5) - 3*a*d**2*e/(4*x**4) - a*d*e**2/x**3 - a*e**3/(2*x**2) -
b*d**3*n/(25*x**5) - b*d**3*log(c*x**n)/(5*x**5) - 3*b*d**2*e*n/(16*x**4) -
 3*b*d**2*e*log(c*x**n)/(4*x**4) - b*d*e**2*n/(3*x**3) - b*d*e**2*log(c*x**
n)/x**3 - b*e**3*n/(4*x**2) - b*e**3*log(c*x**n)/(2*x**2)
```

Giac [A]
time = 1.82, size = 158, normalized size = 1.11

$$-\frac{600\,bnx^3e^3\log\left(x\right)+1200\,bdnx^2e^2\log\left(x\right)+900\,bd^2nxe\log\left(x\right)+300\,bnx^3e^3+400\,bdnx^2e^2+225\,bd^2nxe+600\,bx^3e^3\log\left(c\right)+1200\,bdx^2e^2\log\left(c\right)+900\,bd^2xe\log\left(c\right)+240\,bd^3n\log\left(x\right)+48\,bd^3n+600\,ax^3e^3+1200\,adx^2e^2+900\,ad^2xe+240\,bd^3\log\left(c\right)+240\,ad^3}{1200\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] -1/1200*(600*b*n*x^3*e^3*log(x) + 1200*b*d*n*x^2*e^2*log(x) + 900*b*d^2*n*x
*e*log(x) + 300*b*n*x^3*e^3 + 400*b*d*n*x^2*e^2 + 225*b*d^2*n*x*e + 600*b*x
^3*e^3*log(c) + 1200*b*d*x^2*e^2*log(c) + 900*b*d^2*x*e*log(c) + 240*b*d^3*
n*log(x) + 48*b*d^3*n + 600*a*x^3*e^3 + 1200*a*d*x^2*e^2 + 900*a*d^2*x*e +
240*b*d^3*log(c) + 240*a*d^3)/x^5
```

Mupad [B]
time = 3.58, size = 120, normalized size = 0.85

$$-\frac{x^3\,\left(10\,a\,e^3+5\,b\,e^3\,n\right)+x\,\left(15\,a\,d^2\,e+\frac{15\,b\,d^2\,e\,n}{4}\right)+4\,a\,d^3+x^2\,\left(20\,a\,d\,e^2+\frac{20\,b\,d\,e^2\,n}{3}\right)+\frac{4\,b\,d^3\,n}{5}}{20\,x^5}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{5}+\frac{3\,b\,d^2\,e\,x}{4}+b\,d\,e^2\,x^2+\frac{b\,e^3\,x^3}{2}\right)}{x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^6,x)
```

```
[Out] - (x^3*(10*a*e^3 + 5*b*e^3*n) + x*(15*a*d^2*e + (15*b*d^2*e*n)/4) + 4*a*d^3
 + x^2*(20*a*d*e^2 + (20*b*d*e^2*n)/3) + (4*b*d^3*n)/5)/(20*x^5) - (log(c*x
^n)*((b*d^3)/5 + (b*e^3*x^3)/2 + (3*b*d^2*e*x)/4 + b*d*e^2*x^2))/x^5
```

3.29 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^7}\,dx$

Optimal. Leaf size=133

$$-\frac{bd^3n}{36x^6}-\frac{3bd^2en}{25x^5}-\frac{3bde^2n}{16x^4}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b \ldots}{3 \ldots}$$ [truncated]

```
[Out] -1/36*b*d^3*n/x^6-3/25*b*d^2*e*n/x^5-3/16*b*d*e^2*n/x^4-1/9*b*e^3*n/x^3-1/6
*d^3*(a+b*ln(c*x^n))/x^6-3/5*d^2*e*(a+b*ln(c*x^n))/x^5-3/4*d*e^2*(a+b*ln(c*
x^n))/x^4-1/3*e^3*(a+b*ln(c*x^n))/x^3
```

Rubi [A]
time = 0.07, antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}-\frac{bd^3n}{36x^6}-\frac{3bd^2en}{25x^5}-\frac{3bde^2n}{16x^4}-\frac{be^3n}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^7,x]
```

```
[Out] -1/36*(b*d^3*n)/x^6 - (3*b*d^2*e*n)/(25*x^5) - (3*b*d*e^2*n)/(16*x^4) - (b*
e^3*n)/(9*x^3) - (d^3*(a + b*Log[c*x^n]))/(6*x^6) - (3*d^2*e*(a + b*Log[c*x
^n]))/(5*x^5) - (3*d*e^2*(a + b*Log[c*x^n]))/(4*x^4) - (e^3*(a + b*Log[c*x^
n]))/(3*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^7}\,dx &= -\frac{1}{60}\left(\frac{10d^3}{x^6}+\frac{36d^2e}{x^5}+\frac{45de^2}{x^4}+\frac{20e^3}{x^3}\right)(a+b\log(cx^n))-(bn)\int \frac{-10d^3}{} \\ &= -\frac{1}{60}\left(\frac{10d^3}{x^6}+\frac{36d^2e}{x^5}+\frac{45de^2}{x^4}+\frac{20e^3}{x^3}\right)(a+b\log(cx^n))-\frac{1}{60}(bn)\int \frac{-1}{} \\ &= -\frac{1}{60}\left(\frac{10d^3}{x^6}+\frac{36d^2e}{x^5}+\frac{45de^2}{x^4}+\frac{20e^3}{x^3}\right)(a+b\log(cx^n))-\frac{1}{60}(bn)\int \Big(- \\ &= -\frac{bd^3n}{36x^6}-\frac{3bd^2en}{25x^5}-\frac{3bde^2n}{16x^4}-\frac{be^3n}{9x^3}-\frac{1}{60}\left(\frac{10d^3}{x^6}+\frac{36d^2e}{x^5}+\frac{45de^2}{x^4}+\frac{20e}{x^3}\right.\end{aligned}$$

Mathematica [**A**]
time = 0.04, size = 113, normalized size = 0.85

$$-\frac{60a(10d^3+36d^2ex+45de^2x^2+20e^3x^3)+bn(100d^3+432d^2ex+675de^2x^2+400e^3x^3)+60b(10d^3+36d^2ex+45de^2x^2+20e^3x^3)\log(cx^n)}{3600x^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^7,x]
```

```
[Out] -1/3600*(60*a*(10*d^3 + 36*d^2*e*x + 45*d*e^2*x^2 + 20*e^3*x^3) + b*n*(100*
d^3 + 432*d^2*e*x + 675*d*e^2*x^2 + 400*e^3*x^3) + 60*b*(10*d^3 + 36*d^2*e*
x + 45*d*e^2*x^2 + 20*e^3*x^3)*Log[c*x^n])/x^6
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 571, normalized size = 4.29

method	result
risch	$-\frac{b(20e^3x^3+45d\,e^2x^2+36d^2ex+10d^3)\ln(x^n)}{60x^6}-\frac{1080i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+1080i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+1350i\pi b}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/60*b*(20*e^3*x^3+45*d*e^2*x^2+36*d^2*e*x+10*d^3)/x^6*ln(x^n)-1/3600*(135
0*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1080*I*Pi*b*d^2*e*x*csgn(I*x^n
```

```
)*csgn(I*c*x^n)^2+1080*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+1200*ln(c)*
b*e^3*x^3+600*a*d^3+1350*I*Pi*b*d*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+2700*
a*d*e^2*x^2+2160*a*d^2*e*x-300*I*Pi*b*d^3*csgn(I*c*x^n)^3+1200*a*e^3*x^3-60
0*I*Pi*b*e^3*x^3*csgn(I*c*x^n)^3+600*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*c*x^n)
^2+600*I*Pi*b*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1350*I*Pi*b*d*e^2*x^2*csg
n(I*c*x^n)^3+100*b*d^3*n-1080*I*Pi*b*d^2*e*x*csgn(I*c*x^n)^3-300*I*Pi*b*d^3
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+600*d^3*b*ln(c)-1350*I*Pi*b*d*e^2*x^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2700*ln(c)*b*d*e^2*x^2+2160*ln(c)*b*d^2
*e*x-600*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+300*I*Pi*b*d^3*
csgn(I*c)*csgn(I*c*x^n)^2+300*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1080*I
*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+400*b*e^3*n*x^3+432*b*d^2
*e*n*x+675*b*d*e^2*n*x^2)/x^6
```

Maxima [A]
time = 0.28, size = 140, normalized size = 1.05

$$-\frac{bne^3}{9\,x^3}-\frac{3\,bdne^2}{16\,x^4}-\frac{3\,bd^2ne}{25\,x^5}-\frac{be^3\log\left(cx^n\right)}{3\,x^3}-\frac{3\,bde^2\log\left(cx^n\right)}{4\,x^4}-\frac{3\,bd^2e\log\left(cx^n\right)}{5\,x^5}-\frac{bd^3n}{36\,x^6}-\frac{ae^3}{3\,x^3}-\frac{3\,ade^2}{4\,x^4}-\frac{3\,ad^2e}{5\,x^5}-\frac{bd^3\log\left(cx^n\right)}{6\,x^6}-\frac{ad^3}{6\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*e^3/x^3 - 3/16*b*d*n*e^2/x^4 - 3/25*b*d^2*n*e/x^5 - 1/3*b*e^3*log(
c*x^n)/x^3 - 3/4*b*d*e^2*log(c*x^n)/x^4 - 3/5*b*d^2*e*log(c*x^n)/x^5 - 1/36
*b*d^3*n/x^6 - 1/3*a*e^3/x^3 - 3/4*a*d*e^2/x^4 - 3/5*a*d^2*e/x^5 - 1/6*b*d^
3*log(c*x^n)/x^6 - 1/6*a*d^3/x^6
```

Fricas [A]
time = 0.37, size = 145, normalized size = 1.09

$$-\frac{100\,bd^3n+400\,(bn+3\,a)x^3e^3+600\,ad^3+675\,(bdn+4\,ad)x^2e^2+432\,(bd^2n+5\,ad^2)xe+60\,(20\,bx^3e^3+45\,bdx^2e^2+36\,bd^2xe+10\,bd^3)\log\left(c\right)+60\,(20\,bnx^3e^3+45\,bdnx^2e^2+36\,bd^2nxe+10\,bd^3n)\log\left(x\right)}{3600\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="fricas")
```

```
[Out] -1/3600*(100*b*d^3*n + 400*(b*n + 3*a)*x^3*e^3 + 600*a*d^3 + 675*(b*d*n + 4
*a*d)*x^2*e^2 + 432*(b*d^2*n + 5*a*d^2)*x*e + 60*(20*b*x^3*e^3 + 45*b*d*x^2
*e^2 + 36*b*d^2*x*e + 10*b*d^3)*log(c) + 60*(20*b*n*x^3*e^3 + 45*b*d*n*x^2*
e^2 + 36*b*d^2*n*x*e + 10*b*d^3*n)*log(x))/x^6
```

Sympy [A]
time = 1.03, size = 177, normalized size = 1.33

$$-\frac{ad^3}{6x^6}-\frac{3ad^2e}{5x^5}-\frac{3ade^2}{4x^4}-\frac{ae^3}{3x^3}-\frac{bd^3n}{36x^6}-\frac{bd^3\log\left(cx^n\right)}{6x^6}-\frac{3bd^2en}{25x^5}-\frac{3bd^2e\log\left(cx^n\right)}{5x^5}-\frac{3bde^2n}{16x^4}-\frac{3bde^2\log\left(cx^n\right)}{4x^4}-\frac{be^3n}{9x^3}-\frac{be^3\log\left(cx^n\right)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**7,x)
```

```
[Out] -a*d**3/(6*x**6) - 3*a*d**2*e/(5*x**5) - 3*a*d*e**2/(4*x**4) - a*e**3/(3*x*
*3) - b*d**3*n/(36*x**6) - b*d**3*log(c*x**n)/(6*x**6) - 3*b*d**2*e*n/(25*x
**5) - 3*b*d**2*e*log(c*x**n)/(5*x**5) - 3*b*d*e**2*n/(16*x**4) - 3*b*d*e**
2*log(c*x**n)/(4*x**4) - b*e**3*n/(9*x**3) - b*e**3*log(c*x**n)/(3*x**3)
```

Giac [A]
time = 2.47, size = 158, normalized size = 1.19

$$-\frac{1200\,bnx^3e^3\log\left(x\right)+2700\,bdnx^2e^2\log\left(x\right)+2160\,bd^2nxe\log\left(x\right)+400\,bnx^3e^3+675\,bdnx^2e^2+432\,bd^2nxe+1200\,bx^3e^3\log\left(c\right)+2700\,bdx^2e^2\log\left(c\right)+2160\,bd^2xe\log\left(c\right)+600\,bd^3n\log\left(x\right)+100\,bd^3n+1200\,ax^3e^3+2700\,adx^2e^2+2160\,ad^2xe+600\,bd^3\log\left(c\right)+600\,ad^3}{3600\,x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="giac")
```

```
[Out] -1/3600*(1200*b*n*x^3*e^3*log(x) + 2700*b*d*n*x^2*e^2*log(x) + 2160*b*d^2*n
*x*e*log(x) + 400*b*n*x^3*e^3 + 675*b*d*n*x^2*e^2 + 432*b*d^2*n*x*e + 1200*
b*x^3*e^3*log(c) + 2700*b*d*x^2*e^2*log(c) + 2160*b*d^2*x*e*log(c) + 600*b*
d^3*n*log(x) + 100*b*d^3*n + 1200*a*x^3*e^3 + 2700*a*d*x^2*e^2 + 2160*a*d^2
*x*e + 600*b*d^3*log(c) + 600*a*d^3)/x^6
```

Mupad [B]
time = 3.74, size = 121, normalized size = 0.91

$$-\frac{x^3\,\left(20\,a\,e^3+\frac{20\,b\,e^3\,n}{3}\right)+x\,\left(36\,a\,d^2\,e+\frac{36\,b\,d^2\,e\,n}{5}\right)+10\,a\,d^3+x^2\,\left(45\,a\,d\,e^2+\frac{45\,b\,d\,e^2\,n}{4}\right)+\frac{5\,b\,d^3\,n}{3}}{60\,x^6}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{6}+\frac{3\,b\,d^2\,e\,x}{5}+\frac{3\,b\,d\,e^2\,x^2}{4}+\frac{b\,e^3\,x^3}{3}\right)}{x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^7,x)
```

```
[Out] - (x^3*(20*a*e^3 + (20*b*e^3*n)/3) + x*(36*a*d^2*e + (36*b*d^2*e*n)/5) + 10
*a*d^3 + x^2*(45*a*d*e^2 + (45*b*d*e^2*n)/4) + (5*b*d^3*n)/3)/(60*x^6) - (l
og(c*x^n)*((b*d^3)/6 + (b*e^3*x^3)/3 + (3*b*d^2*e*x)/5 + (3*b*d*e^2*x^2)/4)
)/x^6
```

3.30 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8} dx$

Optimal. Leaf size=133

$$-\frac{bd^3n}{49x^7}-\frac{bd^2en}{12x^6}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{16x^4}-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

```
[Out] -1/49*b*d^3*n/x^7-1/12*b*d^2*e*n/x^6-3/25*b*d*e^2*n/x^5-1/16*b*e^3*n/x^4-1/
7*d^3*(a+b*ln(c*x^n))/x^7-1/2*d^2*e*(a+b*ln(c*x^n))/x^6-3/5*d*e^2*(a+b*ln(c
*x^n))/x^5-1/4*e^3*(a+b*ln(c*x^n))/x^4
```

Rubi [A]
time = 0.07, antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}-\frac{bd^3n}{49x^7}-\frac{bd^2en}{12x^6}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{16x^4}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^3*n)/x^7 - (b*d^2*e*n)/(12*x^6) - (3*b*d*e^2*n)/(25*x^5) - (b*e^
3*n)/(16*x^4) - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (d^2*e*(a + b*Log[c*x^n]
))/(2*x^6) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*x^n])
)/(4*x^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{1}{140}\left(\frac{20d^3}{x^7}+\frac{70d^2e}{x^6}+\frac{84de^2}{x^5}+\frac{35e^3}{x^4}\right)(a+b\log(cx^n))-(bn)\int \frac{-20d}{}$$
$$= -\frac{1}{140}\left(\frac{20d^3}{x^7}+\frac{70d^2e}{x^6}+\frac{84de^2}{x^5}+\frac{35e^3}{x^4}\right)(a+b\log(cx^n))-\frac{1}{140}(bn)\int$$
$$= -\frac{1}{140}\left(\frac{20d^3}{x^7}+\frac{70d^2e}{x^6}+\frac{84de^2}{x^5}+\frac{35e^3}{x^4}\right)(a+b\log(cx^n))-\frac{1}{140}(bn)\int ($$
$$= -\frac{bd^3n}{49x^7}-\frac{bd^2en}{12x^6}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{16x^4}-\frac{1}{140}\left(\frac{20d^3}{x^7}+\frac{70d^2e}{x^6}+\frac{84de^2}{x^5}+\frac{35e^3}{x^4}\right.$$

Mathematica [A]
time = 0.04, size = 113, normalized size = 0.85

$$-\frac{420a(20d^3+70d^2ex+84de^2x^2+35e^3x^3)+bn(1200d^3+4900d^2ex+7056de^2x^2+3675e^3x^3)+420b(20d^3+70d^2ex+84de^2x^2+35e^3x^3)\log(cx^n)}{58800x^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/58800*(420*a*(20*d^3 + 70*d^2*e*x + 84*d*e^2*x^2 + 35*e^3*x^3) + b*n*(12
00*d^3 + 4900*d^2*e*x + 7056*d*e^2*x^2 + 3675*e^3*x^3) + 420*b*(20*d^3 + 70
*d^2*e*x + 84*d*e^2*x^2 + 35*e^3*x^3)*Log[c*x^n])/x^7
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 571, normalized size = 4.29

method	result
risch	$-\frac{b(35e^3x^3+84d\,e^2x^2+70d^2ex+20d^3)\ln(x^n)}{140x^7}-\frac{14700i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+14700i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+17640}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

```
[Out] -1/140*b*(35*e^3*x^3+84*d*e^2*x^2+70*d^2*e*x+20*d^3)/x^7*ln(x^n)-1/58800*(1
4700*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+17640*I*Pi*b*d*e^2*x^2*csgn(I
```

```
*x^n)*csgn(I*c*x^n)^2-14700*I*Pi*b*d^2*e*x*csgn(I*c*x^n)^3+14700*ln(c)*b*e^
3*x^3+7350*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2-4200*I*Pi*b*d^3*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+8400*a*d^3+35280*a*d*e^2*x^2+29400*a*d^2*e*x+1
4700*a*e^3*x^3-7350*I*Pi*b*e^3*x^3*csgn(I*c*x^n)^3+1200*b*d^3*n+7350*I*Pi*b
*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-17640*I*Pi*b*d*e^2*x^2*csgn(I*c*x^n)^3
+8400*d^3*b*ln(c)+35280*ln(c)*b*d*e^2*x^2+29400*ln(c)*b*d^2*e*x+4200*I*Pi*b
*d^3*csgn(I*c)*csgn(I*c*x^n)^2+4200*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-
14700*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-17640*I*Pi*b*d*e^2
*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-7350*I*Pi*b*e^3*x^3*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+17640*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1470
0*I*Pi*b*d^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-4200*I*Pi*b*d^3*csgn(I*c*x^n)^
3+3675*b*e^3*n*x^3+4900*b*d^2*e*n*x+7056*b*d*e^2*n*x^2)/x^7
```

Maxima [A]
time = 0.28, size = 140, normalized size = 1.05

$$-\frac{bne^3}{16\,x^4}-\frac{3\,bdne^2}{25\,x^5}-\frac{bd^2ne}{12\,x^6}-\frac{be^3\log\left(cx^n\right)}{4\,x^4}-\frac{3\,bde^2\log\left(cx^n\right)}{5\,x^5}-\frac{bd^2e\log\left(cx^n\right)}{2\,x^6}-\frac{bd^3n}{49\,x^7}-\frac{ae^3}{4\,x^4}-\frac{3\,ade^2}{5\,x^5}-\frac{ad^2e}{2\,x^6}-\frac{bd^3\log\left(cx^n\right)}{7\,x^7}-\frac{ad^3}{7\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

```
[Out] -1/16*b*n*e^3/x^4 - 3/25*b*d*n*e^2/x^5 - 1/12*b*d^2*n*e/x^6 - 1/4*b*e^3*log
(c*x^n)/x^4 - 3/5*b*d*e^2*log(c*x^n)/x^5 - 1/2*b*d^2*e*log(c*x^n)/x^6 - 1/4
9*b*d^3*n/x^7 - 1/4*a*e^3/x^4 - 3/5*a*d*e^2/x^5 - 1/2*a*d^2*e/x^6 - 1/7*b*d
^3*log(c*x^n)/x^7 - 1/7*a*d^3/x^7
```

Fricas [A]
time = 0.35, size = 145, normalized size = 1.09

$$-\frac{1200\,bd^3n+3675\,(bn+4\,a)x^3e^3+8400\,ad^3+7056\,(bdn+5\,ad)x^2e^2+4900\,(bd^2n+6\,ad^2)xe+420\,(35\,bx^3e^3+84\,bdx^2e^2+70\,bd^2xe+20\,bd^3)\log\left(c\right)+420\,(35\,bnx^3e^3+84\,bdnx^2e^2+70\,bd^2nxe+20\,bd^3n)\log\left(x\right)}{58800\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

```
[Out] -1/58800*(1200*b*d^3*n + 3675*(b*n + 4*a)*x^3*e^3 + 8400*a*d^3 + 7056*(b*d*
n + 5*a*d)*x^2*e^2 + 4900*(b*d^2*n + 6*a*d^2)*x*e + 420*(35*b*x^3*e^3 + 84*
b*d*x^2*e^2 + 70*b*d^2*x*e + 20*b*d^3)*log(c) + 420*(35*b*n*x^3*e^3 + 84*b*
d*n*x^2*e^2 + 70*b*d^2*n*x*e + 20*b*d^3*n)*log(x))/x^7
```

Sympy [A]
time = 1.40, size = 172, normalized size = 1.29

$$-\frac{ad^3}{7x^7}-\frac{ad^2e}{2x^6}-\frac{3ade^2}{5x^5}-\frac{ae^3}{4x^4}-\frac{bd^3n}{49x^7}-\frac{bd^3\log\left(cx^n\right)}{7x^7}-\frac{bd^2en}{12x^6}-\frac{bd^2e\log\left(cx^n\right)}{2x^6}-\frac{3bde^2n}{25x^5}-\frac{3bde^2\log\left(cx^n\right)}{5x^5}-\frac{be^3n}{16x^4}-\frac{be^3\log\left(cx^n\right)}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**8,x)
```

```
[Out] -a*d**3/(7*x**7) - a*d**2*e/(2*x**6) - 3*a*d*e**2/(5*x**5) - a*e**3/(4*x**4
) - b*d**3*n/(49*x**7) - b*d**3*log(c*x**n)/(7*x**7) - b*d**2*e*n/(12*x**6)
 - b*d**2*e*log(c*x**n)/(2*x**6) - 3*b*d*e**2*n/(25*x**5) - 3*b*d*e**2*log(
c*x**n)/(5*x**5) - b*e**3*n/(16*x**4) - b*e**3*log(c*x**n)/(4*x**4)
```

Giac [A]
time = 2.17, size = 158, normalized size = 1.19

$$-\frac{14700\,bnx^3e^3\log\left(x\right)+35280\,bdnx^2e^2\log\left(x\right)+29400\,bd^2nxe\log\left(x\right)+3675\,bnx^3e^3+7056\,bdnx^2e^2+4900\,bd^2nxe+14700\,bx^3e^3\log\left(c\right)+35280\,bdx^2e^2\log\left(c\right)+29400\,bd^2xe\log\left(c\right)+8400\,bd^3n\log\left(x\right)+1200\,bd^3n+14700\,ax^3e^3+35280\,adx^2e^2+29400\,ad^2xe+8400\,bd^3\log\left(c\right)+8400\,ad^3}{58800\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

```
[Out] -1/58800*(14700*b*n*x^3*e^3*log(x) + 35280*b*d*n*x^2*e^2*log(x) + 29400*b*d
^2*n*x*e*log(x) + 3675*b*n*x^3*e^3 + 7056*b*d*n*x^2*e^2 + 4900*b*d^2*n*x*e
+ 14700*b*x^3*e^3*log(c) + 35280*b*d*x^2*e^2*log(c) + 29400*b*d^2*x*e*log(c
) + 8400*b*d^3*n*log(x) + 1200*b*d^3*n + 14700*a*x^3*e^3 + 35280*a*d*x^2*e^
2 + 29400*a*d^2*x*e + 8400*b*d^3*log(c) + 8400*a*d^3)/x^7
```

Mupad [B]
time = 3.59, size = 121, normalized size = 0.91

$$-\frac{x^3\,\left(35\,a\,e^3+\frac{35\,b\,e^3\,n}{4}\right)+x\,\left(70\,a\,d^2\,e+\frac{35\,b\,d^2\,e\,n}{3}\right)+20\,a\,d^3+x^2\,\left(84\,a\,d\,e^2+\frac{84\,b\,d\,e^2\,n}{5}\right)+\frac{20\,b\,d^3\,n}{7}}{140\,x^7}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{7}+\frac{b\,d^2\,e\,x}{2}+\frac{3\,b\,d\,e^2\,x^2}{5}+\frac{b\,e^3\,x^3}{4}\right)}{x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^3)/x^8,x)
```

```
[Out] - (x^3*(35*a*e^3 + (35*b*e^3*n)/4) + x*(70*a*d^2*e + (35*b*d^2*e*n)/3) + 20
*a*d^3 + x^2*(84*a*d*e^2 + (84*b*d*e^2*n)/5) + (20*b*d^3*n)/7)/(140*x^7) -
(log(c*x^n)*((b*d^3)/7 + (b*e^3*x^3)/4 + (b*d^2*e*x)/2 + (3*b*d*e^2*x^2)/5)
)/x^7
```

3.31 $\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx$

Optimal. Leaf size=148

$$\frac{ad^2x}{e^3}-\frac{bd^2nx}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}+\frac{bd^2x\log(cx^n)}{e^3}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))}{3e}-\frac{d^3(a+b\log(cx^n))\,\mathrm{l}}{e^4}$$

```
[Out] a*d^2*x/e^3-b*d^2*n*x/e^3+1/4*b*d*n*x^2/e^2-1/9*b*n*x^3/e+b*d^2*x*ln(c*x^n)
/e^3-1/2*d*x^2*(a+b*ln(c*x^n))/e^2+1/3*x^3*(a+b*ln(c*x^n))/e-d^3*(a+b*ln(c*
x^n))*ln(1+e*x/d)/e^4-b*d^3*n*polylog(2,-e*x/d)/e^4
```

Rubi [A]
time = 0.11, antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {45, 2393, 2332, 2341, 2354, 2438}

$$-\frac{bd^3n\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{d^3\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))}{3e}+\frac{ad^2x}{e^3}+\frac{bd^2x\log(cx^n)}{e^3}-\frac{bd^2nx}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] (a*d^2*x)/e^3 - (b*d^2*n*x)/e^3 + (b*d*n*x^2)/(4*e^2) - (b*n*x^3)/(9*e) + (
b*d^2*x*Log[c*x^n])/e^3 - (d*x^2*(a + b*Log[c*x^n]))/(2*e^2) + (x^3*(a + b*
Log[c*x^n]))/(3*e) - (d^3*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 - (b*d^3
*n*PolyLog[2, -((e*x)/d)])/e^4
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx &= \int \left(\frac{d^2(a+b\log(cx^n))}{e^3}-\frac{dx(a+b\log(cx^n))}{e^2}+\frac{x^2(a+b\log(cx^n))}{e}-\frac{d^3(a+b\ldots}{e^3(d\ldots}\right.\\ &= \frac{d^2\int(a+b\log(cx^n))\,dx}{e^3}-\frac{d^3\int\frac{a+b\log(cx^n)}{d+ex}\,dx}{e^3}-\frac{d\int x(a+b\log(cx^n))\,dx}{e^2}+\frac{\int x\ldots}{}\\ &= \frac{ad^2x}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))}{3e}-\frac{d^3(a+b\ldots}{}\\ &= \frac{ad^2x}{e^3}-\frac{bd^2nx}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}+\frac{bd^2x\log(cx^n)}{e^3}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a\ldots}{}\end{aligned}$$

Mathematica [A]
time = 0.05, size = 142, normalized size = 0.96

$$\frac{36ad^2ex-36bd^2enx-18ade^2x^2+9bde^2nx^2+12ae^3x^3-4be^3nx^3-36ad^3\log\left(1+\frac{ex}{d}\right)+6b\log(cx^n)\left(ex(6d^2-3dex+2e^2x^2)-6d^3\log\left(1+\frac{ex}{d}\right)\right)-36bd^3n\text{Li}_2\left(-\frac{ex}{d}\right)}{36e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] (36*a*d^2*e*x - 36*b*d^2*e*n*x - 18*a*d*e^2*x^2 + 9*b*d*e^2*n*x^2 + 12*a*e^
3*x^3 - 4*b*e^3*n*x^3 - 36*a*d^3*Log[1 + (e*x)/d] + 6*b*Log[c*x^n]*(e*x*(6*
d^2 - 3*d*e*x + 2*e^2*x^2) - 6*d^3*Log[1 + (e*x)/d]) - 36*b*d^3*n*PolyLog[2
, -((e*x)/d)])/(36*e^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 693, normalized size = 4.68

method	result
risch	$-\frac{ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2 d^3 \ln(ex+d)}{2e^4} - \frac{ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)x^3}{6e} + \frac{a x^3}{3e} - \frac{a d^3 \ln(ex+d)}{e^4} - \frac{ad x^2}{2e^2} + ib\pi \operatorname{csgn}(ix$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] b*n*d^3/e^4*dilog(-e*x/d)+1/3*a/e*x^3-a*d^3/e^4*ln(e*x+d)-1/2*a/e^2*d*x^2+1
/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*x*d^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*c
*x^n)^2*d^3/e^4*ln(e*x+d)-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*d*x^2+
1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^3*x*d^2+1/4*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)/e^2*d*x^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)/e^3*x*d^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^3/e^4*ln(e*x+
d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*d*x^2-49/36*b*n*d^3/e^4+1/3*b*l
n(c)/e*x^3+1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e*x^3-1/2*I*b*Pi*csgn(I*c*x
^n)^3/e^3*x*d^2+1/3*b*ln(x^n)/e*x^3+1/2*I*b*Pi*csgn(I*c*x^n)^3*d^3/e^4*ln(e
*x+d)-1/6*I*b*Pi*csgn(I*c*x^n)^3/e*x^3-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2*d^3/e^4*ln(e*x+d)-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x^3+b
*n*d^3/e^4*ln(e*x+d)*ln(-e*x/d)+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x^
3+1/4*I*b*Pi*csgn(I*c*x^n)^3/e^2*d*x^2+a*d^2*x/e^3-1/2*b*ln(x^n)/e^2*d*x^2+
b*ln(x^n)/e^3*x*d^2-b*ln(x^n)*d^3/e^4*ln(e*x+d)-1/2*b*ln(c)/e^2*d*x^2+b*ln(
c)/e^3*x*d^2-b*ln(c)*d^3/e^4*ln(e*x+d)+1/4*b*d*n*x^2/e^2-1/9*b*n*x^3/e-b*d^
2*n*x/e^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

```
[Out] -1/6*(6*d^3*e^(-4)*log(x*e + d) - (2*x^3*e^2 - 3*d*x^2*e + 6*d^2*x)*e^(-3))
*a + b*integrate((x^3*log(c) + x^3*log(x^n))/(x*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x*e + d), x)
```

Sympy [A]
time = 18.60, size = 267, normalized size = 1.80

$$-\frac{ad^3\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{ad^2x}{e^3}-\frac{adx^2}{2e^2}+\frac{ax^3}{3e}+\frac{bd^3n\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^3}-\frac{bd^3\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{bd^2nx}{e^3}+\frac{bd^2x\log(cx^n)}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bdx^2\log(cx^n)}{2e^2}-\frac{bnx^3}{9e}+\frac{bx^3\log(cx^n)}{3e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d),x)
```

```
[Out] -a*d**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + a*d**2*x/
e**3 - a*d*x**2/(2*e**2) + a*x**3/(3*e) + b*d**3*n*Piecewise((x/d, Eq(e, 0)
), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x)
 < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-
log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meije
rg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0
)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**3 -
b*d**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**3
- b*d**2*n*x/e**3 + b*d**2*x*log(c*x**n)/e**3 + b*d*n*x**2/(4*e**2) - b*d*x
**2*log(c*x**n)/(2*e**2) - b*n*x**3/(9*e) + b*x**3*log(c*x**n)/(3*e)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x),x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.32 $\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx$

Optimal. Leaf size=107

$$-\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}-\frac{bdx\log\left(cx^n\right)}{e^2}+\frac{x^2(a+b\log\left(cx^n\right))}{2e}+\frac{d^2(a+b\log\left(cx^n\right))\log\left(1+\frac{ex}{d}\right)}{e^3}+\frac{bd^2n\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{e^3}$$

```
[Out] -a*d*x/e^2+b*d*n*x/e^2-1/4*b*n*x^2/e-b*d*x*ln(c*x^n)/e^2+1/2*x^2*(a+b*ln(c*
x^n))/e+d^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^3+b*d^2*n*polylog(2,-e*x/d)/e^3
```

Rubi [A]
time = 0.09, antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {45, 2393, 2332, 2341, 2354, 2438}

$$\frac{bd^2n\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{d^2\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e^3}+\frac{x^2(a+b\log\left(cx^n\right))}{2e}-\frac{adx}{e^2}-\frac{bdx\log\left(cx^n\right)}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] -((a*d*x)/e^2) + (b*d*n*x)/e^2 - (b*n*x^2)/(4*e) - (b*d*x*Log[c*x^n])/e^2 +
 (x^2*(a + b*Log[c*x^n]))/(2*e) + (d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])
/e^3 + (b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
```

```
Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx &= \int \left(-\frac{d(a+b\log(cx^n))}{e^2}+\frac{x(a+b\log(cx^n))}{e}+\frac{d^2(a+b\log(cx^n))}{e^2(d+ex)}\right)dx\\ &= -\frac{d\int(a+b\log(cx^n))\,dx}{e^2}+\frac{d^2\int\frac{a+b\log(cx^n)}{d+ex}\,dx}{e^2}+\frac{\int x(a+b\log(cx^n))\,dx}{e}\\ &= -\frac{adx}{e^2}-\frac{bnx^2}{4e}+\frac{x^2(a+b\log(cx^n))}{2e}+\frac{d^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}-\frac{(bd)\int}{}\\ &= -\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}-\frac{bdx\log(cx^n)}{e^2}+\frac{x^2(a+b\log(cx^n))}{2e}+\frac{d^2(a+b\log(cx}{e^3}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 105, normalized size = 0.98

$$\frac{-4adex+4bdenx+2ae^2x^2-be^2nx^2+4ad^2\log\left(1+\frac{ex}{d}\right)+2b\log(cx^n)\left(ex(-2d+ex)+2d^2\log\left(1+\frac{ex}{d}\right)\right)+4bd^2n\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{4e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] (-4*a*d*e*x + 4*b*d*e*n*x + 2*a*e^2*x^2 - b*e^2*n*x^2 + 4*a*d^2*Log[1 + (e*
x)/d] + 2*b*Log[c*x^n]*(e*x*(-2*d + e*x) + 2*d^2*Log[1 + (e*x)/d]) + 4*b*d^
2*n*PolyLog[2, -((e*x)/d)])/(4*e^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 521, normalized size = 4.87

method	result
risch	$\frac{ib\pi \operatorname{csgn}(ic\,x^n)^3 dx}{2e^2}+\frac{ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2 x^2}{4e}-\frac{ib\pi \operatorname{csgn}(ic\,x^n)^3 d^2 \ln(ex+d)}{2e^3}+\frac{ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2 x^2}{4e}-\frac{b\ln(x^n)dx}{e^2}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] -b*ln(x^n)/e^2*d*x+a*d^2/e^3*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)/e^2*d*x-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^2/e^3*l
n(e*x+d)+1/2*a/e*x^2+1/2*b*ln(x^n)/e*x^2+1/2*I*b*Pi*csgn(I*c*x^n)^3/e^2*d*x
+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x^2-b*n*d^2/e^3*ln(e*x+d)*ln(-e*x
/d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x^2-1/2*I*b*Pi*csgn(I*
c*x^n)^3*d^2/e^3*ln(e*x+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/e*x^2+1/2*I*b*Pi*csgn
(I*c)*csgn(I*c*x^n)^2*d^2/e^3*ln(e*x+d)+5/4*b*n*d^2/e^3-b*n*d^2/e^3*dilog(-
e*x/d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*d*x+1/2*b*ln(c)/e*x^2-b*ln(
c)/e^2*d*x+b*ln(c)*d^2/e^3*ln(e*x+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e
*x^2-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*d*x+1/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2*d^2/e^3*ln(e*x+d)-a*d*x/e^2+b*ln(x^n)*d^2/e^3*ln(e*x+d)-1/4
*b*n*x^2/e+b*d*n*x/e^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

```
[Out] 1/2*(2*d^2*e^(-3)*log(x*e + d) + (x^2*e - 2*d*x)*e^(-2))*a + b*integrate((x
^2*log(c) + x^2*log(x^n))/(x*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x*e + d), x)
```

Sympy [A]
time = 14.32, size = 218, normalized size = 2.04

$$\frac{ad^2\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{adx}{e^2}+\frac{ax^2}{2e}-\frac{bd^2n\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{bd^2\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}+\frac{bdnx}{e^2}-\frac{bdx\log(cx^n)}{e^2}-\frac{bnx^2}{4e}+\frac{bx^2\log(cx^n)}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d),x)
```

```
[Out] a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 - a*d*x/e**2
 + a*x**2/(2*e) - b*d**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(
2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) -
 polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylo
g(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0)
, ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(
2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**2 + b*d**2*Piecewise((x/d, E
q(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**2 + b*d*n*x/e**2 - b*d*x*l
og(c*x**n)/e**2 - b*n*x**2/(4*e) + b*x**2*log(c*x**n)/(2*e)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x*e + d), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.33 $\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx$

Optimal. Leaf size=69

$$\frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{bdn\text{Li}_2\left(-\frac{ex}{d}\right)}{e^2}$$

```
[Out] a*x/e-b*n*x/e+b*x*ln(c*x^n)/e-d*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^2-b*d*n*polyl
og(2,-e*x/d)/e^2
```

Rubi [A]
time = 0.06, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.263, Rules used = {45, 2393, 2332, 2354, 2438}

$$-\frac{bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^2}+\frac{ax}{e}+\frac{bx\log(cx^n)}{e}-\frac{bnx}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] (a*x)/e - (b*n*x)/e + (b*x*Log[c*x^n])/e - (d*(a + b*Log[c*x^n])*Log[1 + (e
*x)/d])/e^2 - (b*d*n*PolyLog[2, -((e*x)/d)])/e^2
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
```

```
(f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx &= \int \left(\frac{a+b\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))}{e(d+ex)}\right)dx\\ &= \frac{\int (a+b\log(cx^n))\,dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e}\\ &= \frac{ax}{e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{b\int \log(cx^n)\,dx}{e}+\frac{(bdn)\int \frac{\log\left(1+\frac{ex}{d}\right)}{x}\,dx}{e^2}\\ &= \frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{bdn\text{Li}_2\left(-\frac{ex}{d}\right)}{e^2}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 66, normalized size = 0.96

$$\frac{aex-benx-ad\log\left(1+\frac{ex}{d}\right)+b\log(cx^n)\left(ex-d\log\left(1+\frac{ex}{d}\right)\right)-bdn\text{Li}_2\left(-\frac{ex}{d}\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] (a*e*x - b*e*n*x - a*d*Log[1 + (e*x)/d] + b*Log[c*x^n]*(e*x - d*Log[1 + (e*
x)/d]) - b*d*n*PolyLog[2, -((e*x)/d)])/e^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 343, normalized size = 4.97

method	result
risch	$\frac{b\ln(x^n)x}{e}-\frac{b\ln(x^n)d\ln(ex+d)}{e^2}-\frac{bnx}{e}-\frac{bnd}{e^2}+\frac{bnd\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^2}+\frac{bnd\,\text{dilog}\left(-\frac{ex}{d}\right)}{e^2}+\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2x}{2e}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(x^n)/e*x-b*ln(x^n)*d/e^2*ln(e*x+d)-b*n*x/e-b*n*d/e^2+b*n*d/e^2*ln(e*x+
d)*ln(-e*x/d)+b*n*d/e^2*dilog(-e*x/d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/
e*x+1/2*I*b*Pi*csgn(I*c*x^n)^3*d/e^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*d/e^2*ln(e*x+d)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d
/e^2*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/e*x-1/2*I*b*Pi*csgn(I*c)*csgn(I*c
*x^n)^2*d/e^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x-1/2*I*b*
Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x+b*ln(c)/e*x-b*ln(c)*d/e^2*ln(e*x
+d)+a*x/e-a*d/e^2*ln(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

```
[Out] -(d*e^(-2)*log(x*e + d) - x*e^(-1))*a + b*integrate((x*log(c) + x*log(x^n))
/(x*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*x*log(c*x^n) + a*x)/(x*e + d), x)
```

Sympy [A]
time = 8.69, size = 163, normalized size = 2.36

$$- \frac{ad \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + ex \right)}}{e} & \text{otherwise} \end{cases}\right)}{e} + \frac{ax}{e} + \frac{bdn \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\begin{cases} - \operatorname{Li}_{2}\left(\frac{ex e^{i \pi}}{d}\right) & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \wedge \left|{x}\right| < 1 \\ \log{\left(d \right)} \log{\left(x \right)} - \operatorname{Li}_{2}\left(\frac{ex e^{i \pi}}{d}\right) & \text{for}\: \left|{x}\right| < 1 \\ - \log{\left(d \right)} \log{\left(\frac{1}{x} \right)} - \operatorname{Li}_{2}\left(\frac{ex e^{i \pi}}{d}\right) & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \\ - {G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right)} \log{\left(d \right)} + {G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)} \log{\left(d \right)} - \operatorname{Li}_{2}\left(\frac{ex e^{i \pi}}{d}\right) & \text{otherwise} \end{cases}}{e} & \text{otherwise} \end{cases}\right)}{e} - \frac{bd \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + ex \right)}}{e} & \text{otherwise} \end{cases}\right) \log{\left(cx^{n} \right)}}{e} - \frac{bnx}{e} + \frac{bx \log{\left(cx^{n} \right)}}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d),x)
```

```
[Out] -a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e + a*x/e + b*d*n*P
iecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (
Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*
pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d),
```

```
 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg((
(1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), T
rue))/e, True))/e - b*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*
log(c*x**n)/e - b*n*x/e + b*x*log(c*x**n)/e
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x/(x*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x),x)
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.34 $\int \frac{a+b\log(cx^n)}{d+ex}\,dx$

Optimal. Leaf size=39

$$\frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e}+\frac{bn\text{Li}_2\left(-\frac{ex}{d}\right)}{e}$$

```
[Out] (a+b*ln(c*x^n))*ln(1+e*x/d)/e+b*n*polylog(2,-e*x/d)/e
```

Rubi [A]
time = 0.02, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2354, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x),x]
```

```
[Out] ((a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{d+ex}\,dx &= \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e}-\frac{(bn)\int \frac{\log\left(1+\frac{ex}{d}\right)}{x}\,dx}{e}\\ &= \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e}+\frac{bn\text{Li}_2\left(-\frac{ex}{d}\right)}{e}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 37, normalized size = 0.95

$$\frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+bn\text{Li}_2\left(-\frac{ex}{d}\right)}{e}$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*Log[c*x^n])/(d + e*x),x]

[Out] ((a + b*Log[c*x^n])*Log[1 + (e*x)/d] + b*n*PolyLog[2, -((e*x)/d)])/e

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 195, normalized size = 5.00

method	result
risch	$\frac{b\ln(ex+d)\ln(x^n)}{e} - \frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e} - \frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e} - \frac{i\ln(ex+d)b\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)}{2e} + \frac{i\ln(ex+d)b\pi\,\mathrm{csgn}}{2}$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)

[Out] b*ln(e*x+d)/e*ln(x^n)-b/e*n*ln(e*x+d)*ln(-e*x/d)-b/e*n*dilog(-e*x/d)-1/2*I*ln(e*x+d)/e*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*ln(e*x+d)/e*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(e*x+d)/e*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(e*x+d)/e*b*Pi*csgn(I*c*x^n)^3+ln(e*x+d)/e*b*ln(c)+a*ln(e*x+d)/e

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")

[Out] a*e^(-1)*log(x*e + d) + b*integrate((log(c) + log(x^n))/(x*e + d), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")

[Out] integral((b*log(c*x^n) + a)/(x*e + d), x)

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^n\right)}{d + ex}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x*e + d), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x),x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x), x)
```

3.35 $\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx$

Optimal. Leaf size=44

$$-\frac{\log\left(1+\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d}+\frac{bn\text{Li}_2\left(-\frac{d}{ex}\right)}{d}$$

```
[Out] -ln(1+d/e/x)*(a+b*ln(c*x^n))/d+b*n*polylog(2,-d/e/x)/d
```

Rubi [A]
time = 0.04, antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2379, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x)),x]
```

```
[Out] -((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)}\,dx &= \frac{\int \frac{a+b\log(cx^n)}{x}\,dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d}\\
&= \frac{\left(a+b\log\left(cx^n\right)\right)^2}{2bdn}-\frac{\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{ex}{d}\right)}{d}+\frac{(bn)\int \frac{\log\left(1+\frac{ex}{d}\right)}{x}\,dx}{d}\\
&= \frac{\left(a+b\log\left(cx^n\right)\right)^2}{2bdn}-\frac{\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{ex}{d}\right)}{d}-\frac{bn\text{Li}_2\left(-\frac{ex}{d}\right)}{d}
\end{aligned}$$

Mathematica [A]
time = 0.03, size = 63, normalized size = 1.43

$$\frac{(a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{ex}{d}\right)\right)}{2bdn}-\frac{bn\text{Li}_2\left(-\frac{ex}{d}\right)}{d}$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)),x]

[Out] ((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (e*x)/d]))/(2*b*d*n) - (b*n*PolyLog[2, -((e*x)/d)])/d

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 336, normalized size = 7.64

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d}+\frac{b\ln(x^n)\ln(x)}{d}-\frac{bn\ln(x)^2}{2d}+\frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d}+\frac{bn\,\text{dilog}\left(-\frac{ex}{d}\right)}{d}+\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(icx^n}{2d}$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a+b*ln(c*x^n))/x/(e*x+d),x,method=_RETURNVERBOSE)

[Out] -b*ln(x^n)/d*ln(e*x+d)+b*ln(x^n)/d*ln(x)-1/2*b*n/d*ln(x)^2+b*n/d*ln(e*x+d)*ln(-e*x/d)+b*n/d*dilog(-e*x/d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*ln(e*x+d)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/d*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(x)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*ln(x)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*ln(x)-b*ln(c)/d*ln(e*x+d)+b*ln(c)/d*ln(x)-a/d*ln(e*x+d)+a/d*ln(x)

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="maxima")

[Out] -a*(log(x*e + d)/d - log(x)/d) + b*integrate((log(c) + log(x^n))/(x^2*e + d*x), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^2*e + d*x), x)
```

Sympy [C] Result contains complex when optimal does not.
time = 6.47, size = 175, normalized size = 3.98

$$-\frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x}{d} & \text{for } e=0\\ -\frac{\log(-2ex)}{2e} & \text{otherwise}\end{cases}\right)}{d}-\frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x}{d} & \text{for } e=0\\ \frac{\log(2d+2ex)}{2e} & \text{otherwise}\end{cases}\right)}{d}+bn\left(\begin{cases}-\frac{1}{ex} & \text{for } d=0\\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\wedge |x|<1\\ \log(e)\log(x)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)-b\left(\begin{cases}\frac{1}{ex} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d),x)
```

```
[Out] -2*a*e*Piecewise((1/(2*e) + x/d, Eq(e, 0)), (-log(-2*e*x)/(2*e), True))/d -
 2*a*e*Piecewise((1/(2*e) + x/d, Eq(e, 0)), (log(2*d + 2*e*x)/(2*e), True))
/d + b*n*Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar
(I*pi)/(e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2,
d*exp_polar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp
_polar(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x
)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp
_polar(I*pi)/(e*x)), True))/d, True)) - b*Piecewise((1/(e*x), Eq(d, 0)), (l
og(d/x + e)/d, True))*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)), x)
```

3.36 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx$

Optimal. Leaf size=74

$$-\frac{bn}{dx}-\frac{a+b\log\left(cx^n\right)}{dx}+\frac{e\log\left(1+\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d^2}-\frac{ben\text{Li}_2\left(-\frac{d}{ex}\right)}{d^2}$$

```
[Out] -b*n/d/x+(-a-b*ln(c*x^n))/d/x+e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2-b*e*n*polyl
og(2,-d/e/x)/d^2
```

Rubi [A]

time = 0.08, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2380, 2341, 2379, 2438}

$$-\frac{ben\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}+\frac{e\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^2}-\frac{a+b\log\left(cx^n\right)}{dx}-\frac{bn}{dx}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)),x]
```

```
[Out] -((b*n)/(d*x)) - (a + b*Log[c*x^n])/(d*x) + (e*Log[1 + d/(e*x)]*(a + b*Log[
c*x^n]))/d^2 - (b*e*n*PolyLog[2, -(d/(e*x))])/d^2
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^2} - \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^2(a+b\log(cx^n))}{d^2(d+ex)}\right) dx$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{x}\,dx}{d^2} + \frac{e^2\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^2}$$

$$= -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{e(a+b\log(cx^n))^2}{2bd^2n} + \frac{e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} - \frac{(be$$

$$= -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{e(a+b\log(cx^n))^2}{2bd^2n} + \frac{e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} + \frac{ben$$

Mathematica [A]
time = 0.06, size = 88, normalized size = 1.19

$$-\frac{\frac{2bdn}{x} + \frac{2d(a+b\log(cx^n))}{x} + \frac{e(a+b\log(cx^n))^2}{bn} - 2e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 2ben\text{Li}_2\left(-\frac{ex}{d}\right)}{2d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)),x]
```

```
[Out] -1/2*((2*b*d*n)/x + (2*d*(a + b*Log[c*x^n]))/x + (e*(a + b*Log[c*x^n])^2)/(
b*n) - 2*e*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*e*n*PolyLog[2, -((e*x)
/d)])/d^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 504, normalized size = 6.81

method	result
risch	$\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(icx^n)^2 e\ln(ex+d)}{2d^2} - \frac{ib\pi\,\text{csgn}(ic)\text{csgn}(icx^n)^2 e\ln(x)}{2d^2} + \frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(icx^n)^2 e\ln(ex+d)}{2d^2} - \frac{bne\,\text{dilog}\left(-\frac{ex}{d}\right)}{d^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^2*ln(x)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d/x-1/2*I
*b*Pi*csgn(I*c*x^n)^3*e/d^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)*e/d^2*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2*
ln(e*x+d)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/x-b*ln(x^n)/d/x-a/d/x+a*
```

```
e/d^2*ln(e*x+d)-a*e/d^2*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/x-b*ln
(c)/d/x+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2*ln(e*x+d)-1/2*I*b*Pi*csg
n(I*c)*csgn(I*c*x^n)^2*e/d^2*ln(x)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e
/d^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/x-b*n*e/d^2
*ln(e*x+d)*ln(-e*x/d)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2*ln(x)+b*
ln(x^n)*e/d^2*ln(e*x+d)-b*ln(x^n)*e/d^2*ln(x)+b*ln(c)*e/d^2*ln(e*x+d)-b*ln(
c)*e/d^2*ln(x)-b*n*e/d^2*dilog(-e*x/d)+1/2*b*n*e/d^2*ln(x)^2-b*n/d/x
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="maxima")
```

```
[Out] a*(e*log(x*e + d)/d^2 - e*log(x)/d^2 - 1/(d*x)) + b*integrate((log(c) + log
(x^n))/(x^3*e + d*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^3*e + d*x^2), x)
```

Sympy [A]
time = 50.18, size = 216, normalized size = 2.92

$$-\frac{a}{dx}+\frac{ae^2\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{ae\log(x)}{d^2}-\frac{bn}{dx}-\frac{b\log(cx^n)}{dx}-\frac{be^2n\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^2}+\frac{be^2\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}+\frac{ben\log(x)^2}{2d^2}-\frac{be\log(x)\log(cx^n)}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d),x)
```

```
[Out] -a/(d*x) + a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**2 -
 a*e*log(x)/d**2 - b*n/(d*x) - b*log(c*x**n)/(d*x) - b*e**2*n*Piecewise((x/
d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1)
& (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(
x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) <
1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()),
```

```
 ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, Tru
e))/d**2 + b*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*
x**n)/d**2 + b*e*n*log(x)**2/(2*d**2) - b*e*log(x)*log(c*x**n)/d**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\left(d+e\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)), x)
```

3.37 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx$

Optimal. Leaf size=110

$$-\frac{bn}{4dx^2}+\frac{ben}{d^2x}-\frac{a+b\log\left(cx^n\right)}{2dx^2}+\frac{e(a+b\log\left(cx^n\right))}{d^2x}-\frac{e^2\log\left(1+\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}+\frac{be^2n\mathrm{Li}_2\left(-\frac{d}{ex}\right)}{d^3}$$

```
[Out] -1/4*b*n/d/x^2+b*e*n/d^2/x+1/2*(-a-b*ln(c*x^n))/d/x^2+e*(a+b*ln(c*x^n))/d^2
/x-e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^3+b*e^2*n*polylog(2,-d/e/x)/d^3
```

Rubi [A]
time = 0.13, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2380, 2341, 2379, 2438}

$$\frac{be^2n\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}-\frac{e^2\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}+\frac{e(a+b\log\left(cx^n\right))}{d^2x}-\frac{a+b\log\left(cx^n\right)}{2dx^2}+\frac{ben}{d^2x}-\frac{bn}{4dx^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)),x]
```

```
[Out] -1/4*(b*n)/(d*x^2) + (b*e*n)/(d^2*x) - (a + b*Log[c*x^n])/(2*d*x^2) + (e*(a
 + b*Log[c*x^n]))/(d^2*x) - (e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^3 +
 (b*e^2*n*PolyLog[2, -(d/(e*x))])/d^3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^3} - \frac{e(a+b\log(cx^n))}{d^2x^2} + \frac{e^2(a+b\log(cx^n))}{d^3x} - \frac{e^3(a+b\log(cx^n))}{d^3(d+ex)}\right.$$
$$= \frac{\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^2} + \frac{e^2\int \frac{a+b\log(cx^n)}{x}\,dx}{d^3} - \frac{e^3\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^3}$$
$$= -\frac{bn}{4dx^2} + \frac{ben}{d^2x} - \frac{a+b\log(cx^n)}{2dx^2} + \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^2(a+b\log(cx^n))^2}{2bd^3n} - \frac{e^2(a-}{}$$
$$= -\frac{bn}{4dx^2} + \frac{ben}{d^2x} - \frac{a+b\log(cx^n)}{2dx^2} + \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^2(a+b\log(cx^n))^2}{2bd^3n} - \frac{e^2(a-}{}$$

Mathematica [A]
time = 0.14, size = 124, normalized size = 1.13

$$-\frac{\frac{bd^2n}{x^2} - \frac{4bden}{x} + \frac{2d^2(a+b\log(cx^n))}{x^2} - \frac{4de(a+b\log(cx^n))}{x} - \frac{2e^2(a+b\log(cx^n))^2}{bn} + 4e^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 4be^2n\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{4d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)),x]
```

```
[Out] -1/4*((b*d^2*n)/x^2 - (4*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (4*d
*e*(a + b*Log[c*x^n]))/x - (2*e^2*(a + b*Log[c*x^n])^2)/(b*n) + 4*e^2*(a +
b*Log[c*x^n])*Log[1 + (e*x)/d] + 4*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 689, normalized size = 6.26

method	result
risch	$-\frac{b\ln(c)}{2d\,x^2} + \frac{bn\,e^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{d^3} + \frac{ib\pi\mathrm{csgn}(ic\,x^n)^3}{4d\,x^2} - \frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{4d\,x^2} - \frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{4d\,x^2} - \frac{ib\pi\mathrm{csgn}(ic\,x^n)^3 e}{2d^2x}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*I*b*Pi*csgn(I*c*x^n)^3/d/x^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d
^3*ln(e*x+d)-1/2*b*ln(c)/d/x^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*e^2/d^3*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3
*ln(x)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3*ln(e*x+d)+1/2*I*b*Pi*
csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3*ln(x)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n
```

```
)^2/d/x^2-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/x^2+1/2*I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2*e^2/d^3*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2/x
+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/x^2-1/2*b*ln(x^n)/d/x^2-1
/2*a/d/x^2+a*e^2/d^3*ln(x)+a*e/d^2/x-a*e^2/d^3*ln(e*x+d)+1/2*I*b*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2*e/d^2/x-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*e/d^2/x+b*ln(x^n)*e^2/d^3*ln(x)+b*ln(x^n)*e/d^2/x-b*ln(x^n)*e^2/d^3*ln(e*x
+d)+b*n*e^2/d^3*ln(e*x+d)*ln(-e*x/d)-1/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^2/x+1/2
*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^
3*ln(x)-b*ln(c)*e^2/d^3*ln(e*x+d)+b*ln(c)*e^2/d^3*ln(x)+b*ln(c)*e/d^2/x-1/2
*b*n*e^2/d^3*ln(x)^2+b*n*e^2/d^3*dilog(-e*x/d)+b*e*n/d^2/x-1/4*b*n/d/x^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="maxima")
```

```
[Out] -1/2*a*(2*e^2*log(x*e + d)/d^3 - 2*e^2*log(x)/d^3 - (2*x*e - d)/(d^2*x^2))
+ b*integrate((log(c) + log(x^n))/(x^4*e + d*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^4*e + d*x^3), x)
```

Sympy [A]
time = 50.07, size = 265, normalized size = 2.41

$$-\frac{a}{2dx^2}+\frac{ae}{d^2x}-\frac{ae^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^3}+\frac{ae^2\log(x)}{d^3}-\frac{bn}{4dx^2}-\frac{b\log(cx^n)}{2dx^2}+\frac{ben}{d^2x}+\frac{be\log(cx^n)}{d^2x}+\frac{be^3n\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^3}-\frac{be^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}-\frac{be^2n\log(x)^2}{2d^3}+\frac{be^2\log(x)\log(cx^n)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x+d),x)
```

```
[Out] -a/(2*d*x**2) + a*e/(d**2*x) - a*e**3*Piecewise((x/d, Eq(e, 0)), (log(d + e
*x)/e, True))/d**3 + a*e**2*log(x)/d**3 - b*n/(4*d*x**2) - b*log(c*x**n)/(2
*d*x**2) + b*e*n/(d**2*x) + b*e*log(c*x**n)/(d**2*x) + b*e**3*n*Piecewise((
```

```
x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1
) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Ab
s(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()
), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, T
rue))/d**3 - b*e**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(
c*x**n)/d**3 - b*e**2*n*log(x)**2/(2*d**3) + b*e**2*log(x)*log(c*x**n)/d**3
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)*x^3), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\left(d+e\,x\right)} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)), x)
```

3.38 $\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx$

Optimal. Leaf size=150

$$-\frac{bn}{9dx^3}+\frac{ben}{4d^2x^2}-\frac{be^2n}{d^3x}-\frac{a+b\log(cx^n)}{3dx^3}+\frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{e^2(a+b\log(cx^n))}{d^3x}+\frac{e^3\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}$$

```
[Out] -1/9*b*n/d/x^3+1/4*b*e*n/d^2/x^2-b*e^2*n/d^3/x+1/3*(-a-b*ln(c*x^n))/d/x^3+1
/2*e*(a+b*ln(c*x^n))/d^2/x^2-e^2*(a+b*ln(c*x^n))/d^3/x+e^3*ln(1+d/e/x)*(a+b
*ln(c*x^n))/d^4-b*e^3*n*polylog(2,-d/e/x)/d^4
```

Rubi [A]
time = 0.18, antiderivative size = 150, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2380, 2341, 2379, 2438}

$$-\frac{be^3n\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}+\frac{e^3\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}-\frac{e^2(a+b\log(cx^n))}{d^3x}+\frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{a+b\log(cx^n)}{3dx^3}-\frac{be^2n}{d^3x}+\frac{ben}{4d^2x^2}-\frac{bn}{9dx^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*(d + e*x)),x]
```

```
[Out] -1/9*(b*n)/(d*x^3) + (b*e*n)/(4*d^2*x^2) - (b*e^2*n)/(d^3*x) - (a + b*Log[c
*x^n])/(3*d*x^3) + (e*(a + b*Log[c*x^n]))/(2*d^2*x^2) - (e^2*(a + b*Log[c*x
^n]))/(d^3*x) + (e^3*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^4 - (b*e^3*n*Po
lyLog[2, -(d/(e*x))])/d^4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^4} - \frac{e(a+b\log(cx^n))}{d^2x^3} + \frac{e^2(a+b\log(cx^n))}{d^3x^2} - \frac{e^3(a+b\log(cx^n))}{d^4x}\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^4}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d^2} + \frac{e^2\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^3} - \frac{e^3\int \frac{a+b\log(cx^n)}{x}\,dx}{d^4} + \frac{e^4\int}{}$$

$$= -\frac{bn}{9dx^3} + \frac{ben}{4d^2x^2} - \frac{be^2n}{d^3x} - \frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{2d^2x^2} - \frac{e^2(a+b\log(cx^n))}{d^3x}$$

$$= -\frac{bn}{9dx^3} + \frac{ben}{4d^2x^2} - \frac{be^2n}{d^3x} - \frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{2d^2x^2} - \frac{e^2(a+b\log(cx^n))}{d^3x}$$

Mathematica [A]
time = 0.12, size = 159, normalized size = 1.06

$$\frac{-\frac{4bd^3n}{x^3} + \frac{9bd^2en}{x^2} - \frac{36bde^2n}{x} - \frac{12d^3(a+b\log(cx^n))}{x^3} + \frac{18d^2e(a+b\log(cx^n))}{x^2} - \frac{36de^2(a+b\log(cx^n))}{x} - \frac{18e^3(a+b\log(cx^n))^2}{bn} + 36e^3(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 36be^3n\text{Li}_2\left(-\frac{ex}{d}\right)}{36d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x)),x]
```

```
[Out] ((-4*b*d^3*n)/x^3 + (9*b*d^2*e*n)/x^2 - (36*b*d*e^2*n)/x - (12*d^3*(a + b*L
og[c*x^n]))/x^3 + (18*d^2*e*(a + b*Log[c*x^n]))/x^2 - (36*d*e^2*(a + b*Log[
c*x^n]))/x - (18*e^3*(a + b*Log[c*x^n])^2)/(b*n) + 36*e^3*(a + b*Log[c*x^n]
)*Log[1 + (e*x)/d] + 36*b*e^3*n*PolyLog[2, -((e*x)/d)])/(36*d^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 868, normalized size = 5.79

method	result
risch	$-\frac{bn\,e^3\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d^4} + \frac{bn\,e^3\ln(x)^2}{2d^4} - \frac{b\ln(c)e^2}{d^3x} - \frac{bn\,e^3\,\text{dilog}\left(-\frac{ex}{d}\right)}{d^4} - \frac{b\ln(c)}{3d\,x^3} - \frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2}{6d\,x^3} - \frac{ib\pi\text{csgn}(i}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] -b*n*e^3/d^4*ln(e*x+d)*ln(-e*x/d)+1/2*b*n*e^3/d^4*ln(x)^2-b*n*e^3/d^4*dilog
(-e*x/d)-b*ln(c)*e^2/d^3/x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^3/d^4*l
n(x)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2/x^2+1/4*I*b*Pi*csgn(I*c)*
```

```
csgn(I*c*x^n)^2*e/d^2/x^2+1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/
x^3+1/2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3/x-1/3*b*ln(c)/d/x^3+1/6*I*b*Pi*csgn(
I*c*x^n)^3/d/x^3+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^3/d^4*ln(e*x+d)-1
/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3/x-1/3*a/d/x^3-1/6*I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2/d/x^3-1/4*I*b*Pi*csgn(I*c*x^n)^3*e/d^2/x^2+1/2*I*b*
Pi*csgn(I*c*x^n)^3*e^3/d^4*ln(x)-1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/x^3
-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^3/d^4*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c
*x^n)^2*e^2/d^3/x+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^3/d^4*ln(e*x+d)-1/
2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^3/d^4*ln(x)+1/2*b*ln(c)*e/d^2/x^2+b*ln
(c)*e^3/d^4*ln(e*x+d)-b*ln(c)*e^3/d^4*ln(x)+a*e^3/d^4*ln(e*x+d)-a*e^2/d^3/x
+1/2*a*e/d^2/x^2-a*e^3/d^4*ln(x)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*e/d^2/x^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3/x+1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^3/d^4*ln(x)-1/2*I*b*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^3/d^4*ln(e*x+d)-1/3*b*ln(x^n)/d/x^3-b*ln(x^
n)*e^2/d^3/x+1/2*b*ln(x^n)*e/d^2/x^2-b*ln(x^n)*e^3/d^4*ln(x)+b*ln(x^n)*e^3/
d^4*ln(e*x+d)+1/4*b*e*n/d^2/x^2-b*e^2*n/d^3/x-1/9*b*n/d/x^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="maxima")
```

```
[Out] 1/6*a*(6*e^3*log(x*e + d)/d^4 - 6*e^3*log(x)/d^4 - (6*x^2*e^2 - 3*d*x*e + 2
*d^2)/(d^3*x^3)) + b*integrate((log(c) + log(x^n))/(x^5*e + d*x^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^5*e + d*x^4), x)
```

Sympy [A]
time = 75.50, size = 314, normalized size = 2.09

$$-\frac{a}{3dx^3}+\frac{ae}{2d^2x^2}-\frac{ae^2}{d^3x}+\frac{ae^4\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log{(d+ex)}}{e} & \text{otherwise}\end{cases}\right)}{d^4}-\frac{ae^3\log{(x)}}{d^4}-\frac{bn}{9dx^3}-\frac{b\log{(cx^n)}}{3dx^3}+\frac{ben}{4d^2x^2}+\frac{be\log{(cx^n)}}{2d^2x^2}-\frac{be^2n}{d^3x}-\frac{be^2\log{(cx^n)}}{d^3x}-\frac{be^4n\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\begin{cases}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\wedge |x|<1\\ \log{(d)}\log{(x)}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1\\ -\log{(d)}\log{\left(\frac{1}{x}\right)}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log{(d)}+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log{(d)}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^4}+\frac{be^4\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log{(d+ex)}}{e} & \text{otherwise}\end{cases}\right)\log{(cx^n)}}{d^4}+\frac{be^3n\log{(x)}^2}{2d^4}-\frac{be^3\log{(x)}\log{(cx^n)}}{d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x+d),x)
```

```
[Out] -a/(3*d*x**3) + a*e/(2*d**2*x**2) - a*e**2/(d**3*x) + a*e**4*Piecewise((x/d
, Eq(e, 0)), (log(d + e*x)/e, True))/d**4 - a*e**3*log(x)/d**4 - b*n/(9*d*x
**3) - b*log(c*x**n)/(3*d*x**3) + b*e*n/(4*d**2*x**2) + b*e*log(c*x**n)/(2*
d**2*x**2) - b*e**2*n/(d**3*x) - b*e**2*log(c*x**n)/(d**3*x) - b*e**4*n*Pie
cewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Ab
s(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi
)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1
/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1
, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), Tru
e))/e, True))/d**4 + b*e**4*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, Tru
e))*log(c*x**n)/d**4 + b*e**3*n*log(x)**2/(2*d**4) - b*e**3*log(x)*log(c*x*
*n)/d**4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\left(d+e\,x\right)} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x)), x)
```

3.39 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal. Leaf size=152

$$\frac{3bdnx}{e^3}-\frac{d(3a+bn)x}{e^3}-\frac{3bnx^2}{4e^2}-\frac{3bdx\log\left(cx^n\right)}{e^3}-\frac{x^3\left(a+b\log\left(cx^n\right)\right)}{e(d+ex)}+\frac{x^2\left(3a+bn+3b\log\left(cx^n\right)\right)}{2e^2}+\frac{d^2(3a+bn}{}$$

```
[Out] 3*b*d*n*x/e^3-d*(b*n+3*a)*x/e^3-3/4*b*n*x^2/e^2-3*b*d*x*ln(c*x^n)/e^3-x^3*(
a+b*ln(c*x^n))/e/(e*x+d)+1/2*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2+d^2*(3*a+b*n+3
*b*ln(c*x^n))*ln(1+e*x/d)/e^4+3*b*d^2*n*polylog(2,-e*x/d)/e^4
```

Rubi [A]
time = 0.15, antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2384, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{3bd^2n\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{d^2\log\left(\frac{ex}{d}+1\right)\left(3a+3b\log\left(cx^n\right)+bn\right)}{e^4}-\frac{x^3\left(a+b\log\left(cx^n\right)\right)}{e(d+ex)}+\frac{x^2\left(3a+3b\log\left(cx^n\right)+bn\right)}{2e^2}-\frac{dx(3a+bn)}{e^3}-\frac{3bdx\log\left(cx^n\right)}{e^3}+\frac{3bdnx}{e^3}-\frac{3bnx^2}{4e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

```
[Out] (3*b*d*n*x)/e^3 - (d*(3*a + b*n)*x)/e^3 - (3*b*n*x^2)/(4*e^2) - (3*b*d*x*Lo
g[c*x^n])/e^3 - (x^3*(a + b*Log[c*x^n]))/(e*(d + e*x)) + (x^2*(3*a + b*n +
3*b*Log[c*x^n]))/(2*e^2) + (d^2*(3*a + b*n + 3*b*Log[c*x^n])*Log[1 + (e*x)/
d])/e^4 + (3*b*d^2*n*PolyLog[2, -((e*x)/d)])/e^4
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \left(-\frac{2d(a+b\log(cx^n))}{e^3}+\frac{x(a+b\log(cx^n))}{e^2}-\frac{d^3(a+b\log(cx^n))}{e^3(d+ex)^2}+\frac{3d^2(a+\ldots}{e^3(\ldots}\right.$$

$$= -\frac{(2d)\int(a+b\log(cx^n))\,dx}{e^3}+\frac{(3d^2)\int\frac{a+b\log(cx^n)}{d+ex}\,dx}{e^3}-\frac{d^3\int\frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^3}+\frac{\int x\ldots}{\ldots}$$

$$= -\frac{2adx}{e^3}-\frac{bnx^2}{4e^2}+\frac{x^2(a+b\log(cx^n))}{2e^2}-\frac{d^2x(a+b\log(cx^n))}{e^3(d+ex)}+\frac{3d^2(a+b\log(c\ldots}{e\ldots}$$

$$= -\frac{2adx}{e^3}+\frac{2bdnx}{e^3}-\frac{bnx^2}{4e^2}-\frac{2bdx\log(cx^n)}{e^3}+\frac{x^2(a+b\log(cx^n))}{2e^2}-\frac{d^2x(a+b\log\ldots}{e^3(d+\ldots}$$

Mathematica [A]

time = 0.08, size = 141, normalized size = 0.93

$$\frac{-8adex+8bdenx-be^2nx^2-8bdex\log(cx^n)+2e^2x^2(a+b\log(cx^n))+\frac{4d^3(a+b\log(cx^n))}{d+ex}-4bd^2n(\log(x)-\log(d+ex))+12d^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+12bd^2n\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{4e^4}$$

Antiderivative was successfully verified.

[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^2,x]

[Out] (-8*a*d*e*x + 8*b*d*e*n*x - b*e^2*n*x^2 - 8*b*d*e*x*Log[c*x^n] + 2*e^2*x^2*(a + b*Log[c*x^n]) + (4*d^3*(a + b*Log[c*x^n]))/(d + e*x) - 4*b*d^2*n*(Log[x] - Log[d + e*x]) + 12*d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 12*b*d^2*n*PolyLog[2, -((e*x)/d)])/(4*e^4)

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 739, normalized size = 4.86

method	result
risch	$-\frac{3bn\,d^2\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^4}+\frac{9bn\,d^2}{4e^4}-\frac{3bn\,d^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^4}+\frac{3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2d^2\ln(ex+d)}{2e^4}-\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csg}}{4e^2}$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)

[Out] -3*b*n/e^4*d^2*ln(e*x+d)*ln(-e*x/d)+3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^4*d^2*ln(e*x+d)+3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^4*d^2*ln(e*x+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*x^2+9/4*b*n/e^4*d^2-I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^3*d*x-3/2*I*b*Pi*csgn(I*c*x^n)^3/e^4*d^2*ln(e*x+d)+1/2*b*ln(x^n)/e^2*x^2-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*d*x+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^3/e^4/(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3*d^3/e^4/(e*x+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*x^2+1/2*a/e^2*x^2+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^3*d*x-1/4*I*b*Pi*csgn(I*c*x^n)^3/e^2*x^2+1/2*b*ln(c)/e^2*x^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^3/e^4/(e*x+d)+I*b*Pi*csgn(I*c*x^n)^3/e^3*d*x+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*x^2-2*a/e^3*d*x+3*a/e^4*d^2*ln(e*x+d)+a*d^3/e^4/(e*x+d)+3*b*ln(c)/e^4*d^2*ln(e*x+d)+b*ln(c)*d^3/e^4/(e*x+d)-2*b*ln(c)/e^3*d*x-3*b*n/e^4*d^2*dilog(-e*x/d)-b*n/e^4*d^2*ln(e*x)+b*n/e^4*d^2*ln(e*x+d)+3*b*ln(x^n)/e^4*d^2*ln(e*x+d)+b*ln(x^n)*d^3/e^4/(e*x+d)-2*b*ln(x^n)/e^3*d*x-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^3/e^4/(e*x+d)-3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^4*d^2*ln(e*x+d)+2*b*d*n*x/e^3-1/4*b*n*x^2/e^2

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")

[Out] 1/2*(6*d^2*e^(-4)*log(x*e + d) + 2*d^3/(x*e^5 + d*e^4) + (x^2*e - 4*d*x)*e^(-3))*a + b*integrate((x^3*log(c) + x^3*log(x^n))/(x^2*e^2 + 2*d*x*e + d^2), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Sympy [A]
time = 28.40, size = 323, normalized size = 2.12

$$-\frac{ad^{3}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)}{e^{3}} + \frac{3ad^{2}\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log{\left(d+ex \right)}}{e} & \text{otherwise}\end{cases}\right)}{e^{3}} - \frac{2adx}{e^{3}} + \frac{ax^{2}}{2e^{2}} + \frac{bd^{3}n\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{\log{\left(x \right)}}{de} + \frac{\log{\left(\frac{d}{e}+x \right)}}{de} & \text{otherwise}\end{cases}\right)}{e^{3}} - \frac{bd^{3}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)\log{\left(cx^{n} \right)}}{e^{3}} - \frac{3bd^{2}n\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\begin{cases}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1\\\log{\left(d \right)}\log{\left(x \right)} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \left|x\right| < 1\\-\log{\left(d \right)}\log{\left(\frac{1}{x} \right)} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right)\log{\left(d \right)} + G_{2,2}^{0,2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)\log{\left(d \right)} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^{3}} + \frac{3bd^{2}\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log{\left(d+ex \right)}}{e} & \text{otherwise}\end{cases}\right)\log{\left(cx^{n} \right)}}{e^{3}} + \frac{2bdnx}{e^{3}} - \frac{2bdx\log{\left(cx^{n} \right)}}{e^{3}} - \frac{bnx^{2}}{4e^{2}} + \frac{bx^{2}\log{\left(cx^{n} \right)}}{2e^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

```
[Out] -a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 + 3*a
*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 - 2*a*d*x/e**
3 + a*x**2/(2*e**2) + b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e)
 + log(d/e + x)/(d*e), True))/e**3 - b*d**3*Piecewise((x/d**2, Eq(e, 0)), (
-1/(d*e + e**2*x), True))*log(c*x**n)/e**3 - 3*b*d**2*n*Piecewise((x/d, Eq(
e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/A
bs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1
), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-
meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((),
(0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e*
*3 + 3*b*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n
)/e**3 + 2*b*d*n*x/e**3 - 2*b*d*x*log(c*x**n)/e**3 - b*n*x**2/(4*e**2) + b*
x**2*log(c*x**n)/(2*e**2)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^2,x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.40 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2} dx$

Optimal. Leaf size=98

$$-\frac{bnx}{e^2}+\frac{2x(a+b\log(cx^n))}{e^2}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}-\frac{d(2a+bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}-\frac{2bdn\text{Li}_2\left(-\frac{ex}{d}\right)}{e^3}$$

```
[Out] -b*n*x/e^2+2*x*(a+b*ln(c*x^n))/e^2-x^2*(a+b*ln(c*x^n))/e/(e*x+d)-d*(2*a+b*n
+2*b*ln(c*x^n))*ln(1+e*x/d)/e^3-2*b*d*n*polylog(2,-e*x/d)/e^3
```

Rubi [A]
time = 0.11, antiderivative size = 107, normalized size of antiderivative = 1.09, number of steps used = 7, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2384, 45, 2393, 2332, 2354, 2438}

$$-\frac{2bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{d\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+bn)}{e^3}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}+\frac{x(2a+bn)}{e^2}+\frac{2bx\log(cx^n)}{e^2}-\frac{2bnx}{e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

```
[Out] (-2*b*n*x)/e^2 + ((2*a + b*n)*x)/e^2 + (2*b*x*Log[c*x^n])/e^2 - (x^2*(a + b
*Log[c*x^n]))/(e*(d + e*x)) - (d*(2*a + b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)
/d])/e^3 - (2*b*d*n*PolyLog[2, -((e*x)/d)])/e^3
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx &= \int \left(\frac{a+b\log(cx^n)}{e^2}+\frac{d^2(a+b\log(cx^n))}{e^2(d+ex)^2}-\frac{2d(a+b\log(cx^n))}{e^2(d+ex)}\right)dx\\ &= \frac{\int (a+b\log(cx^n))\,dx}{e^2}-\frac{(2d)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^2}+\frac{d^2\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^2}\\ &= \frac{ax}{e^2}+\frac{dx(a+b\log(cx^n))}{e^2(d+ex)}-\frac{2d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}+\frac{b\int \log(cx^n)\,dx}{e^2}+\\ &= \frac{ax}{e^2}-\frac{bnx}{e^2}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{e^2(d+ex)}-\frac{bdn\log(d+ex)}{e^3}-\frac{2d(a+b\log}{}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 98, normalized size = 1.00

$$\frac{aex-benx+bex\log(cx^n)-\frac{d^2(a+b\log(cx^n))}{d+ex}+bdn(\log(x)-\log(d+ex))-2d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-2bdn\text{Li}_2\left(-\frac{ex}{d}\right)}{e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

```
[Out] (a*e*x - b*e*n*x + b*e*x*Log[c*x^n] - (d^2*(a + b*Log[c*x^n]))/(d + e*x) +
b*d*n*(Log[x] - Log[d + e*x]) - 2*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2
*b*d*n*PolyLog[2, -((e*x)/d)])/e^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 558, normalized size = 5.69

method	result
risch	$\frac{2bnd\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^3}-\frac{ib\pi\mathrm{csgn}(ic\,x^n)^3x}{2e^2}-\frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2d^2}{2e^3(ex+d)}-\frac{bnd}{e^3}+\frac{b\ln(x^n)x}{e^2}-\frac{a\,d^2}{e^3(ex+d)}-\frac{2ad\ln(ex+d)}{e^3}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^3*d*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*x/e^2-1/2*I*b*Pi*csgn(I*c*x^n)^3*x/e^2+1/2*I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2*x/e^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*x/e^2
-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*d*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn
(I*c*x^n)^2*d^2/e^3/(e*x+d)-b*n/e^3*d+b*ln(x^n)*x/e^2-a*d^2/e^3/(e*x+d)-2*a
/e^3*d*ln(e*x+d)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^3/(e*x+d)+b*l
n(c)*x/e^2+2*b*n/e^3*d*ln(e*x+d)*ln(-e*x/d)+1/2*I*b*Pi*csgn(I*c*x^n)^3*d^2/
e^3/(e*x+d)+I*b*Pi*csgn(I*c*x^n)^3/e^3*d*ln(e*x+d)-b*ln(x^n)*d^2/e^3/(e*x+d
)-2*b*ln(x^n)/e^3*d*ln(e*x+d)+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^
3*d*ln(e*x+d)-b*ln(c)*d^2/e^3/(e*x+d)-2*b*ln(c)/e^3*d*ln(e*x+d)-b*n/e^3*d*l
n(e*x+d)+b*n/e^3*d*ln(e*x)+2*b*n/e^3*d*dilog(-e*x/d)+1/2*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*d^2/e^3/(e*x+d)-b*n*x/e^2+a*x/e^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] -(2*d*e^(-3)*log(x*e + d) - x*e^(-2) + d^2/(x*e^4 + d*e^3))*a + b*integrate
((x^2*log(c) + x^2*log(x^n))/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Sympy [A]
time = 13.63, size = 269, normalized size = 2.74

$$\frac{ad^2\left(\begin{cases}\frac{x}{d^2} & \text{for}\ e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{2ad\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{ax}{e^2}-\frac{bd^2n\left(\begin{cases}\frac{x}{d^2} & \text{for}\ e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{bd^2\left(\begin{cases}\frac{x}{d^2} & \text{for}\ e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}+\frac{2bdn\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\left.\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\right|x\right)\log(d)+G_{2,2}^{0,2}\left(\left.\begin{matrix}1,1 & \\ & 0,0\end{matrix}\right|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{2bd\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}-\frac{bnx}{e^2}+\frac{bx\log(cx^n)}{e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

```
[Out] a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**2 - 2*a*
d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 + a*x/e**2 - b*d*
*2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), Tru
e))/e**2 + b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*
log(c*x**n)/e**2 + 2*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(
2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) -
 polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylo
g(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0)
, ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(
2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**2 - 2*b*d*Piecewise((x/d, Eq
(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**2 - b*n*x/e**2 + b*x*log(c*
x**n)/e**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.41 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal. Leaf size=65

$$-\frac{x(a+b\log(cx^n))}{e(d+ex)}+\frac{(a+bn+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{bn\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{e^2}$$

```
[Out] -x*(a+b*ln(c*x^n))/e/(e*x+d)+(a+b*n+b*ln(c*x^n))*ln(1+e*x/d)/e^2+b*n*polylo
g(2,-e*x/d)/e^2
```

Rubi [A]
time = 0.04, antiderivative size = 65, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2384, 2354, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e^2}-\frac{x(a+b\log(cx^n))}{e(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

```
[Out] -((x*(a + b*Log[c*x^n]))/(e*(d + e*x))) + ((a + b*n + b*Log[c*x^n])*Log[1 +
 (e*x)/d])/e^2 + (b*n*PolyLog[2, -((e*x)/d)])/e^2
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}dx = \int \left(-\frac{d(a+b\log(cx^n))}{e(d+ex)^2} + \frac{a+b\log(cx^n)}{e(d+ex)}\right)dx$$
$$= \frac{\int \frac{a+b\log(cx^n)}{d+ex}dx}{e} - \frac{d\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{e}$$
$$= -\frac{x(a+b\log(cx^n))}{e(d+ex)} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2} - \frac{(bn)\int \frac{\log\left(1+\frac{ex}{d}\right)}{x}dx}{e^2} + \frac{(bn)\int}{}$$
$$= -\frac{x(a+b\log(cx^n))}{e(d+ex)} + \frac{bn\log(d+ex)}{e^2} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2} + \frac{bn\mathrm{Li}_2\left(-\frac{e}{}\right.}{e^2}$$

Mathematica [A]
time = 0.04, size = 71, normalized size = 1.09

$$\frac{\frac{d(a+b\log(cx^n))}{d+ex} - bn(\log(x)-\log(d+ex)) + (a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + bn\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

```
[Out] ((d*(a + b*Log[c*x^n]))/(d + e*x) - b*n*(Log[x] - Log[d + e*x]) + (a + b*Lo
g[c*x^n])*Log[1 + (e*x)/d] + b*n*PolyLog[2, -((e*x)/d)])/e^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 389, normalized size = 5.98

method	result
risch	$\frac{b\ln(x^n)\ln(ex+d)}{e^2} + \frac{b\ln(x^n)d}{e^2(ex+d)} - \frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^2} - \frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^2} - \frac{bn\ln(ex)}{e^2} + \frac{bn\ln(ex+d)}{e^2} + \frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n}{2e^2(ex+d)}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(x^n)/e^2*ln(e*x+d)+b*ln(x^n)*d/e^2/(e*x+d)-b*n/e^2*ln(e*x+d)*ln(-e*x/d
)-b*n/e^2*dilog(-e*x/d)-b*n/e^2*ln(e*x)+b*n/e^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2*d/e^2/(e*x+d)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d/
e^2/(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/e^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2/e^2*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*ln(
e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^2/(e*x+d)-1/2*I*b
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c*x
^n)^3*d/e^2/(e*x+d)+b*ln(c)/e^2*ln(e*x+d)+b*ln(c)*d/e^2/(e*x+d)+a/e^2*ln(e*
x+d)+a*d/e^2/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
[Out] (e^(-2)*log(x*e + d) + d/(x*e^3 + d*e^2))*a + b*integrate((x*log(c) + x*log
(x^n))/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
[Out] integral((b*x*log(c*x^n) + a*x)/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\log{(cx^n)})}{(d+ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d)**2,x)
[Out] Integral(x*(a + b*log(c*x**n))/(d + e*x)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x/(x*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x)^2,x)
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.42 $\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx$

Optimal. Leaf size=39

$$\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}$$

[Out] x*(a+b*ln(c*x^n))/d/(e*x+d)-b*n*ln(e*x+d)/d/e

Rubi [A]
time = 0.01, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}=0.111$, Rules used = {2351, 31}

$$\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}$$

Antiderivative was successfully verified.

[In] Int[(a + b*Log[c*x^n])/(d + e*x)^2,x]

[Out] (x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx&=\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{(bn)\int \frac{1}{d+ex}\,dx}{d}\\&=\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 41, normalized size = 1.05

$$\frac{-\frac{a+b\log(cx^n)}{d+ex}+\frac{bn(\log(x)-\log(d+ex))}{d}}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x)^2,x]
```

```
[Out] (-((a + b*Log[c*x^n])/(d + e*x)) + (b*n*(Log[x] - Log[d + e*x]))/d)/e
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 173, normalized size = 4.44

method	result
risch	$-\frac{b\ln(x^n)}{e(ex+d)}-\frac{-i\pi bd\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi bd\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi bd\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-i\pi bd\mathrm{csgn}(ic\,x^n)^3+2\ln}{2(ex+d)ed}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b/e/(e*x+d)*ln(x^n)-1/2*(-I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*P
i*b*d*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b
*d*csgn(I*c*x^n)^3+2*ln(e*x+d)*b*e*n*x-2*ln(-x)*b*e*n*x+2*ln(e*x+d)*b*d*n-2
*ln(-x)*b*d*n+2*d*b*ln(c)+2*a*d)/(e*x+d)/e/d
```

Maxima [A]
time = 0.28, size = 62, normalized size = 1.59

$$-bn\left(\frac{e^{(-1)}\log\left(xe+d\right)}{d}-\frac{e^{(-1)}\log\left(x\right)}{d}\right)-\frac{b\log\left(cx^n\right)}{xe^2+de}-\frac{a}{xe^2+de}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] -b*n*(e^(-1)*log(x*e + d)/d - e^(-1)*log(x)/d) - b*log(c*x^n)/(x*e^2 + d*e)
 - a/(x*e^2 + d*e)
```

Fricas [A]
time = 0.36, size = 54, normalized size = 1.38

$$\frac{bnxe\log\left(x\right)-bd\log\left(c\right)-ad-\left(bnxe+bdn\right)\log\left(xe+d\right)}{dxe^2+d^2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] (b*n*x*e*log(x) - b*d*log(c) - a*d - (b*n*x*e + b*d*n)*log(x*e + d))/(d*x*e
^2 + d^2*e)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 153 vs. $2(31) = 62$.

time = 0.69, size = 153, normalized size = 3.92

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}\right) & \text{for } d = 0 \wedge e = 0 \\ \frac{-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}}{e^2} & \text{for } d = 0 \\ \frac{ax - bnx + bx\log(cx^n)}{d^2} & \text{for } e = 0 \\ -\frac{ad}{d^2e + de^2x} - \frac{bdn\log\left(\frac{d}{e} + x\right)}{d^2e + de^2x} - \frac{benx\log\left(\frac{d}{e} + x\right)}{d^2e + de^2x} + \frac{bex\log(cx^n)}{d^2e + de^2x} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d)**2,x)
```

```
[Out] Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((-a
/x - b*n/x - b*log(c*x**n)/x)/e**2, Eq(d, 0)), ((a*x - b*n*x + b*x*log(c*x*
*n))/d**2, Eq(e, 0)), (-a*d/(d**2*e + d*e**2*x) - b*d*n*log(d/e + x)/(d**2*
e + d*e**2*x) - b*e*n*x*log(d/e + x)/(d**2*e + d*e**2*x) + b*e*x*log(c*x**n
)/(d**2*e + d*e**2*x), True))
```

Giac [A]
time = 3.91, size = 58, normalized size = 1.49

$$-\frac{bnxe\log(xe+d) - bnxe\log(x) + bdn\log(xe+d) + bd\log(c) + ad}{dxe^2 + d^2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] -(b*n*x*e*log(x*e + d) - b*n*x*e*log(x) + b*d*n*log(x*e + d) + b*d*log(c) +
 a*d)/(d*x*e^2 + d^2*e)
```

Mupad [B]
time = 4.56, size = 54, normalized size = 1.38

$$-\frac{a}{x\,e^2 + d\,e} - \frac{b\,\ln(c\,x^n)}{e\,(d + e\,x)} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d} + 1\right)}{d\,e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x)^2,x)
```

```
[Out] - a/(d*e + e^2*x) - (b*log(c*x^n))/(e*(d + e*x)) - (2*b*n*atanh((2*e*x)/d +
 1))/(d*e)
```

3.43 $\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx$

Optimal. Leaf size=80

$$-\frac{ex(a+b\log(cx^n))}{d^2(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2}+\frac{bn\log(d+ex)}{d^2}+\frac{bn\mathrm{Li}_2\left(-\frac{d}{ex}\right)}{d^2}$$

```
[Out] -e*x*(a+b*ln(c*x^n))/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2+b*n*ln(e*x
+d)/d^2+b*n*polylog(2,-d/e/x)/d^2
```

Rubi [A]
time = 0.08, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2389, 2379, 2438, 2351, 31}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^2}-\frac{ex(a+b\log(cx^n))}{d^2(d+ex)}+\frac{bn\log(d+ex)}{d^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x)^2),x]
```

```
[Out] -((e*x*(a + b*Log[c*x^n]))/(d^2*(d + e*x))) - (Log[1 + d/(e*x)]*(a + b*Log[
c*x^n]))/d^2 + (b*n*Log[d + e*x])/d^2 + (b*n*PolyLog[2, -(d/(e*x))])/d^2
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
```

```
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx &= \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d}\\ &= -\frac{ex(a+b\log(cx^n))}{d^2(d+ex)} + \frac{\int \frac{a+b\log(cx^n)}{x}\,dx}{d^2} - \frac{e\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^2} + \frac{(ben)\int \frac{1}{d+ex}\,dx}{d^2}\\ &= -\frac{ex(a+b\log(cx^n))}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{2bd^2n} + \frac{bn\log(d+ex)}{d^2} - \frac{(a+b\log(cx^n))\log(1}{d^2}\\ &= -\frac{ex(a+b\log(cx^n))}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{2bd^2n} + \frac{bn\log(d+ex)}{d^2} - \frac{(a+b\log(cx^n))\log(1}{d^2}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 96, normalized size = 1.20

$$\frac{\frac{2d(a+b\log(cx^n))}{d+ex} + \frac{(a+b\log(cx^n))^2}{bn} - 2bn(\log(x)-\log(d+ex)) - 2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 2bn\text{Li}_2\left(-\frac{ex}{d}\right)}{2d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^2),x]
[Out] ((2*d*(a + b*Log[c*x^n]))/(d + e*x) + (a + b*Log[c*x^n])^2/(b*n) - 2*b*n*(L
og[x] - Log[d + e*x]) - 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*n*PolyL
og[2, -((e*x)/d)])/(2*d^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 521, normalized size = 6.51

method	result
risch	$-\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2\ln(ex+d)}{2d^2} - \frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2\ln(ex+d)}{2d^2} + \frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2}{2d(ex+d)} + \frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n}{2d(ex+d)}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)/d^2*ln(x)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^2*ln(e*x+d)+1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2*ln(e*x+d)-1/2*I*b*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/(e*x+d)-1/2*b*n/d^2*ln(x)^2-b*n/d^2*ln(x)+b
*n/d^2*dilog(-e*x/d)-b*ln(c)/d^2*ln(e*x+d)+b*ln(c)/d/(e*x+d)-a/d^2*ln(e*x+d
)+a/d/(e*x+d)+a/d^2*ln(x)-1/2*I*b*Pi*csgn(I*c*x^n)^3/d/(e*x+d)-1/2*I*b*Pi*c
sgn(I*c*x^n)^3/d^2*ln(x)-b*ln(x^n)/d^2*ln(e*x+d)+b*ln(x^n)/d/(e*x+d)+b*ln(x
^n)/d^2*ln(x)+b*ln(c)/d^2*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(e*x
+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*ln(x)+1/2*I*b*Pi*csgn(I*x^n)*c
sgn(I*c*x^n)^2/d^2*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*ln(e*x+d)
-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*ln(e*x+d)+b*n/d^2*ln(e*x+d)*ln(
-e*x/d)+b*n*ln(e*x+d)/d^2
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] a*(1/(d*x*e + d^2) - log(x*e + d)/d^2 + log(x)/d^2) + b*integrate((log(c) +
 log(x^n))/(x^3*e^2 + 2*d*x^2*e + d^2*x), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^3*e^2 + 2*d*x^2*e + d^2*x), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(c x^{n} \right)}}{x \left(d + e x\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x*(d + e*x)**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^2*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^2),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^2), x)
```

3.44 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx$

Optimal. Leaf size=114

$$-\frac{bn}{d^2x}-\frac{a+b\log\left(cx^n\right)}{d^2x}+\frac{e^2x(a+b\log\left(cx^n\right))}{d^3(d+ex)}+\frac{2e\log\left(1+\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}-\frac{ben\log(d+ex)}{d^3}-\frac{2ben\text{Li}_2\left(-\right.}{d^3}$$

```
[Out] -b*n/d^2/x+(-a-b*ln(c*x^n))/d^2/x+e^2*x*(a+b*ln(c*x^n))/d^3/(e*x+d)+2*e*ln(
1+d/e/x)*(a+b*ln(c*x^n))/d^3-b*e*n*ln(e*x+d)/d^3-2*b*e*n*polylog(2,-d/e/x)/
d^3
```

Rubi [A]
time = 0.13, antiderivative size = 114, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {46, 2393, 2341, 2351, 31, 2379, 2438}

$$-\frac{2ben\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}+\frac{e^2x(a+b\log\left(cx^n\right))}{d^3(d+ex)}+\frac{2e\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}-\frac{a+b\log\left(cx^n\right)}{d^2x}-\frac{ben\log(d+ex)}{d^3}-\frac{bn}{d^2x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^2),x]
```

```
[Out] -((b*n)/(d^2*x)) - (a + b*Log[c*x^n])/(d^2*x) + (e^2*x*(a + b*Log[c*x^n]))/
(d^3*(d + e*x)) + (2*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^3 - (b*e*n*Lo
g[d + e*x])/d^3 - (2*b*e*n*PolyLog[2, -(d/(e*x))])/d^3
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx &= \int \left(\frac{a+b\log(cx^n)}{d^2x^2} - \frac{2e(a+b\log(cx^n))}{d^3x} + \frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^2} + \frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)} \right.\\
&= \frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^2} - \frac{(2e)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^3} + \frac{(2e^2)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^3} + \frac{e^2\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d^2} \\
&= -\frac{bn}{d^2x} - \frac{a+b\log(cx^n)}{d^2x} + \frac{e^2x(a+b\log(cx^n))}{d^3(d+ex)} - \frac{e(a+b\log(cx^n))^2}{bd^3n} + \frac{2e(a+b\log(c}{} \\
&= -\frac{bn}{d^2x} - \frac{a+b\log(cx^n)}{d^2x} + \frac{e^2x(a+b\log(cx^n))}{d^3(d+ex)} - \frac{e(a+b\log(cx^n))^2}{bd^3n} - \frac{ben\log(d+ex}{d^3}
\end{aligned}$$

Mathematica [A]
time = 0.10, size = 120, normalized size = 1.05

$$-\frac{\frac{bdn}{x}+\frac{d(a+b\log(cx^n))}{x}+\frac{de(a+b\log(cx^n))}{d+ex}+\frac{e(a+b\log(cx^n))^2}{bn}-ben(\log(x)-\log(d+ex))-2e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-2ben\text{Li}_2\left(-\frac{ex}{d}\right)}{d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^2),x]
```

```
[Out] -(((b*d*n)/x + (d*(a + b*Log[c*x^n]))/x + (d*e*(a + b*Log[c*x^n]))/(d + e*x
) + (e*(a + b*Log[c*x^n])^2)/(b*n) - b*e*n*(Log[x] - Log[d + e*x]) - 2*e*(a
 + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*e*n*PolyLog[2, -((e*x)/d)])/d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 703, normalized size = 6.17

method	result
risch	$-\frac{2bne\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d^3}-\frac{2bne\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{d^3}-\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2}{2d^2x}-\frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2}{2d^2x}+\frac{ib\pi\mathrm{csgn}(icx^n)^3e\ln(}{d^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2*b*n/d^3*e*ln(e*x+d)*ln(-e*x/d)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e*ln
(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2/(e*x+d)-I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2/d^3*e*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)/d^2/x+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^2/x-a/d^2/x-1/2*I*b*Pi*csgn(I*c)*csgn
(I*c*x^n)^2/d^2/x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/x+I*b*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2/d^3*e*ln(e*x+d)-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3
*e*ln(x)+I*b*Pi*csgn(I*c*x^n)^3/d^3*e*ln(x)+1/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^
2/(e*x+d)-I*b*Pi*csgn(I*c*x^n)^3/d^3*e*ln(e*x+d)-1/2*I*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2*e/d^2/(e*x+d)+2*b*ln(x^n)/d^3*e*ln(e*x+d)-2*b*ln(x^n)/d^3*e*ln
(x)-b*ln(x^n)*e/d^2/(e*x+d)+2*a/d^3*e*ln(e*x+d)-2*a/d^3*e*ln(x)-a*e/d^2/(e*
x+d)+2*b*ln(c)/d^3*e*ln(e*x+d)-2*b*ln(c)/d^3*e*ln(x)-b*ln(c)*e/d^2/(e*x+d)+
b*n/d^3*e*ln(x)^2-2*b*n/d^3*e*dilog(-e*x/d)+b*n/d^3*e*ln(x)-b*ln(x^n)/d^2/x
-b*e*n*ln(e*x+d)/d^3+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e*ln(x)
-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e*ln(e*x+d)+1/2*I*b*Pi*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/(e*x+d)-b*ln(c)/d^2/x-b*n/d^2/x
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] -a*((2*x*e + d)/(d^2*x^2*e + d^3*x) - 2*e*log(x*e + d)/d^3 + 2*e*log(x)/d^3
) + b*integrate((log(c) + log(x^n))/(x^4*e^2 + 2*d*x^3*e + d^2*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^4*e^2 + 2*d*x^3*e + d^2*x^2), x)
```

Sympy [A]
time = 42.01, size = 318, normalized size = 2.79

$$\frac{ae^{2}\left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{1}{de + e^{2} x} & \text{otherwise} \end{cases}\right)}{d^{2}} - \frac{a}{d^{2} x} + \frac{2ae^{2}\left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + ex \right)}}{e} & \text{otherwise} \end{cases}\right)}{d^{3}} - \frac{2ae\log{\left(x \right)}}{d^{3}} - \frac{be^{2}n\left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{\log{\left(x \right)}}{de} + \frac{\log{\left(\frac{d}{e} + x \right)}}{de} & \text{otherwise} \end{cases}\right)}{d^{2}} + \frac{be^{2}\left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{1}{de + e^{2} x} & \text{otherwise} \end{cases}\right)\log{\left(cx^{n} \right)}}{d^{2}} - \frac{bn}{d^{2} x} - \frac{b\log{\left(cx^{n} \right)}}{d^{2} x} - \frac{2be^{2}n\left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\begin{cases} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1 \\ \log{\left(d \right)}\log{\left(x \right)} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \left|x\right| < 1 \\ - \log{\left(d \right)}\log{\left(\frac{1}{x} \right)} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \\ - G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right)\log{\left(d \right)} + G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)\log{\left(d \right)} - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise} \end{cases}}{e} & \text{otherwise} \end{cases}\right)}{d^{3}} + \frac{2be^{2}\left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + ex \right)}}{e} & \text{otherwise} \end{cases}\right)\log{\left(cx^{n} \right)}}{d^{3}} + \frac{ben\log{\left(x \right)}^{2}}{d^{3}} - \frac{2be\log{\left(x \right)}\log{\left(cx^{n} \right)}}{d^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**2,x)
```

```
[Out] a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**2 - a/(d
**2*x) + 2*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**3 -
 2*a*e*log(x)/d**3 - b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e)
+ log(d/e + x)/(d*e), True))/d**2 + b*e**2*Piecewise((x/d**2, Eq(e, 0)), (-
1/(d*e + e**2*x), True))*log(c*x**n)/d**2 - b*n/(d**2*x) - b*log(c*x**n)/(d
**2*x) - 2*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*
exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylo
g(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*
x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*
exp_polar(I*pi)/d), True))/e, True))/d**3 + 2*b*e**2*Piecewise((x/d, Eq(e,
0)), (log(d + e*x)/e, True))*log(c*x**n)/d**3 + b*e*n*log(x)**2/d**3 - 2*b*
e*log(x)*log(c*x**n)/d**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^2*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^2),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^2), x)
```

3.45 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$

Optimal. Leaf size=154

$$-\frac{bn}{4d^2x^2}+\frac{2ben}{d^3x}-\frac{a+b\log\left(cx^n\right)}{2d^2x^2}+\frac{2e(a+b\log\left(cx^n\right))}{d^3x}-\frac{e^3x(a+b\log\left(cx^n\right))}{d^4(d+ex)}-\frac{3e^2\log\left(1+\frac{d}{ex}\right)(a+b\log\left(cx^n\right)}{d^4}$$

```
[Out] -1/4*b*n/d^2/x^2+2*b*e*n/d^3/x+1/2*(-a-b*ln(c*x^n))/d^2/x^2+2*e*(a+b*ln(c*x
^n))/d^3/x-e^3*x*(a+b*ln(c*x^n))/d^4/(e*x+d)-3*e^2*ln(1+d/e/x)*(a+b*ln(c*x^
n))/d^4+b*e^2*n*ln(e*x+d)/d^4+3*b*e^2*n*polylog(2,-d/e/x)/d^4
```

Rubi [A]
time = 0.16, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {46, 2393, 2341, 2351, 31, 2379, 2438}

$$\frac{3be^2n\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}-\frac{e^3x(a+b\log\left(cx^n\right))}{d^4(d+ex)}-\frac{3e^2\log\left(\frac{d}{ex}+1\right)(a+b\log\left(cx^n\right))}{d^4}+\frac{2e(a+b\log\left(cx^n\right))}{d^3x}-\frac{a+b\log\left(cx^n\right)}{2d^2x^2}+\frac{be^2n\log(d+ex)}{d^4}+\frac{2ben}{d^3x}-\frac{bn}{4d^2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^2),x]
```

```
[Out] -1/4*(b*n)/(d^2*x^2) + (2*b*e*n)/(d^3*x) - (a + b*Log[c*x^n])/(2*d^2*x^2) +
 (2*e*(a + b*Log[c*x^n]))/(d^3*x) - (e^3*x*(a + b*Log[c*x^n]))/(d^4*(d + e*
x)) - (3*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^4 + (b*e^2*n*Log[d + e*
x])/d^4 + (3*b*e^2*n*PolyLog[2, -(d/(e*x))])/d^4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx &= \int \left(\frac{a+b\log(cx^n)}{d^2x^3} - \frac{2e(a+b\log(cx^n))}{d^3x^2} + \frac{3e^2(a+b\log(cx^n))}{d^4x} - \frac{e^3(a+b\log(cx^n))}{d^3(d+ex)^2}\right. \\
&= \frac{\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d^2} - \frac{(2e)\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^3} + \frac{(3e^2)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^4} - \frac{(3e^3)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^4} \\
&= -\frac{bn}{4d^2x^2} + \frac{2ben}{d^3x} - \frac{a+b\log(cx^n)}{2d^2x^2} + \frac{2e(a+b\log(cx^n))}{d^3x} - \frac{e^3x(a+b\log(cx^n))}{d^4(d+ex)} + \frac{3e^2}{} \\
&= -\frac{bn}{4d^2x^2} + \frac{2ben}{d^3x} - \frac{a+b\log(cx^n)}{2d^2x^2} + \frac{2e(a+b\log(cx^n))}{d^3x} - \frac{e^3x(a+b\log(cx^n))}{d^4(d+ex)} + \frac{3e^2}{}
\end{aligned}
$$

Mathematica [A]
time = 0.16, size = 165, normalized size = 1.07

$$
-\frac{\frac{bd^2n}{x^2} - \frac{8bden}{x} + \frac{2d^2(a+b\log(cx^n))}{x^2} - \frac{8de(a+b\log(cx^n))}{x} - \frac{4de^2(a+b\log(cx^n))}{d+ex} - \frac{6e^2(a+b\log(cx^n))^2}{bn} + 4be^2n(\log(x)-\log(d+ex)) + 12e^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 12be^2n\text{Li}_2\left(-\frac{ex}{d}\right)}{4d^4}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^2),x]
```

```
[Out] -1/4*((b*d^2*n)/x^2 - (8*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (8*d
*e*(a + b*Log[c*x^n]))/x - (4*d*e^2*(a + b*Log[c*x^n]))/(d + e*x) - (6*e^2*
(a + b*Log[c*x^n])^2)/(b*n) + 4*b*e^2*n*(Log[x] - Log[d + e*x]) + 12*e^2*(a
 + b*Log[c*x^n])*Log[1 + (e*x)/d] + 12*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 910, normalized size = 5.91

method	result	size
risch	Expression too large to display	910

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3/(e*x+d)+I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2/d^3*e/x-3*a/d^4*e^2*ln(e*x+d)+a*e^2/d^3/(e*x+d)+3*a/d^4*e^2*ln(x
)+2*a/d^3*e/x+3*b*n/d^4*e^2*ln(e*x+d)*ln(-e*x/d)+3/2*I*b*Pi*csgn(I*c*x^n)^3
/d^4*e^2*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3/(e*x+d)-3/2*I*b*Pi*cs
gn(I*x^n)*csgn(I*c*x^n)^2/d^4*e^2*ln(e*x+d)+3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2/d^4*e^2*ln(x)-3*b*ln(c)/d^4*e^2*ln(e*x+d)+3*b*ln(c)/d^4*e^2*ln(x)+b
*ln(c)*e^2/d^3/(e*x+d)+2*b*ln(c)/d^3*e/x-b*n/d^4*e^2*ln(x)-3/2*b*n/d^4*e^2*
ln(x)^2+3*b*n/d^4*e^2*dilog(-e*x/d)+1/4*I*b*Pi*csgn(I*c*x^n)^3/d^2/x^2-3/2*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e^2*ln(e*x+d)-1/4*I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2/d^2/x^2-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/x^2+I*b*Pi*
csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*e/x+3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^
4*e^2*ln(x)-1/2*a/d^2/x^2-3/2*I*b*Pi*csgn(I*c*x^n)^3/d^4*e^2*ln(x)-I*b*Pi*c
sgn(I*c*x^n)^3/d^3*e/x+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3/(e*x+
d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/x^2-3*b*ln(x^n)/d^4*e
^2*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3/(e*x+d)
-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e/x-3/2*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)/d^4*e^2*ln(x)+3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)/d^4*e^2*ln(e*x+d)-1/2*b*ln(c)/d^2/x^2-1/2*b*ln(x^n)/d^2/x^2+b*e^2
*n*ln(e*x+d)/d^4+b*ln(x^n)*e^2/d^3/(e*x+d)+3*b*ln(x^n)/d^4*e^2*ln(x)+2*b*ln
(x^n)/d^3*e/x-1/4*b*n/d^2/x^2+2*b*e*n/d^3/x
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*a*((6*x^2*e^2 + 3*d*x*e - d^2)/(d^3*x^3*e + d^4*x^2) - 6*e^2*log(x*e +
d)/d^4 + 6*e^2*log(x)/d^4) + b*integrate((log(c) + log(x^n))/(x^5*e^2 + 2*d
*x^4*e + d^2*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^5*e^2 + 2*d*x^4*e + d^2*x^3), x)
```

Sympy [A]
time = 59.49, size = 376, normalized size = 2.44

$$-\frac{a}{2d^2x^2} - \frac{ae^3\left(\begin{cases}\frac{x}{d^2} & \text{for}\: e = 0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{2ae}{d^3x} - \frac{3ae^3\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\ \frac{\log{(d+ex)}}{e} & \text{otherwise}\end{cases}\right)}{d^4} + \frac{3ae^2\log{(x)}}{d^4} - \frac{bn}{4d^2x^2} - \frac{b\log{(cx^n)}}{2d^2x^2} + \frac{be^3n\left(\begin{cases}\frac{x}{d^2} & \text{for}\: e = 0\\ -\frac{\log{(x)}}{de} + \frac{\log{\left(\frac{d}{e}+x\right)}}{de} & \text{otherwise}\end{cases}\right)}{d^3} - \frac{be^3\left(\begin{cases}\frac{x}{d^2} & \text{for}\: e = 0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log{(cx^n)}}{d^3} + \frac{2ben}{d^3x} + \frac{2be\log{(cx^n)}}{d^3x} + \frac{3be^3n\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{|x|} < 1 \wedge |x| < 1\\ \log{(d)}\log{(x)} - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: |x| < 1\\ -\log{(d)}\log{\left(\frac{1}{x}\right)} - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{|x|} < 1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log{(d)} + G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log{(d)} - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^4} - \frac{3be^3\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\ \frac{\log{(d+ex)}}{e} & \text{otherwise}\end{cases}\right)\log{(cx^n)}}{d^4} - \frac{3be^2n\log{(x)}^2}{2d^4} + \frac{3be^2\log{(x)}\log{(cx^n)}}{d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**2,x)
```

```
[Out] -a/(2*d**2*x**2) - a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x),
 True))/d**3 + 2*a*e/(d**3*x) - 3*a*e**3*Piecewise((x/d, Eq(e, 0)), (log(d
+ e*x)/e, True))/d**4 + 3*a*e**2*log(x)/d**4 - b*n/(4*d**2*x**2) - b*log(c*
x**n)/(2*d**2*x**2) + b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e)
 + log(d/e + x)/(d*e), True))/d**3 - b*e**3*Piecewise((x/d**2, Eq(e, 0)), (
-1/(d*e + e**2*x), True))*log(c*x**n)/d**3 + 2*b*e*n/(d**3*x) + 2*b*e*log(c
*x**n)/(d**3*x) + 3*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylo
g(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x)
 - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - poly
log(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylo
g(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**4 - 3*b*e**3*Piecewise((x/
d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**4 - 3*b*e**2*n*log(x)*
*2/(2*d**4) + 3*b*e**2*log(x)*log(c*x**n)/d**4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^2*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,{\left(d+e\,x\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)^2),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)^2), x)
```

3.46 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx$

Optimal. Leaf size=149

$$-\frac{3bnx}{e^3}+\frac{(6a+5bn)x}{2e^3}+\frac{3bx\log(cx^n)}{e^3}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}-\frac{x^2(3a+bn+3b\log(cx^n))}{2e^2(d+ex)}-\frac{d(6a+5bn+6b\log(}{2e^4}$$

```
[Out] -3*b*n*x/e^3+1/2*(5*b*n+6*a)*x/e^3+3*b*x*ln(c*x^n)/e^3-1/2*x^3*(a+b*ln(c*x^
n))/e/(e*x+d)^2-1/2*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2/(e*x+d)-1/2*d*(6*a+5*b*
n+6*b*ln(c*x^n))*ln(1+e*x/d)/e^4-3*b*d*n*polylog(2,-e*x/d)/e^4
```

Rubi [A]
time = 0.17, antiderivative size = 149, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2384, 45, 2393, 2332, 2354, 2438}

$$-\frac{3bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{d\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+5bn)}{2e^4}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e^2(d+ex)}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}+\frac{x(6a+5bn)}{2e^3}+\frac{3bx\log(cx^n)}{e^3}-\frac{3bnx}{e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] (-3*b*n*x)/e^3 + ((6*a + 5*b*n)*x)/(2*e^3) + (3*b*x*Log[c*x^n])/e^3 - (x^3*
(a + b*Log[c*x^n]))/(2*e*(d + e*x)^2) - (x^2*(3*a + b*n + 3*b*Log[c*x^n]))/
(2*e^2*(d + e*x)) - (d*(6*a + 5*b*n + 6*b*Log[c*x^n])*Log[1 + (e*x)/d])/(2*
e^4) - (3*b*d*n*PolyLog[2, -((e*x)/d)])/e^4
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \left(\frac{a+b\log(cx^n)}{e^3} - \frac{d^3(a+b\log(cx^n))}{e^3(d+ex)^3} + \frac{3d^2(a+b\log(cx^n))}{e^3(d+ex)^2} - \frac{3d(a+b\log\ldots}{e^3(d+e\ldots}\right.$$

$$= \frac{\int (a+b\log(cx^n))\,dx}{e^3} - \frac{(3d)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^3} + \frac{(3d^2)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^3} - \frac{d^3\int \frac{a+\ldots}{(\ldots}}{\ldots}$$

$$= \frac{ax}{e^3} + \frac{d^3(a+b\log(cx^n))}{2e^4(d+ex)^2} + \frac{3dx(a+b\log(cx^n))}{e^3(d+ex)} - \frac{3d(a+b\log(cx^n))\log(1+\ldots}{e^4}$$

$$= \frac{ax}{e^3} - \frac{bnx}{e^3} + \frac{bx\log(cx^n)}{e^3} + \frac{d^3(a+b\log(cx^n))}{2e^4(d+ex)^2} + \frac{3dx(a+b\log(cx^n))}{e^3(d+ex)} - \frac{3bdn\,\mathrm{l}\ldots}{\ldots}$$

$$= \frac{ax}{e^3} - \frac{bnx}{e^3} - \frac{bd^2n}{2e^4(d+ex)} - \frac{bdn\log(x)}{2e^4} + \frac{bx\log(cx^n)}{e^3} + \frac{d^3(a+b\log(cx^n))}{2e^4(d+ex)^2} + \ldots$$

Mathematica [A]
time = 0.10, size = 150, normalized size = 1.01

$$\frac{2aex - 2benx + 2bex\log(cx^n) + \frac{d^3(a+b\log(cx^n))}{(d+ex)^2} - \frac{6d^2(a+b\log(cx^n))}{d+ex} + 6bdn(\log(x) - \log(d+ex)) - bdn\left(\frac{d}{d+ex} + \log(x) - \log(d+ex)\right) - 6d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 6bdn\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{2e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

[Out] (2*a*e*x - 2*b*e*n*x + 2*b*e*x*Log[c*x^n] + (d^3*(a + b*Log[c*x^n]))/(d + e*x)^2 - (6*d^2*(a + b*Log[c*x^n]))/(d + e*x) + 6*b*d*n*(Log[x] - Log[d + e*x]) - b*d*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) - 6*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*b*d*n*PolyLog[2, -((e*x)/d)])/(2*e^4)

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 764, normalized size = 5.13

method	result
risch	$\frac{3bnd\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^4}+\frac{3bnd\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^4}+\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2x}{2e^3}+\frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2x}{2e^3}+\frac{3ib\pi\mathrm{csgn}(ic\,x^n)^3d\ln(e$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)

[Out] 3*b*n/e^4*d*ln(e*x+d)*ln(-e*x/d)-3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^4*d^2/(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/e^3*x-3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^4*d*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*x+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^3*x+a/e^3*x+3/2*I*b*Pi*csgn(I*c*x^n)^3/e^4*d*ln(e*x+d)+3/2*I*b*Pi*csgn(I*c*x^n)^3/e^4*d^2/(e*x+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3*d^3/e^4/(e*x+d)^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^3*x-3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^4*d*ln(e*x+d)-3*b*ln(x^n)/e^4*d^2/(e*x+d)+1/2*b*ln(x^n)*d^3/e^4/(e*x+d)^2-3*b*ln(x^n)/e^4*d*ln(e*x+d)-3*b*ln(c)/e^4*d^2/(e*x+d)+1/2*b*ln(c)*d^3/e^4/(e*x+d)^2-3*b*ln(c)/e^4*d*ln(e*x+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^3/e^4/(e*x+d)^2-3*a/e^4*d*ln(e*x+d)-3*a/e^4*d^2/(e*x+d)+1/2*a*d^3/e^4/(e*x+d)^2+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^3/e^4/(e*x+d)^2-3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^4*d^2/(e*x+d)+5/2*b*n/e^4*d*ln(e*x)-5/2*b*n/e^4*d*ln(e*x+d)-1/2*b*n/e^4*d^2/(e*x+d)+3*b*n/e^4*d*dilog(-e*x/d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^3/e^4/(e*x+d)^2+3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^4*d*ln(e*x+d)+3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^4*d^2/(e*x+d)+b*ln(x^n)/e^3*x+b*ln(c)/e^3*x-b*n/e^4*d-b*n*x/e^3

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")

[Out] -1/2*(6*d*e^(-4)*log(x*e + d) - 2*x*e^(-3) + (6*d^2*x*e + 5*d^3)/(x^2*e^6 + 2*d*x*e^5 + d^2*e^4))*a + b*integrate((x^3*log(c) + x^3*log(x^n))/(x^3*e^3 + 3*d*x^2*e^2 + 3*d^2*x*e + d^3), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x^3*e^3 + 3*d*x^2*e^2 + 3*d^2*x*e + d^
3), x)
```

Sympy [A]
time = 29.62, size = 391, normalized size = 2.62

$$-\frac{ad^3\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{3ad^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^3}-\frac{3ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{ax}{e^3}+\frac{bd^3n\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2d^2e+2de^2x}-\frac{\log(x)}{2d^2e}+\frac{\log\left(\frac{d}{e}+x\right)}{2d^2e} & \text{otherwise}\end{cases}\right)}{e^3}-\frac{bd^3\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{3bd^2n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{3bd^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}+\frac{3bdn\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^3}-\frac{3bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{bnx}{e^3}+\frac{bx\log(cx^n)}{e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

```
[Out] -a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**3 +
 3*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 - 3
*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + a*x/e**3 + b
*d**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/
(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**3 - b*d**3*Piecewise((x/d**
3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**3 - 3*b*d**2*n*
Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e
**3 + 3*b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log
(c*x**n)/e**3 + 3*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2,
e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - po
lylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2
, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), (
)), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2,
e*x*exp_polar(I*pi)/d), True))/e, True))/e**3 - 3*b*d*Piecewise((x/d, Eq(e,
 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**3 - b*n*x/e**3 + b*x*log(c*x**
n)/e**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^3,x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^3, x)
```

3.47 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3} \, dx$

Optimal. Leaf size=107

$$-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}-\frac{x(2a+bn+2b\log(cx^n))}{2e^2(d+ex)}+\frac{(2a+3bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{2e^3}+\frac{bn\text{Li}_2\left(-\frac{ex}{d}\right)}{e^3}$$

```
[Out] -1/2*x^2*(a+b*ln(c*x^n))/e/(e*x+d)^2-1/2*x*(2*a+b*n+2*b*ln(c*x^n))/e^2/(e*x
+d)+1/2*(2*a+3*b*n+2*b*ln(c*x^n))*ln(1+e*x/d)/e^3+b*n*polylog(2,-e*x/d)/e^3
```

Rubi [A]
time = 0.09, antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2384, 2354, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{2e^3}-\frac{x(2a+2b\log(cx^n)+bn)}{2e^2(d+ex)}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] -1/2*(x^2*(a + b*Log[c*x^n]))/(e*(d + e*x)^2) - (x*(2*a + b*n + 2*b*Log[c*x
^n]))/(2*e^2*(d + e*x)) + ((2*a + 3*b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)/d])
/(2*e^3) + (b*n*PolyLog[2, -((e*x)/d)])/e^3
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex)^3} - \frac{2d(a+b\log(cx^n))}{e^2(d+ex)^2} + \frac{a+b\log(cx^n)}{e^2(d+ex)}\right) dx$$
$$= \frac{\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^2} - \frac{(2d)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^2} + \frac{d^2\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{e^2}$$
$$= -\frac{d^2(a+b\log(cx^n))}{2e^3(d+ex)^2} - \frac{2x(a+b\log(cx^n))}{e^2(d+ex)} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3} - (bn$$
$$= -\frac{d^2(a+b\log(cx^n))}{2e^3(d+ex)^2} - \frac{2x(a+b\log(cx^n))}{e^2(d+ex)} + \frac{2bn\log(d+ex)}{e^3} + \frac{(a+b\log(cx^n))}{e^3}$$
$$= \frac{bdn}{2e^3(d+ex)} + \frac{bn\log(x)}{2e^3} - \frac{d^2(a+b\log(cx^n))}{2e^3(d+ex)^2} - \frac{2x(a+b\log(cx^n))}{e^2(d+ex)} + \frac{3bn\log(d}{2e^3}$$

Mathematica [A]
time = 0.08, size = 122, normalized size = 1.14

$$\frac{-\frac{d^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{4d(a+b\log(cx^n))}{d+ex} - 4bn(\log(x)-\log(d+ex)) + bn\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right) + 2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 2bn\text{Li}_2\left(-\frac{ex}{d}\right)}{2e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] (-((d^2*(a + b*Log[c*x^n]))/(d + e*x)^2) + (4*d*(a + b*Log[c*x^n]))/(d + e*
x) - 4*b*n*(Log[x] - Log[d + e*x]) + b*n*(d/(d + e*x) + Log[x] - Log[d + e*
x]) + 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 2*b*n*PolyLog[2, -((e*x)/d)])
/(2*e^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 596, normalized size = 5.57

method	result
risch	$\frac{a\ln(ex+d)}{e^3} + \frac{b\ln(c)\ln(ex+d)}{e^3} + \frac{b\ln(x^n)\ln(ex+d)}{e^3} + \frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(icx^n)^2\ln(ex+d)}{2e^3} + \frac{ib\pi\text{csgn}(icx^n)^3d^2}{4e^3(ex+d)^2} + \frac{ib\pi\,\text{csgn}(ic)\text{c}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] a/e^3*ln(e*x+d)+b*ln(c)/e^3*ln(e*x+d)+b*ln(x^n)/e^3*ln(e*x+d)+1/2*I*b*Pi*cs
gn(I*x^n)*csgn(I*c*x^n)^2/e^3*ln(e*x+d)+2*a*d/e^3/(e*x+d)-1/2*a*d^2/e^3/(e*
x+d)^2+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^3/(e*x+d)+I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2*d/e^3/(e*x+d)-3/2*b*n/e^3*ln(e*x)+3/2*b*n/e^3*ln(e*x+d)-b*n/e
^3*dilog(-e*x/d)-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^3/(e*x+d)^2-1
```

```
/2*I*b*Pi*csgn(I*c*x^n)^3/e^3*ln(e*x+d)+1/4*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^3/
(e*x+d)^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*ln(e*x+d)-I*b*Pi*csgn(I*
c*x^n)^3*d/e^3/(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^3*l
n(e*x+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^3/(e*x+d)^2-1/2*b*ln(c)
*d^2/e^3/(e*x+d)^2+2*b*ln(c)*d/e^3/(e*x+d)+1/2*b*n*d/e^3/(e*x+d)-b*n/e^3*ln
(e*x+d)*ln(-e*x/d)-1/2*b*ln(x^n)*d^2/e^3/(e*x+d)^2+2*b*ln(x^n)*d/e^3/(e*x+d
)+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^2/e^3/(e*x+d)^2-I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^3/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*(2*e^(-3)*log(x*e + d) + (4*d*x*e + 3*d^2)/(x^2*e^5 + 2*d*x*e^4 + d^2*e
^3))*a + b*integrate((x^2*log(c) + x^2*log(x^n))/(x^3*e^3 + 3*d*x^2*e^2 + 3
*d^2*x*e + d^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x^3*e^3 + 3*d*x^2*e^2 + 3*d^2*x*e + d^
3), x)
```

Sympy [A]
time = 20.36, size = 347, normalized size = 3.24

$$\frac{ad^2\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{2ad\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{a\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{bd^2n\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2d^2e+2de^2x}-\frac{\log(x)}{2d^2e}+\frac{\log\left(\frac{d}{e}+x\right)}{2d^2e} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{bd^2\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}+\frac{2bdn\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{2bd\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}-\frac{bn\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{b\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

```
[Out] a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**2 -
2*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**2 + a*Pie
cewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 - b*d**2*n*Piecewise((
x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/
```

```
e + x)/(2*d**2*e), True))/e**2 + b*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(
2*e*(d + e*x)**2), True))*log(c*x**n)/e**2 + 2*b*d*n*Piecewise((x/d**2, Eq(
e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**2 - 2*b*d*Piecewise(
(x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**2 - b*n*Piece
wise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(
x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/
d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/A
bs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1,
1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True)
)/e, True))/e**2 + b*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log
(c*x**n)/e**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^3, x)
```

3.48 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx$

Optimal. Leaf size=62

$$-\frac{bn}{2e^2(d+ex)}+\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\log(d+ex)}{2de^2}$$

```
[Out] -1/2*b*n/e^2/(e*x+d)+1/2*x^2*(a+b*ln(c*x^n))/d/(e*x+d)^2-1/2*b*n*ln(e*x+d)/
d/e^2
```

Rubi [A]
time = 0.03, antiderivative size = 62, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {2373, 45}

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn}{2e^2(d+ex)}-\frac{bn\log(d+ex)}{2de^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] -1/2*(b*n)/(e^2*(d + e*x)) + (x^2*(a + b*Log[c*x^n]))/(2*d*(d + e*x)^2) - (
b*n*Log[d + e*x])/(2*d*e^2)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2} - \frac{(bn)\int \frac{x}{(d+ex)^2}\,dx}{2d}$$
$$= \frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2} - \frac{(bn)\int \left(-\frac{d}{e(d+ex)^2}+\frac{1}{e(d+ex)}\right)dx}{2d}$$
$$= -\frac{bn}{2e^2(d+ex)} + \frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2} - \frac{bn\log(d+ex)}{2de^2}$$

Mathematica [A]
time = 0.08, size = 75, normalized size = 1.21

$$\frac{bn\log(x) - \frac{bdn(d+ex)+ad(d+2ex)+bd(d+2ex)\log(cx^n)+bn(d+ex)^2\log(d+ex)}{(d+ex)^2}}{2de^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] (b*n*Log[x] - (b*d*n*(d + e*x) + a*d*(d + 2*e*x) + b*d*(d + 2*e*x)*Log[c*x^
n] + b*n*(d + e*x)^2*Log[d + e*x])/(d + e*x)^2)/(2*d*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 349, normalized size = 5.63

method	result
risch	$-\frac{b(2ex+d)\ln(x^n)}{2(ex+d)^2e^2} - \frac{-i\pi b\,d^2\text{csgn}(ic\,x^n)^3+i\pi b\,d^2\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2+i\pi b\,d^2\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+2i\pi bdex\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(2*e*x+d)/(e*x+d)^2/e^2*ln(x^n)-1/4*(-I*Pi*b*d^2*csgn(I*c*x^n)^3+I*P
i*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+2*
I*Pi*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+2*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d*e*x*cs
gn(I*c*x^n)^3-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*ln(e*x+d)*b*
e^2*n*x^2-2*ln(-x)*b*e^2*n*x^2+4*ln(e*x+d)*b*d*e*n*x-4*ln(-x)*b*d*e*n*x+4*l
n(c)*b*d*e*x+2*ln(e*x+d)*b*d^2*n-2*ln(-x)*b*d^2*n+2*b*d*e*n*x+2*d^2*b*ln(c)
+4*a*d*e*x+2*b*d^2*n+2*a*d^2)/d/e^2/(e*x+d)^2
```

Maxima [A]
time = 0.26, size = 107, normalized size = 1.73

$$-\frac{1}{2}\,bn\left(\frac{e^{(-2)}\log(xe+d)}{d} - \frac{e^{(-2)}\log(x)}{d} + \frac{1}{xe^3+de^2}\right) - \frac{(2\,xe+d)b\log(cx^n)}{2\,(x^2e^4+2\,dxe^3+d^2e^2)} - \frac{(2\,xe+d)a}{2\,(x^2e^4+2\,dxe^3+d^2e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -1/2*b*n*(e^(-2)*log(x*e + d)/d - e^(-2)*log(x)/d + 1/(x*e^3 + d*e^2)) - 1/
2*(2*x*e + d)*b*log(c*x^n)/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 1/2*(2*x*e + d
)*a/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2)
```

Fricas [**A**]
time = 0.37, size = 113, normalized size = 1.82

$$\frac{bnx^2e^2\log(x) - bd^2n - ad^2 - (bdn + 2\,ad)xe - (bnx^2e^2 + 2\,bdnxe + bd^2n)\log(xe + d) - (2\,bdxe + bd^2)\log(c)}{2\,(dx^2e^4 + 2\,d^2xe^3 + d^3e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(b*n*x^2*e^2*log(x) - b*d^2*n - a*d^2 - (b*d*n + 2*a*d)*x*e - (b*n*x^2*
e^2 + 2*b*d*n*x*e + b*d^2*n)*log(x*e + d) - (2*b*d*x*e + b*d^2)*log(c))/(d*
x^2*e^4 + 2*d^2*x*e^3 + d^3*e^2)
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 398 vs. 2(53) = 106.
time = 2.05, size = 398, normalized size = 6.42

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}\right) & \text{for } d = 0 \wedge e = 0 \\ \frac{\frac{ax^2}{2} - \frac{bnx^2}{4} + \frac{bx^2\log(cx^n)}{2}}{d^3} & \text{for } e = 0 \\ \frac{-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}}{e^3} & \text{for } d = 0 \\ -\frac{ad^2}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{2adex}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{bd^2n\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{bd^2n}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{2bdenx\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{bdenx}{2d^3e^2+4d^2e^3x+2de^4x^2} - \frac{be^2nx^2\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2} + \frac{be^2x^2\log(cx^n)}{2d^3e^2+4d^2e^3x+2de^4x^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

```
[Out] Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a*
x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**3, Eq(e, 0)), ((-a/x - b*n/x
 - b*log(c*x**n)/x)/e**3, Eq(d, 0)), (-a*d**2/(2*d**3*e**2 + 4*d**2*e**3*x
+ 2*d*e**4*x**2) - 2*a*d*e*x/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2)
- b*d**2*n*log(d/e + x)/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - b*d
**2*n/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - 2*b*d*e*n*x*log(d/e +
 x)/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - b*d*e*n*x/(2*d**3*e**2
+ 4*d**2*e**3*x + 2*d*e**4*x**2) - b*e**2*n*x**2*log(d/e + x)/(2*d**3*e**2
+ 4*d**2*e**3*x + 2*d*e**4*x**2) + b*e**2*x**2*log(c*x**n)/(2*d**3*e**2 + 4
*d**2*e**3*x + 2*d*e**4*x**2), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 122 vs. 2(57) = 114.
time = 7.85, size = 122, normalized size = 1.97

$$-\frac{bnx^2e^2\log(xe + d) + 2\,bdnxe\log(xe + d) - bnx^2e^2\log(x) + bdnxe + bd^2n\log(xe + d) + 2\,bdxe\log(c) + bd^2n + 2\,adxe + bd^2\log(c) + ad^2}{2\,(dx^2e^4 + 2\,d^2xe^3 + d^3e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] -1/2*(b*n*x^2*e^2*log(x*e + d) + 2*b*d*n*x*e*log(x*e + d) - b*n*x^2*e^2*log
(x) + b*d*n*x*e + b*d^2*n*log(x*e + d) + 2*b*d*x*e*log(c) + b*d^2*n + 2*a*d
*x*e + b*d^2*log(c) + a*d^2)/(d*x^2*e^4 + 2*d^2*x*e^3 + d^3*e^2)
```

Mupad [B]
time = 4.03, size = 108, normalized size = 1.74

$$-\frac{a\,d+x\,\left(2\,a\,e+b\,e\,n\right)+b\,d\,n}{2\,d^2\,e^2+4\,d\,e^3\,x+2\,e^4\,x^2}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{2\,e^2}+\frac{b\,x}{e}\right)}{d^2+2\,d\,e\,x+e^2\,x^2}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

```
[Out] - (a*d + x*(2*a*e + b*e*n) + b*d*n)/(2*d^2*e^2 + 2*e^4*x^2 + 4*d*e^3*x) - (
log(c*x^n)*((b*d)/(2*e^2) + (b*x)/e))/(d^2 + e^2*x^2 + 2*d*e*x) - (b*n*atan
h((2*e*x)/d + 1))/(d*e^2)
```

3.49 $\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx$

Optimal. Leaf size=76

$$\frac{bn}{2de(d+ex)}+\frac{bn\log(x)}{2d^2e}-\frac{a+b\log\left(cx^n\right)}{2e(d+ex)^2}-\frac{bn\log(d+ex)}{2d^2e}$$

```
[Out] 1/2*b*n/d/e/(e*x+d)+1/2*b*n*ln(x)/d^2/e+1/2*(-a-b*ln(c*x^n))/e/(e*x+d)^2-1/
2*b*n*ln(e*x+d)/d^2/e
```

Rubi [A]
time = 0.02, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}=0.111$, Rules used = {2356, 46}

$$-\frac{a+b\log\left(cx^n\right)}{2e(d+ex)^2}+\frac{bn\log(x)}{2d^2e}-\frac{bn\log(d+ex)}{2d^2e}+\frac{bn}{2de(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x)^3,x]
```

```
[Out] (b*n)/(2*d*e*(d + e*x)) + (b*n*Log[x])/(2*d^2*e) - (a + b*Log[c*x^n])/(2*e*
(d + e*x)^2) - (b*n*Log[d + e*x])/(2*d^2*e)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = -\frac{a+b\log(cx^n)}{2e(d+ex)^2} + \frac{(bn)\int \frac{1}{x(d+ex)^2}\,dx}{2e}$$
$$= -\frac{a+b\log(cx^n)}{2e(d+ex)^2} + \frac{(bn)\int \left(\frac{1}{d^2x} - \frac{e}{d(d+ex)^2} - \frac{e}{d^2(d+ex)}\right)dx}{2e}$$
$$= \frac{bn}{2de(d+ex)} + \frac{bn\log(x)}{2d^2e} - \frac{a+b\log(cx^n)}{2e(d+ex)^2} - \frac{bn\log(d+ex)}{2d^2e}$$

Mathematica [A]
time = 0.04, size = 53, normalized size = 0.70

$$\frac{-\frac{a+b\log(cx^n)}{(d+ex)^2} + \frac{bn\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)}{d^2}}{2e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x)^3,x]
```

```
[Out] (-((a + b*Log[c*x^n])/(d + e*x)^2) + (b*n*(d/(d + e*x) + Log[x] - Log[d + e
*x]))/d^2)/(2*e)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 235, normalized size = 3.09

method	result
risch	$-\frac{b\ln(x^n)}{2e(ex+d)^2} - \frac{-i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi b\,d^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-i\pi b\,d^2\mathrm{csgn}(ic\,x^n)^3}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b/e/(e*x+d)^2*ln(x^n)-1/4*(-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x
^n)^2-I*Pi*b*d^2*csgn(I*c*x^n)^3+2*ln(e*x+d)*b*e^2*n*x^2-2*ln(-x)*b*e^2*n*x
^2+4*ln(e*x+d)*b*d*e*n*x-4*ln(-x)*b*d*e*n*x+2*ln(e*x+d)*b*d^2*n-2*ln(-x)*b*
d^2*n-2*b*d*e*n*x+2*d^2*b*ln(c)-2*b*d^2*n+2*a*d^2)/d^2/e/(e*x+d)^2
```

Maxima [A]
time = 0.34, size = 98, normalized size = 1.29

$$-\frac{1}{2}\,bn\left(\frac{e^{(-1)}\log(xe+d)}{d^2} - \frac{e^{(-1)}\log(x)}{d^2} - \frac{1}{dxe^2+d^2e}\right) - \frac{b\log(cx^n)}{2\,(x^2e^3+2\,dxe^2+d^2e)} - \frac{a}{2\,(x^2e^3+2\,dxe^2+d^2e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -1/2*b*n*(e^(-1)*log(x*e + d)/d^2 - e^(-1)*log(x)/d^2 - 1/(d*x*e^2 + d^2*e)
) - 1/2*b*log(c*x^n)/(x^2*e^3 + 2*d*x*e^2 + d^2*e) - 1/2*a/(x^2*e^3 + 2*d*x
*e^2 + d^2*e)
```

Fricas [A]
time = 0.35, size = 108, normalized size = 1.42

$$\frac{bdnxe + bd^2n - bd^2\log(c) - ad^2 - (bnx^2e^2 + 2\,bdnxe + bd^2n)\log(xe+d) + (bnx^2e^2 + 2\,bdnxe)\log(x)}{2\,(d^2x^2e^3 + 2\,d^3xe^2 + d^4e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(b*d*n*x*e + b*d^2*n - b*d^2*log(c) - a*d^2 - (b*n*x^2*e^2 + 2*b*d*n*x*
e + b*d^2*n)*log(x*e + d) + (b*n*x^2*e^2 + 2*b*d*n*x*e)*log(x))/(d^2*x^2*e^
3 + 2*d^3*x*e^2 + d^4*e)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 415 vs. 2(66) = 132.
time = 2.06, size = 415, normalized size = 5.46

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}\right) & \text{for } d = 0 \wedge e = 0 \\ \frac{-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}}{e^3} & \text{for } d = 0 \\ \frac{ax - bnx + bx\log(cx^n)}{d^3} & \text{for } e = 0 \\ -\frac{ad^2}{2d^4e+4d^3e^2x+2d^2e^3x^2} - \frac{bd^2n\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2} + \frac{bd^2n}{2d^4e+4d^3e^2x+2d^2e^3x^2} - \frac{2bdenx\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2} + \frac{bdenx}{2d^4e+4d^3e^2x+2d^2e^3x^2} + \frac{2bdex\log(cx^n)}{2d^4e+4d^3e^2x+2d^2e^3x^2} - \frac{be^2nx^2\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2} + \frac{be^2x^2\log(cx^n)}{2d^4e+4d^3e^2x+2d^2e^3x^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d)**3,x)
```

```
[Out] Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d,
 0) & Eq(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**
3, Eq(d, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**3, Eq(e, 0)), (-a*d**2/(2
*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) - b*d**2*n*log(d/e + x)/(2*d**4
*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) + b*d**2*n/(2*d**4*e + 4*d**3*e**2*x
 + 2*d**2*e**3*x**2) - 2*b*d*e*n*x*log(d/e + x)/(2*d**4*e + 4*d**3*e**2*x +
 2*d**2*e**3*x**2) + b*d*e*n*x/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2
) + 2*b*d*e*x*log(c*x**n)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) - b
*e**2*n*x**2*log(d/e + x)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) + b
*e**2*x**2*log(c*x**n)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2), True)
)
```

Giac [A]
time = 6.80, size = 120, normalized size = 1.58

$$-\frac{bnx^2e^2\log(xe+d) + 2\,bdnxe\log(xe+d) - bnx^2e^2\log(x) - 2\,bdnxe\log(x) - bdnxe + bd^2n\log(xe+d) - bd^2n + bd^2\log(c) + ad^2}{2\,(d^2x^2e^3 + 2\,d^3xe^2 + d^4e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] -1/2*(b*n*x^2*e^2*log(x*e + d) + 2*b*d*n*x*e*log(x*e + d) - b*n*x^2*e^2*log
(x) - 2*b*d*n*x*e*log(x) - b*d*n*x*e + b*d^2*n*log(x*e + d) - b*d^2*n + b*d
^2*log(c) + a*d^2)/(d^2*x^2*e^3 + 2*d^3*x*e^2 + d^4*e)
```

Mupad [B]
time = 4.05, size = 91, normalized size = 1.20

$$\frac{b\,n-a+\frac{b\,e\,n\,x}{d}}{2\,d^2\,e+4\,d\,e^2\,x+2\,e^3\,x^2}-\frac{b\,\ln\left(c\,x^n\right)}{2\,e\,\left(d^2+2\,d\,e\,x+e^2\,x^2\right)}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d^2\,e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x)^3,x)
```

```
[Out] (b*n - a + (b*e*n*x)/d)/(2*d^2*e + 2*e^3*x^2 + 4*d*e^2*x) - (b*log(c*x^n))/
(2*e*(d^2 + e^2*x^2 + 2*d*e*x)) - (b*n*atanh((2*e*x)/d + 1))/(d^2*e)
```

3.50 $\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$

Optimal. Leaf size=134

$$-\frac{bn}{2d^2(d+ex)}-\frac{bn\log(x)}{2d^3}+\frac{a+b\log\left(cx^n\right)}{2d(d+ex)^2}-\frac{ex(a+b\log\left(cx^n\right))}{d^3(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}+\frac{3bn\log(d+}{2d^3}$$

```
[Out] -1/2*b*n/d^2/(e*x+d)-1/2*b*n*ln(x)/d^3+1/2*(a+b*ln(c*x^n))/d/(e*x+d)^2-e*x*
(a+b*ln(c*x^n))/d^3/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^3+3/2*b*n*ln(e*x+
d)/d^3+b*n*polylog(2,-d/e/x)/d^3
```

Rubi [A]
time = 0.15, antiderivative size = 134, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2389, 2379, 2438, 2351, 31, 2356, 46}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}-\frac{\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}-\frac{ex(a+b\log\left(cx^n\right))}{d^3(d+ex)}+\frac{a+b\log\left(cx^n\right)}{2d(d+ex)^2}+\frac{3bn\log(d+ex)}{2d^3}-\frac{bn\log(x)}{2d^3}-\frac{bn}{2d^2(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x)^3),x]
```

```
[Out] -1/2*(b*n)/(d^2*(d + e*x)) - (b*n*Log[x])/(2*d^3) + (a + b*Log[c*x^n])/(2*d
*(d + e*x)^2) - (e*x*(a + b*Log[c*x^n]))/(d^3*(d + e*x)) - (Log[1 + d/(e*x)
]*(a + b*Log[c*x^n]))/d^3 + (3*b*n*Log[d + e*x])/(2*d^3) + (b*n*PolyLog[2,
-(d/(e*x))])/d^3
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^3}\,dx &= \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{d} \\
&= \frac{a+b\log\left(cx^n\right)}{2d(d+ex)^2} + \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx}{d^2} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d^2} - \frac{(bn)\int \frac{1}{x(d+ex)^2}\,dx}{2d} \\
&= \frac{a+b\log\left(cx^n\right)}{2d(d+ex)^2} - \frac{ex(a+b\log\left(cx^n\right))}{d^3(d+ex)} + \frac{\int \frac{a+b\log(cx^n)}{x}\,dx}{d^3} - \frac{e\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^3} - \frac{(bn)\int}{} \\
&= -\frac{bn}{2d^2(d+ex)} - \frac{bn\log(x)}{2d^3} + \frac{a+b\log\left(cx^n\right)}{2d(d+ex)^2} - \frac{ex(a+b\log\left(cx^n\right))}{d^3(d+ex)} + \frac{(a+b\log\left(cx^n\right)}{2bd^3n} \\
&= -\frac{bn}{2d^2(d+ex)} - \frac{bn\log(x)}{2d^3} + \frac{a+b\log\left(cx^n\right)}{2d(d+ex)^2} - \frac{ex(a+b\log\left(cx^n\right))}{d^3(d+ex)} + \frac{(a+b\log\left(cx^n\right)}{2bd^3n}
\end{aligned}$$

Mathematica [A]
time = 0.09, size = 141, normalized size = 1.05

$$\frac{\frac{d^2(a+b\log(cx^n))}{(d+ex)^2}+\frac{2d(a+b\log(cx^n))}{d+ex}+\frac{(a+b\log(cx^n))^2}{bn}-2bn(\log(x)-\log(d+ex))+bn\left(-\frac{d}{d+ex}-\log(x)+\log(d+ex)\right)-2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-2bn\text{Li}_2\left(-\frac{ex}{d}\right)}{2d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^3),x]
```

```
[Out] ((d^2*(a + b*Log[c*x^n]))/(d + e*x)^2 + (2*d*(a + b*Log[c*x^n]))/(d + e*x)
+ (a + b*Log[c*x^n])^2/(b*n) - 2*b*n*(Log[x] - Log[d + e*x]) + b*n*(-(d/(d
+ e*x)) - Log[x] + Log[d + e*x]) - 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] -
2*b*n*PolyLog[2, -((e*x)/d)])/(2*d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 703, normalized size = 5.25

method	result
risch	$\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2}{2d^2(ex+d)}+\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2}{4d(ex+d)^2}+\frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2}{4d(ex+d)^2}+\frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2\ln(x)}{2d^3}+$ ibπ csgn

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/(e*x+d)+1/2*I*b*Pi*csgn
(I*c)*csgn(I*c*x^n)^2/d^2/(e*x+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/d/(e*x+d)^2-1/
2*I*b*Pi*csgn(I*c*x^n)^3/d^3*ln(x)+a/d^3*ln(x)-a/d^3*ln(e*x+d)+a/d^2/(e*x+d
)+1/2*a/d/(e*x+d)^2+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(e*x+d)^2+1/4*I*
b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(e*x+d)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2/d^3*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*ln(x)
+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*ln(x)-1/2*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2/d^3*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^3*ln(e*x+d)-1/2*I*b*
Pi*csgn(I*c*x^n)^3/d^2/(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*ln(
e*x+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/(e*x+d)^2+1/2*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*ln(e*x+d)+1/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2/d^2/(e*x+d)+b*n/d^3*ln(e*x+d)*ln(-e*x/d)+b*ln(x^n)/d^3*ln(x
)-b*ln(x^n)/d^3*ln(e*x+d)+b*ln(x^n)/d^2/(e*x+d)+1/2*b*ln(x^n)/d/(e*x+d)^2-b
*ln(c)/d^3*ln(e*x+d)+b*ln(c)/d^2/(e*x+d)+1/2*b*ln(c)/d/(e*x+d)^2+b*ln(c)/d^
3*ln(x)-1/2*b*n/d^3*ln(x)^2+b*n/d^3*dilog(-e*x/d)-3/2*b*n*ln(x)/d^3+3/2*b*n
*ln(e*x+d)/d^3-1/2*b*n/d^2/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*a*((2*x*e + 3*d)/(d^2*x^2*e^2 + 2*d^3*x*e + d^4) - 2*log(x*e + d)/d^3 +
 2*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(x^4*e^3 + 3*d*x^3*e^2 + 3
*d^2*x^2*e + d^3*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^4*e^3 + 3*d*x^3*e^2 + 3*d^2*x^2*e + d^3*x),
x)
```

Sympy [A]
time = 42.47, size = 352, normalized size = 2.63

$$-\frac{ae\left(\begin{cases}\frac{x}{d^3} & \text{for}\ e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{d}-\frac{ae\left(\begin{cases}\frac{x}{d^2} & \text{for}\ e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{ae\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^3}+\frac{a\log(x)}{d^3}+\frac{be^2n\left(\begin{cases}-\frac{1}{e^3x} & \text{for}\ d=0\\ -\frac{1}{2de^2+2e^3x}-\frac{\log(d+ex)}{2de^2} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{be^2\left(\begin{cases}\frac{1}{e^3x} & \text{for}\ d=0\\ -\frac{1}{2d\left(\frac{d}{x}+e\right)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}-\frac{2ben\left(\begin{cases}-\frac{1}{e^2x} & \text{for}\ d=0\\ -\frac{\log(d^2+dex)}{de} & \text{otherwise}\end{cases}\right)}{d^2}+\frac{2be\left(\begin{cases}\frac{1}{e^2x} & \text{for}\ d=0\\ -\frac{1}{\frac{d^2}{x}+de} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}+\frac{bn\left(\begin{cases}-\frac{1}{ex} & \text{for}\ d=0\\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for}\ |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{b\left(\begin{cases}\frac{1}{ex} & \text{for}\ d=0\\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d)**3,x)
```

```
[Out] -a*e*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d - a*e*P
iecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**2 - a*e*Piecewis
e((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**3 + a*log(x)/d**3 + b*e**2*n*
Piecewise((-1/(e**3*x), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d + e*x)
/(2*d*e**2), True))/d**2 - b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)), (-1/(2*
d*(d/x + e)**2), True))*log(c*x**n)/d**2 - 2*b*e*n*Piecewise((-1/(e**2*x),
Eq(d, 0)), (-log(d**2 + d*e*x)/(d*e), True))/d**2 + 2*b*e*Piecewise((1/(e**
2*x), Eq(d, 0)), (-1/(d**2/x + d*e), True))*log(c*x**n)/d**2 + b*n*Piecewis
e((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar(I*pi)/(e*x)), (A
bs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2, d*exp_polar(I*pi)
/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp_polar(I*pi)/(e*x
)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijer
g(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x
)), True))/d, True))/d**2 - b*Piecewise((1/(e*x), Eq(d, 0)), (log(d/x + e)/
d, True))*log(c*x**n)/d**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^3*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^3),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^3), x)
```

3.51 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$

Optimal. Leaf size=171

$$-\frac{bn}{d^3x}+\frac{ben}{2d^3(d+ex)}+\frac{ben\log(x)}{2d^4}-\frac{a+b\log\left(cx^n\right)}{d^3x}-\frac{e(a+b\log\left(cx^n\right))}{2d^2(d+ex)^2}+\frac{2e^2x(a+b\log\left(cx^n\right))}{d^4(d+ex)}+\frac{3e\log\left(1+\frac{d}{ex}\right)}{}$$

```
[Out] -b*n/d^3/x+1/2*b*e*n/d^3/(e*x+d)+1/2*b*e*n*ln(x)/d^4+(-a-b*ln(c*x^n))/d^3/x
-1/2*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^2+2*e^2*x*(a+b*ln(c*x^n))/d^4/(e*x+d)+3*
e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^4-5/2*b*e*n*ln(e*x+d)/d^4-3*b*e*n*polylog(2
,-d/e/x)/d^4
```

Rubi [A]
time = 0.17, antiderivative size = 171, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {46, 2393, 2341, 2356, 2351, 31, 2379, 2438}

$$-\frac{3ben\text{PolyLog}(2,-\frac{d}{ex})}{d^4}+\frac{2e^2x(a+b\log\left(cx^n\right))}{d^4(d+ex)}+\frac{3e\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^4}-\frac{a+b\log\left(cx^n\right)}{d^3x}-\frac{e(a+b\log\left(cx^n\right))}{2d^2(d+ex)^2}+\frac{ben\log(x)}{2d^4}-\frac{5ben\log(d+ex)}{2d^4}+\frac{ben}{2d^3(d+ex)}-\frac{bn}{d^3x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^3),x]
```

```
[Out] -((b*n)/(d^3*x)) + (b*e*n)/(2*d^3*(d + e*x)) + (b*e*n*Log[x])/(2*d^4) - (a
+ b*Log[c*x^n])/(d^3*x) - (e*(a + b*Log[c*x^n]))/(2*d^2*(d + e*x)^2) + (2*e
^2*x*(a + b*Log[c*x^n]))/(d^4*(d + e*x)) + (3*e*Log[1 + d/(e*x)]*(a + b*Log
[c*x^n]))/d^4 - (5*b*e*n*Log[d + e*x])/(2*d^4) - (3*b*e*n*PolyLog[2, -(d/(e
*x))])/d^4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \int \left(\frac{a+b\log(cx^n)}{d^3x^2} - \frac{3e(a+b\log(cx^n))}{d^4x} + \frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^3} + \frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)^2}\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^3} - \frac{(3e)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^4} + \frac{(3e^2)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^4} + \frac{(2e^2)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d^3}$$

$$= -\frac{bn}{d^3x} - \frac{a+b\log(cx^n)}{d^3x} - \frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2} + \frac{2e^2x(a+b\log(cx^n))}{d^4(d+ex)} - \frac{3e(a+b\log(}{2bd^4n}$$

$$= -\frac{bn}{d^3x} - \frac{a+b\log(cx^n)}{d^3x} - \frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2} + \frac{2e^2x(a+b\log(cx^n))}{d^4(d+ex)} - \frac{3e(a+b\log(}{2bd^4n}$$

$$= -\frac{bn}{d^3x} + \frac{ben}{2d^3(d+ex)} + \frac{ben\log(x)}{2d^4} - \frac{a+b\log(cx^n)}{d^3x} - \frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2} + \frac{2e^2x(a+}{d^4(}$$

Mathematica [A]
time = 0.12, size = 173, normalized size = 1.01

$$\frac{-\frac{2bdn}{x} - \frac{2d(a+b\log(cx^n))}{x} - \frac{d^2e(a+b\log(cx^n))}{(d+ex)^2} - \frac{4de(a+b\log(cx^n))}{d+ex} - \frac{3e(a+b\log(cx^n))^2}{bn} + 4ben(\log(x)-\log(d+ex)) + ben\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right) + 6e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 6ben\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{2d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^3),x]
```

```
[Out] ((-2*b*d*n)/x - (2*d*(a + b*Log[c*x^n]))/x - (d^2*e*(a + b*Log[c*x^n]))/(d
+ e*x)^2 - (4*d*e*(a + b*Log[c*x^n]))/(d + e*x) - (3*e*(a + b*Log[c*x^n])^2
)/(b*n) + 4*b*e*n*(Log[x] - Log[d + e*x]) + b*e*n*(d/(d + e*x) + Log[x] - L
og[d + e*x]) + 6*e*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 6*b*e*n*PolyLog[2,
 -((e*x)/d)])/(2*d^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 894, normalized size = 5.23

method	result	size
risch	Expression too large to display	894

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -3*b*n/d^4*e*ln(e*x+d)*ln(-e*x/d)-3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*
e*ln(x)-1/2*a*e/d^2/(e*x+d)^2+3*a/d^4*e*ln(e*x+d)-2*a/d^3*e/(e*x+d)-3*a/d^4
*e*ln(x)-1/2*b*ln(x^n)*e/d^2/(e*x+d)^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2
/d^3/x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3/x+I*b*Pi*csgn(I*c*x^n)^3/
d^3*e/(e*x+d)+3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e*ln(e*x+d)-1/4*I*b*
```

```
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2/(e*x+d)^2-1/4*I*b*Pi*csgn(I*c)*csgn(I*
c*x^n)^2*e/d^2/(e*x+d)^2-I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*e/(e*x+d)-I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e/(e*x+d)+3/2*I*b*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2/d^4*e*ln(e*x+d)-3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4*e*ln(x
)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^3/x+3*b*ln(x^n)/d^4*e*ln(e*x+d)-2*b*ln(x^n)/
d^3*e/(e*x+d)-3*b*ln(x^n)/d^4*e*ln(x)-3*b*ln(c)/d^4*e*ln(x)+3/2*I*b*Pi*csgn
(I*c*x^n)^3/d^4*e*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3/
x-a/d^3/x+1/4*I*b*Pi*csgn(I*c*x^n)^3*e/d^2/(e*x+d)^2-3/2*I*b*Pi*csgn(I*c*x^
n)^3/d^4*e*ln(e*x+d)-1/2*b*ln(c)*e/d^2/(e*x+d)^2-2*b*ln(c)/d^3*e/(e*x+d)+3*
b*ln(c)/d^4*e*ln(e*x+d)+3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*
e*ln(x)+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e/(e*x+d)+1/4*I*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/(e*x+d)^2-3/2*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)/d^4*e*ln(e*x+d)+3/2*b*n/d^4*e*ln(x)^2-3*b*n/d^4*e*
dilog(-e*x/d)-b*ln(x^n)/d^3/x-b*ln(c)/d^3/x+5/2*b*e*n*ln(x)/d^4-5/2*b*e*n*l
n(e*x+d)/d^4-b*n/d^3/x+1/2*b*e*n/d^3/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -1/2*a*((6*x^2*e^2 + 9*d*x*e + 2*d^2)/(d^3*x^3*e^2 + 2*d^4*x^2*e + d^5*x) -
 6*e*log(x*e + d)/d^4 + 6*e*log(x)/d^4) + b*integrate((log(c) + log(x^n))/(
x^5*e^3 + 3*d*x^4*e^2 + 3*d^2*x^3*e + d^3*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^5*e^3 + 3*d*x^4*e^2 + 3*d^2*x^3*e + d^3*x^2)
, x)
```

Sympy [A]
time = 45.47, size = 444, normalized size = 2.60

$$\frac{ae^2\left(\begin{cases}\frac{x}{d^3} & \text{for}\: e = 0\\-\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{d^2} + \frac{2ae^2\left(\begin{cases}\frac{x}{d^2} & \text{for}\: e = 0\\-\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{d^3} - \frac{a}{d^3x} + \frac{3ae^2\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^4} - \frac{3ae\log(x)}{d^4} - \frac{be^2n\left(\begin{cases}\frac{x}{d^3} & \text{for}\: e = 0\\-\frac{1}{2d^2e+2de^2x} - \frac{\log(x)}{2d^3e} + \frac{\log\left(\frac{d}{e}+x\right)}{2d^3e} & \text{otherwise}\end{cases}\right)}{d^2} + \frac{be^2\left(\begin{cases}\frac{x}{d^3} & \text{for}\: e = 0\\-\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2} - \frac{2be^2n\left(\begin{cases}\frac{x}{d^2} & \text{for}\: e = 0\\-\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{2be^2\left(\begin{cases}\frac{x}{d^2} & \text{for}\: e = 0\\-\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3} - \frac{bn}{d^3x} - \frac{b\log(cx^n)}{d^3x} - \frac{3be^2n\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{|x|} < 1 \wedge |x| < 1\\\log(d)\log(x) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: |x| < 1\\-\log(d)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{|x|} < 1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix}1, 1 & \\ & 0, 0\end{matrix} \middle| x\right)\log(d) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^4} + \frac{3be^2\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^4} + \frac{3ben\log(x)^2}{2d^4} - \frac{3be\log(x)\log(cx^n)}{d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**3,x)
```

```
[Out] a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**2 +
2*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**3 - a/
(d**3*x) + 3*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**4
 - 3*a*e*log(x)/d**4 - b*e**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e
 + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/d**2 +
 b*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*
x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(
d/e + x)/(d*e), True))/d**3 + 2*b*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d
*e + e**2*x), True))*log(c*x**n)/d**3 - b*n/(d**3*x) - b*log(c*x**n)/(d**3*
x) - 3*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_
polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2,
 e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*ex
p_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*l
og(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_
polar(I*pi)/d), True))/e, True))/d**4 + 3*b*e**2*Piecewise((x/d, Eq(e, 0)),
 (log(d + e*x)/e, True))*log(c*x**n)/d**4 + 3*b*e*n*log(x)**2/(2*d**4) - 3*
b*e*log(x)*log(c*x**n)/d**4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^3*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x\right)}^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^3),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^3), x)
```

3.52 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx$

Optimal. Leaf size=217

$$-\frac{bn}{4d^3x^2}+\frac{3ben}{d^4x}-\frac{be^2n}{2d^4(d+ex)}-\frac{be^2n\log(x)}{2d^5}-\frac{a+b\log\left(cx^n\right)}{2d^3x^2}+\frac{3e(a+b\log\left(cx^n\right))}{d^4x}+\frac{e^2(a+b\log\left(cx^n\right))}{2d^3(d+ex)^2}-\frac{3e^3x}{}$$

```
[Out] -1/4*b*n/d^3/x^2+3*b*e*n/d^4/x-1/2*b*e^2*n/d^4/(e*x+d)-1/2*b*e^2*n*ln(x)/d^
5+1/2*(-a-b*ln(c*x^n))/d^3/x^2+3*e*(a+b*ln(c*x^n))/d^4/x+1/2*e^2*(a+b*ln(c*
x^n))/d^3/(e*x+d)^2-3*e^3*x*(a+b*ln(c*x^n))/d^5/(e*x+d)-6*e^2*ln(1+d/e/x)*(
a+b*ln(c*x^n))/d^5+7/2*b*e^2*n*ln(e*x+d)/d^5+6*b*e^2*n*polylog(2,-d/e/x)/d^
5
```

Rubi [A]
time = 0.20, antiderivative size = 217, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.381, Rules used = {46, 2393, 2341, 2356, 2351, 31, 2379, 2438}

$$\frac{6be^2n\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}-\frac{3e^3x(a+b\log\left(cx^n\right))}{d^5(d+ex)}-\frac{6e^2\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^5}+\frac{3e(a+b\log\left(cx^n\right))}{d^4x}+\frac{e^2(a+b\log\left(cx^n\right))}{2d^3(d+ex)^2}-\frac{a+b\log\left(cx^n\right)}{2d^3x^2}-\frac{be^2n\log(x)}{2d^5}+\frac{7be^2n\log(d+ex)}{2d^5}-\frac{be^2n}{2d^4(d+ex)}+\frac{3ben}{d^4x}-\frac{bn}{4d^3x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^3),x]
```

```
[Out] -1/4*(b*n)/(d^3*x^2) + (3*b*e*n)/(d^4*x) - (b*e^2*n)/(2*d^4*(d + e*x)) - (b
*e^2*n*Log[x])/(2*d^5) - (a + b*Log[c*x^n])/(2*d^3*x^2) + (3*e*(a + b*Log[c
*x^n]))/(d^4*x) + (e^2*(a + b*Log[c*x^n]))/(2*d^3*(d + e*x)^2) - (3*e^3*x*(
a + b*Log[c*x^n]))/(d^5*(d + e*x)) - (6*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x
^n]))/d^5 + (7*b*e^2*n*Log[d + e*x])/(2*d^5) + (6*b*e^2*n*PolyLog[2, -(d/(e
*x))])/d^5
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \left(\frac{a+b\log(cx^n)}{d^3x^3} - \frac{3e(a+b\log(cx^n))}{d^4x^2} + \frac{6e^2(a+b\log(cx^n))}{d^5x} - \frac{e^3(a+b\log(cx^n \cdots}{d^3(d+ex)^3} \cdots\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d^3} - \frac{(3e)\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^4} + \frac{(6e^2)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^5} - \frac{(6e^3)\int \frac{a+b\log(cx^n)}{d+ex} \cdots}{d^5} \cdots$$

$$= -\frac{bn}{4d^3x^2} + \frac{3ben}{d^4x} - \frac{a+b\log(cx^n)}{2d^3x^2} + \frac{3e(a+b\log(cx^n))}{d^4x} + \frac{e^2(a+b\log(cx^n))}{2d^3(d+ex)^2} - \frac{3e^3 \cdots}{} \cdots$$

$$= -\frac{bn}{4d^3x^2} + \frac{3ben}{d^4x} - \frac{a+b\log(cx^n)}{2d^3x^2} + \frac{3e(a+b\log(cx^n))}{d^4x} + \frac{e^2(a+b\log(cx^n))}{2d^3(d+ex)^2} - \frac{3e^3 \cdots}{} \cdots$$

$$= -\frac{bn}{4d^3x^2} + \frac{3ben}{d^4x} - \frac{be^2n}{2d^4(d+ex)} - \frac{be^2n\log(x)}{2d^5} - \frac{a+b\log(cx^n)}{2d^3x^2} + \frac{3e(a+b\log(cx^n \cdots}{d^4x} \cdots$$

<u>**Mathematica**</u> [A]
time = 0.25, size = 227, normalized size = 1.05

$$-\frac{\frac{bd^2n}{x^2} - \frac{12bden}{x} + \frac{2d^2(a+b\log(cx^n))}{x^2} - \frac{12de(a+b\log(cx^n))}{x} - \frac{2d^2e^2(a+b\log(cx^n))}{(d+ex)^2} - \frac{12de^2(a+b\log(cx^n))}{d+ex} - \frac{12e^2(a+b\log(cx^n))^2}{bn} + 12be^2n(\log(x)-\log(d+ex)) + \frac{2be^2n(d+(d+ex)\log(x)-(d+ex)\log(d+ex))}{d+ex} + 24e^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 24be^2n\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{4d^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^3),x]
```

```
[Out] -1/4*((b*d^2*n)/x^2 - (12*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (12
*d*e*(a + b*Log[c*x^n]))/x - (2*d^2*e^2*(a + b*Log[c*x^n]))/(d + e*x)^2 - (
12*d*e^2*(a + b*Log[c*x^n]))/(d + e*x) - (12*e^2*(a + b*Log[c*x^n])^2)/(b*n
) + 12*b*e^2*n*(Log[x] - Log[d + e*x]) + (2*b*e^2*n*(d + (d + e*x)*Log[x] -
 (d + e*x)*Log[d + e*x]))/(d + e*x) + 24*e^2*(a + b*Log[c*x^n])*Log[1 + (e*
x)/d] + 24*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^5
```

<u>**Maple**</u> [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 1119, normalized size = 5.16

method	result	size
risch	Expression too large to display	1119

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 6*b*n/d^5*e^2*ln(e*x+d)*ln(-e*x/d)+3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^5
*e^2*ln(x)-3*b*n/d^5*e^2*ln(x)^2+6*b*n/d^5*e^2*dilog(-e*x/d)-1/4*I*b*Pi*csg
n(I*c*x^n)^3*e^2/d^3/(e*x+d)^2-3*I*b*Pi*csgn(I*c*x^n)^3/d^5*e^2*ln(x)-3/2*I
*b*Pi*csgn(I*c*x^n)^3/d^4*e/x-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3/x^
```

```
2+3*I*b*Pi*csgn(I*c*x^n)^3/d^5*e^2*ln(e*x+d)-3/2*I*b*Pi*csgn(I*c*x^n)^3/d^4
*e^2/(e*x+d)+3*b*ln(x^n)/d^4*e/x+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)/d^3/x^2-3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^5*e^2*ln(e*x+d)-1/4*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2/d^3/x^2+3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^
4*e^2/(e*x+d)+3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^5*e^2*ln(x)+1/4*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3/(e*x+d)^2+3/2*I*b*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2/d^4*e/x-6*b*ln(x^n)/d^5*e^2*ln(e*x+d)-3*I*b*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2/d^5*e^2*ln(e*x+d)+3/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e/x+1/4
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3/(e*x+d)^2+3/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2/d^4*e^2/(e*x+d)-6*a/d^5*e^2*ln(e*x+d)+3*a/d^4*e^2/(e*x+d)+1
/2*a*e^2/d^3/(e*x+d)^2+6*a/d^5*e^2*ln(x)+3*a/d^4*e/x+1/4*I*b*Pi*csgn(I*c*x^
n)^3/d^3/x^2+3*b*ln(x^n)/d^4*e^2/(e*x+d)-1/2*a/d^3/x^2+1/2*b*ln(c)*e^2/d^3/
(e*x+d)^2+3*b*ln(c)/d^4*e/x+6*b*ln(c)/d^5*e^2*ln(x)-6*b*ln(c)/d^5*e^2*ln(e*
x+d)-1/2*b*ln(x^n)/d^3/x^2-3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^5
*e^2*ln(x)-3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*e/x-1/4*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3/(e*x+d)^2-3/2*I*b*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*e^2/(e*x+d)+3*b*ln(c)/d^4*e^2/(e*x+d)-1/2*b
*ln(c)/d^3/x^2+3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^5*e^2*ln(e*x+
d)-7/2*b*e^2*n*ln(x)/d^5+7/2*b*e^2*n*ln(e*x+d)/d^5+1/2*b*ln(x^n)*e^2/d^3/(e
*x+d)^2+6*b*ln(x^n)/d^5*e^2*ln(x)+3*b*e*n/d^4/x-1/2*b*e^2*n/d^4/(e*x+d)-1/4
*b*n/d^3/x^2
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*a*((12*x^3*e^3 + 18*d*x^2*e^2 + 4*d^2*x*e - d^3)/(d^4*x^4*e^2 + 2*d^5*x
^3*e + d^6*x^2) - 12*e^2*log(x*e + d)/d^5 + 12*e^2*log(x)/d^5) + b*integrat
e((log(c) + log(x^n))/(x^6*e^3 + 3*d*x^5*e^2 + 3*d^2*x^4*e + d^3*x^3), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^6*e^3 + 3*d*x^5*e^2 + 3*d^2*x^4*e + d^3*x^3)
, x)
```

Sympy [A]
time = 49.03, size = 496, normalized size = 2.29

$$- \frac{a e^{3} \left(\begin{cases} \frac{x}{d^{3}} & \text{for}\: e = 0 \\ - \frac{1}{2 e \left(d + e x\right)^{2}} & \text{otherwise} \end{cases}\right)}{d^{3}} - \frac{a}{2 d^{3} x^{2}} - \frac{3 a e^{3} \left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{1}{d e + e^{2} x} & \text{otherwise} \end{cases}\right)}{d^{4}} + \frac{3 a e}{d^{4} x} - \frac{6 a e^{3} \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + e x \right)}}{e} & \text{otherwise} \end{cases}\right)}{d^{5}} + \frac{6 a e^{2} \log{\left(x \right)}}{d^{5}} + \frac{b e^{3} n \left(\begin{cases} \frac{x}{d^{3}} & \text{for}\: e = 0 \\ - \frac{1}{2 d^{2} e + 2 d e^{2} x} - \frac{\log{\left(x \right)}}{2 d^{2} e} + \frac{\log{\left(\frac{d}{e} + x \right)}}{2 d^{2} e} & \text{otherwise} \end{cases}\right)}{d^{3}} - \frac{b e^{3} \left(\begin{cases} \frac{x}{d^{3}} & \text{for}\: e = 0 \\ - \frac{1}{2 e \left(d + e x\right)^{2}} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{d^{3}} - \frac{b n}{4 d^{3} x^{2}} - \frac{b \log{\left(c x^{n} \right)}}{2 d^{3} x^{2}} + \frac{3 b e^{3} n \left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{\log{\left(x \right)}}{d e} + \frac{\log{\left(\frac{d}{e} + x \right)}}{d e} & \text{otherwise} \end{cases}\right)}{d^{4}} - \frac{3 b e^{3} \left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{1}{d e + e^{2} x} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{d^{4}} + \frac{3 b e n}{d^{4} x} + \frac{3 b e \log{\left(c x^{n} \right)}}{d^{4} x} + \frac{6 b e^{3} n \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\begin{cases} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \wedge \left|{x}\right| < 1 \\ \log{\left(d \right)} \log{\left(x \right)} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{for}\: \left|{x}\right| < 1 \\ - \log{\left(d \right)} \log{\left(\frac{1}{x} \right)} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \\ - {G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\ 0, 0 & \end{matrix} \middle| {x} \right)} \log{\left(d \right)} + {G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)} \log{\left(d \right)} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{otherwise} \end{cases}}{e} & \text{otherwise} \end{cases}\right)}{d^{5}} - \frac{6 b e^{3} \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + e x \right)}}{e} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{d^{5}} - \frac{3 b e^{2} n \log{\left(x \right)}^{2}}{d^{5}} + \frac{6 b e^{2} \log{\left(x \right)} \log{\left(c x^{n} \right)}}{d^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**3,x)
```

```
[Out] -a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**3 -
 a/(2*d**3*x**2) - 3*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x
), True))/d**4 + 3*a*e/(d**4*x) - 6*a*e**3*Piecewise((x/d, Eq(e, 0)), (log(
d + e*x)/e, True))/d**5 + 6*a*e**2*log(x)/d**5 + b*e**3*n*Piecewise((x/d**3
, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)
/(2*d**2*e), True))/d**3 - b*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d
 + e*x)**2), True))*log(c*x**n)/d**3 - b*n/(4*d**3*x**2) - b*log(c*x**n)/(2
*d**3*x**2) + 3*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log
(d/e + x)/(d*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(
d*e + e**2*x), True))*log(c*x**n)/d**4 + 3*b*e*n/(d**4*x) + 3*b*e*log(c*x**
n)/(d**4*x) + 6*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2,
 e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - p
olylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(
2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0),
()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2,
 e*x*exp_polar(I*pi)/d), True))/e, True))/d**5 - 6*b*e**3*Piecewise((x/d, E
q(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**5 - 3*b*e**2*n*log(x)**2/d
**5 + 6*b*e**2*log(x)*log(c*x**n)/d**5
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^3*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,{\left(d+e\,x\right)}^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)^3),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)^3), x)
```

3.53 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal. Leaf size=229

$$\frac{10bdnx}{e^5}-\frac{d(60a+47bn)x}{6e^5}-\frac{5bnx^2}{2e^4}-\frac{10bdx\log(cx^n)}{e^5}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}-\frac{x^4(5a+bn+5b\log(cx^n))}{6e^2(d+ex)^2}-\frac{x^3(20a}{}$$

```
[Out] 10*b*d*n*x/e^5-1/6*d*(47*b*n+60*a)*x/e^5-5/2*b*n*x^2/e^4-10*b*d*x*ln(c*x^n)
/e^5-1/3*x^5*(a+b*ln(c*x^n))/e/(e*x+d)^3-1/6*x^4*(5*a+b*n+5*b*ln(c*x^n))/e^
2/(e*x+d)^2-1/6*x^3*(20*a+9*b*n+20*b*ln(c*x^n))/e^3/(e*x+d)+1/12*x^2*(60*a+
47*b*n+60*b*ln(c*x^n))/e^4+1/6*d^2*(60*a+47*b*n+60*b*ln(c*x^n))*ln(1+e*x/d)
/e^6+10*b*d^2*n*polylog(2,-e*x/d)/e^6
```

Rubi [A]

time = 0.28, antiderivative size = 229, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {2384, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{10bd^2n\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^6}+\frac{d^2\log\left(\frac{ex}{d}+1\right)(60a+60b\log(cx^n)+47bn)}{6e^6}-\frac{x^3(20a+20b\log(cx^n)+9bn)}{6e^3(d+ex)}-\frac{x^4(5a+5b\log(cx^n)+bn)}{6e^2(d+ex)^2}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}+\frac{x^2(60a+60b\log(cx^n)+47bn)}{12e^4}-\frac{dx(60a+47bn)}{6e^5}-\frac{10bdx\log(cx^n)}{e^5}+\frac{10bdnx}{e^5}-\frac{5bnx^2}{2e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] (10*b*d*n*x)/e^5 - (d*(60*a + 47*b*n)*x)/(6*e^5) - (5*b*n*x^2)/(2*e^4) - (1
0*b*d*x*Log[c*x^n])/e^5 - (x^5*(a + b*Log[c*x^n]))/(3*e*(d + e*x)^3) - (x^4
*(5*a + b*n + 5*b*Log[c*x^n]))/(6*e^2*(d + e*x)^2) - (x^3*(20*a + 9*b*n + 2
0*b*Log[c*x^n]))/(6*e^3*(d + e*x)) + (x^2*(60*a + 47*b*n + 60*b*Log[c*x^n])
)/(12*e^4) + (d^2*(60*a + 47*b*n + 60*b*Log[c*x^n])*Log[1 + (e*x)/d])/(6*e^
6) + (10*b*d^2*n*PolyLog[2, -((e*x)/d)])/e^6
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \left(-\frac{4d(a+b\log(cx^n))}{e^5}+\frac{x(a+b\log(cx^n))}{e^4}-\frac{d^5(a+b\log(cx^n))}{e^5(d+ex)^4}+\frac{5d^4(a+}{e^5(d}\right.$$

$$=-\frac{(4d)\int(a+b\log(cx^n))\,dx}{e^5}+\frac{(10d^2)\int\frac{a+b\log(cx^n)}{d+ex}\,dx}{e^5}-\frac{(10d^3)\int\frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^5}$$

$$=-\frac{4adx}{e^5}-\frac{bnx^2}{4e^4}+\frac{x^2(a+b\log(cx^n))}{2e^4}+\frac{d^5(a+b\log(cx^n))}{3e^6(d+ex)^3}-\frac{5d^4(a+b\log(cx^n}{2e^6(d+ex)^2}$$

$$=-\frac{4adx}{e^5}+\frac{4bdnx}{e^5}-\frac{bnx^2}{4e^4}-\frac{4bdx\log(cx^n)}{e^5}+\frac{x^2(a+b\log(cx^n))}{2e^4}+\frac{d^5(a+b\log}{3e^6(d+e}$$

$$=-\frac{4adx}{e^5}+\frac{4bdnx}{e^5}-\frac{bnx^2}{4e^4}-\frac{bd^4n}{6e^6(d+ex)^2}+\frac{13bd^3n}{6e^6(d+ex)}+\frac{13bd^2n\log(x)}{6e^6}-\frac{4bd}{}$$

Mathematica [A]
time = 0.20, size = 249, normalized size = 1.09

$$\frac{-48adex+48bdenx-3be^2nx^2-48bdex\log(cx^n)+6e^2x^2(a+b\log(cx^n))+\frac{4d^5(a+b\log(cx^n))}{(d+ex)^3}-\frac{30d^4(a+b\log(cx^n))}{(d+ex)^2}+\frac{120d^3(a+b\log(cx^n))}{d+ex}-2bd^2n\left(\frac{d(3d+2ex)}{(d+ex)^2}+2\log(x)-2\log(d+ex)\right)-120bd^2n(\log(x)-\log(d+ex))+30bd^2n\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)+120d^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+120bd^2n\operatorname{Li}_2\left(-\frac{ex}{d}\right)}{12e^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] (-48*a*d*e*x + 48*b*d*e*n*x - 3*b*e^2*n*x^2 - 48*b*d*e*x*Log[c*x^n] + 6*e^2
*x^2*(a + b*Log[c*x^n]) + (4*d^5*(a + b*Log[c*x^n]))/(d + e*x)^3 - (30*d^4*
(a + b*Log[c*x^n]))/(d + e*x)^2 + (120*d^3*(a + b*Log[c*x^n]))/(d + e*x) -
2*b*d^2*n*((d*(3*d + 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) - 120
*b*d^2*n*(Log[x] - Log[d + e*x]) + 30*b*d^2*n*(d/(d + e*x) + Log[x] - Log[d
 + e*x]) + 120*d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 120*b*d^2*n*PolyLo
g[2, -((e*x)/d)])/(12*e^6)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 1153, normalized size = 5.03

method	result	size
risch	Expression too large to display	1153

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] 10*b*ln(x^n)/e^6*d^2*ln(e*x+d)-10*b*n/e^6*d^2*ln(e*x+d)*ln(-e*x/d)-4*a/e^5*
d*x+1/3*a*d^5/e^6/(e*x+d)^3+10*a/e^6*d^2*ln(e*x+d)+10*a/e^6*d^3/(e*x+d)-5/2
*a/e^6*d^4/(e*x+d)^2+2*I*b*Pi*csgn(I*c*x^n)^3/e^5*d*x-1/6*I*b*Pi*csgn(I*c*x
^n)^3*d^5/e^6/(e*x+d)^3-5*I*b*Pi*csgn(I*c*x^n)^3/e^6*d^2*ln(e*x+d)+10*b*ln(
x^n)/e^6*d^3/(e*x+d)-5/2*b*ln(x^n)/e^6*d^4/(e*x+d)^2+1/3*b*ln(x^n)*d^5/e^6/
(e*x+d)^3-5*I*b*Pi*csgn(I*c*x^n)^3/e^6*d^3/(e*x+d)+1/4*I*b*Pi*csgn(I*x^n)*c
sgn(I*c*x^n)^2/e^4*x^2-1/4*I*b*Pi*csgn(I*c*x^n)^3/e^4*x^2+1/6*I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2*d^5/e^6/(e*x+d)^3+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/
e^4*x^2-5/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^6*d^4/(e*x+d)^2-1/4*I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^4*x^2-4*b*ln(x^n)/e^5*d*x+1/6*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2*d^5/e^6/(e*x+d)^3+5/4*I*b*Pi*csgn(I*c*x^n)^3/e^6
*d^4/(e*x+d)^2-2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^5*d*x+5*I*b*Pi*csgn(I*x
^n)*csgn(I*c*x^n)^2/e^6*d^3/(e*x+d)+5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^6*
d^2*ln(e*x+d)+5*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^6*d^2*ln(e*x+d)+5*I*b*
Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^6*d^3/(e*x+d)-2*I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2/e^5*d*x+1/2*a/e^4*x^2-5*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e
^6*d^2*ln(e*x+d)-5*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^6*d^3/(e*x+
d)-5/2*b*ln(c)/e^6*d^4/(e*x+d)^2+10*b*ln(c)/e^6*d^2*ln(e*x+d)-4*b*ln(c)/e^5
*d*x+1/3*b*ln(c)*d^5/e^6/(e*x+d)^3+10*b*ln(c)/e^6*d^3/(e*x+d)-47/6*b*n/e^6*
d^2*ln(e*x)+47/6*b*n/e^6*d^2*ln(e*x+d)+13/6*b*n/e^6*d^3/(e*x+d)-1/6*b*n/e^6
```

```
*d^4/(e*x+d)^2-10*b*n/e^6*d^2*dilog(-e*x/d)-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)*d^5/e^6/(e*x+d)^3+1/2*b*ln(x^n)/e^4*x^2+17/4*b*n/e^6*d^2+5/
4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^6*d^4/(e*x+d)^2+2*I*b*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^5*d*x+1/2*b*ln(c)/e^4*x^2-5/4*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2/e^6*d^4/(e*x+d)^2+4*b*d*n*x/e^5-1/4*b*n*x^2/e^4
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*(60*d^2*e^(-6)*log(x*e + d) + 3*(x^2*e - 8*d*x)*e^(-5) + (60*d^3*x^2*e^
2 + 105*d^4*x*e + 47*d^5)/(x^3*e^9 + 3*d*x^2*e^8 + 3*d^2*x*e^7 + d^3*e^6))*
a + b*integrate((x^5*log(c) + x^5*log(x^n))/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*
x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b*x^5*log(c*x^n) + a*x^5)/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2
+ 4*d^3*x*e + d^4), x)
```

Sympy [A]
time = 65.64, size = 617, normalized size = 2.69

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

```
[Out] -a*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**5 +
 5*a*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**5
 - 10*a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**5
+ 10*a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**5 - 4*a*d
*x/e**5 + a*x**2/(2*e**4) + b*d**5*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6
*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e*
*2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), Tru
```

```
e))/e**5 - b*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), Tru
e))*log(c*x**n)/e**5 - 5*b*d**4*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2
*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**5
 + 5*b*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*lo
g(c*x**n)/e**5 + 10*b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) +
 log(d/e + x)/(d*e), True))/e**5 - 10*b*d**3*Piecewise((x/d**2, Eq(e, 0)),
(-1/(d*e + e**2*x), True))*log(c*x**n)/e**5 - 10*b*d**2*n*Piecewise((x/d, E
q(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1
/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1),
(-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), (()
, (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/
e**5 + 10*b*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x
**n)/e**5 + 4*b*d*n*x/e**5 - 4*b*d*x*log(c*x**n)/e**5 - b*n*x**2/(4*e**4) +
 b*x**2*log(c*x**n)/(2*e**4)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^5/(x*e + d)^4, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^4} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

```
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

3.54 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal. Leaf size=183

$$-\frac{4bnx}{e^4}+\frac{(12a+13bn)x}{3e^4}+\frac{4bx\log(cx^n)}{e^4}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}-\frac{x^3(4a+bn+4b\log(cx^n))}{6e^2(d+ex)^2}-\frac{x^2(12a+7bn+1}{6e^3(d+}$$

```
[Out] -4*b*n*x/e^4+1/3*(13*b*n+12*a)*x/e^4+4*b*x*ln(c*x^n)/e^4-1/3*x^4*(a+b*ln(c*
x^n))/e/(e*x+d)^3-1/6*x^3*(4*a+b*n+4*b*ln(c*x^n))/e^2/(e*x+d)^2-1/6*x^2*(12
*a+7*b*n+12*b*ln(c*x^n))/e^3/(e*x+d)-1/3*d*(12*a+13*b*n+12*b*ln(c*x^n))*ln(
1+e*x/d)/e^5-4*b*d*n*polylog(2,-e*x/d)/e^5
```

Rubi [A]
time = 0.25, antiderivative size = 183, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2384, 45, 2393, 2332, 2354, 2438}

$$-\frac{4bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}-\frac{d\log\left(\frac{ex}{d}+1\right)(12a+12b\log(cx^n)+13bn)}{3e^5}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{6e^3(d+ex)}-\frac{x^3(4a+4b\log(cx^n)+bn)}{6e^2(d+ex)^2}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}+\frac{x(12a+13bn)}{3e^4}+\frac{4bx\log(cx^n)}{e^4}-\frac{4bnx}{e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] (-4*b*n*x)/e^4 + ((12*a + 13*b*n)*x)/(3*e^4) + (4*b*x*Log[c*x^n])/e^4 - (x^
4*(a + b*Log[c*x^n]))/(3*e*(d + e*x)^3) - (x^3*(4*a + b*n + 4*b*Log[c*x^n])
)/(6*e^2*(d + e*x)^2) - (x^2*(12*a + 7*b*n + 12*b*Log[c*x^n]))/(6*e^3*(d +
e*x)) - (d*(12*a + 13*b*n + 12*b*Log[c*x^n])*Log[1 + (e*x)/d])/(3*e^5) - (4
*b*d*n*PolyLog[2, -((e*x)/d)])/e^5
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
```

```
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \left(\frac{a+b\log(cx^n)}{e^4} + \frac{d^4(a+b\log(cx^n))}{e^4(d+ex)^4} - \frac{4d^3(a+b\log(cx^n))}{e^4(d+ex)^3} + \frac{6d^2(a+b\log(\right.$$

$$= \frac{\int (a+b\log(cx^n))\,dx}{e^4} - \frac{(4d)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^4} + \frac{(6d^2)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^4} - \frac{(4d^3)\int \frac{a}{}}{}$$

$$= \frac{ax}{e^4} - \frac{d^4(a+b\log(cx^n))}{3e^5(d+ex)^3} + \frac{2d^3(a+b\log(cx^n))}{e^5(d+ex)^2} + \frac{6dx(a+b\log(cx^n))}{e^4(d+ex)} - \frac{4d(a+}{}$$

$$= \frac{ax}{e^4} - \frac{bnx}{e^4} + \frac{bx\log(cx^n)}{e^4} - \frac{d^4(a+b\log(cx^n))}{3e^5(d+ex)^3} + \frac{2d^3(a+b\log(cx^n))}{e^5(d+ex)^2} + \frac{6dx(a+}{e^4(}$$

$$= \frac{ax}{e^4} - \frac{bnx}{e^4} + \frac{bd^3n}{6e^5(d+ex)^2} - \frac{5bd^2n}{3e^5(d+ex)} - \frac{5bdn\log(x)}{3e^5} + \frac{bx\log(cx^n)}{e^4} - \frac{d^4(a+}{3e^5(}$$

Mathematica [A]
time = 0.15, size = 207, normalized size = 1.13

$$\frac{6aex - 6benx + 6bex\log(cx^n) - \frac{2d^4(a+b\log(cx^n))}{(d+ex)^3} + \frac{12d^3(a+b\log(cx^n))}{(d+ex)^2} - \frac{36d^2(a+b\log(cx^n))}{d+ex} + bdn\left(\frac{d(3d+2ex)}{(d+ex)^2} + 2\log(x) - 2\log(d+ex)\right) + 36bdn(\log(x) - \log(d+ex)) - 12bdn\left(\frac{d}{d+ex} + \log(x) - \log(d+ex)\right) - 24d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 24bdn\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{6e^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] (6*a*e*x - 6*b*e*n*x + 6*b*e*x*Log[c*x^n] - (2*d^4*(a + b*Log[c*x^n]))/(d +
 e*x)^3 + (12*d^3*(a + b*Log[c*x^n]))/(d + e*x)^2 - (36*d^2*(a + b*Log[c*x^
n]))/(d + e*x) + b*d*n*((d*(3*d + 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d
+ e*x]) + 36*b*d*n*(Log[x] - Log[d + e*x]) - 12*b*d*n*(d/(d + e*x) + Log[x]
 - Log[d + e*x]) - 24*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 24*b*d*n*Poly
Log[2, -((e*x)/d)])/(6*e^5)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 969, normalized size = 5.30

method	result	size
risch	Expression too large to display	969

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] 4*b*n/e^5*d*ln(e*x+d)*ln(-e*x/d)+1/6*I*b*Pi*csgn(I*c*x^n)^3*d^4/e^5/(e*x+d)
^3+2*I*b*Pi*csgn(I*c*x^n)^3/e^5*d*ln(e*x+d)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2/e^4*x-I*b*Pi*csgn(I*c*x^n)^3/e^5*d^3/(e*x+d)^2+3*I*b*Pi*csgn(I*c*x^
n)^3/e^5*d^2/(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/e^4*x-1/6*I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2*d^4/e^5/(e*x+d)^3-3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^5*
d^2/(e*x+d)+a/e^4*x-2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^5*d*ln(e*x+d)+I*b*
Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^5*d^3/(e*x+d)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2/e^5*d^3/(e*x+d)^2-1/3*b*ln(x^n)*d^4/e^5/(e*x+d)^3-6*b*ln(x^n)/e^5*d^
2/(e*x+d)-1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^4/e^5/(e*x+d)^3-2*I*b*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2/e^5*d*ln(e*x+d)-4*b*ln(x^n)/e^5*d*ln(e*x+d)-4*
a/e^5*d*ln(e*x+d)-6*a/e^5*d^2/(e*x+d)+2*a/e^5*d^3/(e*x+d)^2-1/3*a*d^4/e^5/(
e*x+d)^3-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^5*d^3/(e*x+d)^2+3*I*b
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^5*d^2/(e*x+d)+1/6*I*b*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*d^4/e^5/(e*x+d)^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*c
*x^n)^2/e^4*x+2*b*ln(c)/e^5*d^3/(e*x+d)^2-4*b*ln(c)/e^5*d*ln(e*x+d)-1/3*b*l
n(c)*d^4/e^5/(e*x+d)^3-6*b*ln(c)/e^5*d^2/(e*x+d)+13/3*b*n/e^5*d*ln(e*x)+1/6
*b*n/e^5*d^3/(e*x+d)^2-13/3*b*n/e^5*d*ln(e*x+d)-5/3*b*n/e^5*d^2/(e*x+d)+4*b
*n/e^5*d*dilog(-e*x/d)+b*ln(c)/e^4*x-b*n/e^5*d+2*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)/e^5*d*ln(e*x+d)+b*ln(x^n)/e^4*x-1/2*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)/e^4*x-3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^5*d^2/(e*x+
d)+2*b*ln(x^n)/e^5*d^3/(e*x+d)^2-b*n*x/e^4
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")

[Out] -1/3*(12*d*e^(-5)*log(x*e + d) - 3*x*e^(-4) + (18*d^2*x^2*e^2 + 30*d^3*x*e + 13*d^4)/(x^3*e^8 + 3*d*x^2*e^7 + 3*d^2*x*e^6 + d^3*e^5))*a + b*integrate((x^4*log(c) + x^4*log(x^n))/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")

[Out] integral((b*x^4*log(c*x^n) + a*x^4)/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)

Sympy [A]
time = 32.03, size = 563, normalized size = 3.08

$$\frac{ad^4\left(\begin{cases}\frac{x}{d^4} & \text{for } e=0\\ -\frac{1}{3e(d+ex)^3} & \text{otherwise}\end{cases}\right)}{e^4}-\frac{4ad^3\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{e^4}+\frac{6ad^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^4}-\frac{4ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^4}+\frac{ax}{e^4}-\frac{bd^4n\left(\begin{cases}\frac{x}{d^4} & \text{for } e=0\\ -\frac{3d}{6d^4e+12d^3e^2x+6d^2e^3x^2}-\frac{2ex}{6d^4e+12d^3e^2x+6d^2e^3x^2}-\frac{\log(x)}{3d^3e}+\frac{\log\left(\frac{d}{e}+x\right)}{3d^3e} & \text{otherwise}\end{cases}\right)}{e^4}+\frac{bd^4\left(\begin{cases}\frac{x}{d^4} & \text{for } e=0\\ -\frac{1}{3e(d+ex)^3} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^4}+\frac{4bd^3n\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2d^2e+2de^2x}-\frac{\log(x)}{2d^2e}+\frac{\log\left(\frac{d}{e}+x\right)}{2d^2e} & \text{otherwise}\end{cases}\right)}{e^4}-\frac{4bd^3\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^4}-\frac{6bd^2n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^4}+\frac{6bd^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^4}+\frac{4bdn\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^4}-\frac{4bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^4}-\frac{bnx}{e^4}+\frac{bx\log(cx^n)}{e^4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x**4*(a+b*ln(c*x**n))/(e*x+d)**4,x)

[Out] a*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**4 - 4*a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**4 + 6*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**4 - 4*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**4 + a*x/e**4 - b*d**4*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), True))/e**4 + b*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**4 + 4*b*d**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**4 - 4*b*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**4 - 6*b*d**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**4 + 6*b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**4 + 4*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), (

```
)), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2,
e*x*exp_polar(I*pi)/d), True))/e, True))/e**4 - 4*b*d*Piecewise((x/d, Eq(e,
 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**4 - b*n*x/e**4 + b*x*log(c*x**
n)/e**4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^4/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^4\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n)))/(d + e*x)^4,x)
[Out] int((x^4*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

3.55 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal. Leaf size=141

$$-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}-\frac{x^2(3a+bn+3b\log(cx^n))}{6e^2(d+ex)^2}-\frac{x(6a+5bn+6b\log(cx^n))}{6e^3(d+ex)}+\frac{(6a+11bn+6b\log(cx^n))\log}{6e^4}$$

```
[Out] -1/3*x^3*(a+b*ln(c*x^n))/e/(e*x+d)^3-1/6*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2/(e
*x+d)^2-1/6*x*(6*a+5*b*n+6*b*ln(c*x^n))/e^3/(e*x+d)+1/6*(6*a+11*b*n+6*b*ln(
c*x^n))*ln(1+e*x/d)/e^4+b*n*polylog(2,-e*x/d)/e^4
```

Rubi [A]
time = 0.15, antiderivative size = 141, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2384, 2354, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+11bn)}{6e^4}-\frac{x(6a+6b\log(cx^n)+5bn)}{6e^3(d+ex)}-\frac{x^2(3a+3b\log(cx^n)+bn)}{6e^2(d+ex)^2}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] -1/3*(x^3*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) - (x^2*(3*a + b*n + 3*b*Log[c
*x^n]))/(6*e^2*(d + e*x)^2) - (x*(6*a + 5*b*n + 6*b*Log[c*x^n]))/(6*e^3*(d
+ e*x)) + ((6*a + 11*b*n + 6*b*Log[c*x^n])*Log[1 + (e*x)/d])/(6*e^4) + (b*n
*PolyLog[2, -((e*x)/d)])/e^4
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \left(-\frac{d^3(a+b\log(cx^n))}{e^3(d+ex)^4} + \frac{3d^2(a+b\log(cx^n))}{e^3(d+ex)^3} - \frac{3d(a+b\log(cx^n))}{e^3(d+ex)^2} + \frac{a+b\,l}{e^3(d}\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^3} - \frac{(3d)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^3} + \frac{(3d^2)\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{e^3} - \frac{d^3\int \frac{a+b\log(cx^n)}{(d+ex)^4}}{e^3}$$

$$= \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex)^3} - \frac{3d^2(a+b\log(cx^n))}{2e^4(d+ex)^2} - \frac{3x(a+b\log(cx^n))}{e^3(d+ex)} + \frac{(a+b\log(cx}{}$$

$$= \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex)^3} - \frac{3d^2(a+b\log(cx^n))}{2e^4(d+ex)^2} - \frac{3x(a+b\log(cx^n))}{e^3(d+ex)} + \frac{3bn\log(d+}{e^4}$$

$$= -\frac{bd^2n}{6e^4(d+ex)^2} + \frac{7bdn}{6e^4(d+ex)} + \frac{7bn\log(x)}{6e^4} + \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex)^3} - \frac{3d^2(a+b\,lo}{2e^4(d+}$$

Mathematica [A]
time = 0.16, size = 179, normalized size = 1.27

$$\frac{\frac{2d^3(a+b\log(cx^n))}{(d+ex)^3} - \frac{9d^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{18d(a+b\log(cx^n))}{d+ex} - bn\left(\frac{d(3d+2ex)}{(d+ex)^2} + 2\log(x) - 2\log(d+ex)\right) - 18bn(\log(x)-\log(d+ex)) + 9bn\left(\frac{d}{d+ex} + \log(x) - \log(d+ex)\right) + 6(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 6bn\text{Li}_2\left(-\frac{ex}{d}\right)}{6e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] ((2*d^3*(a + b*Log[c*x^n]))/(d + e*x)^3 - (9*d^2*(a + b*Log[c*x^n]))/(d + e
*x)^2 + (18*d*(a + b*Log[c*x^n]))/(d + e*x) - b*n*((d*(3*d + 2*e*x))/(d + e
*x)^2 + 2*Log[x] - 2*Log[d + e*x]) - 18*b*n*(Log[x] - Log[d + e*x]) + 9*b*n
*(d/(d + e*x) + Log[x] - Log[d + e*x]) + 6*(a + b*Log[c*x^n])*Log[1 + (e*x)
/d] + 6*b*n*PolyLog[2, -((e*x)/d)])/(6*e^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 801, normalized size = 5.68

method	result
risch	$\frac{a\ln(ex+d)}{e^4} + \frac{3b\ln(c)d}{e^4(ex+d)} - \frac{3b\ln(c)d^2}{2e^4(ex+d)^2} + \frac{b\ln(c)d^3}{3e^4(ex+d)^3} - \frac{ib\pi\text{csgn}(ic\,x^n)^3\ln(ex+d)}{2e^4} - \frac{3ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)d}{2e^4(ex+d)} -$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] a/e^4*ln(e*x+d)+3*b*ln(c)*d/e^4/(e*x+d)-3/2*b*ln(c)*d^2/e^4/(e*x+d)^2+1/3*b
*ln(c)*d^3/e^4/(e*x+d)^3-1/2*I*b*Pi*csgn(I*c*x^n)^3/e^4*ln(e*x+d)-1/6*I*b*P
i*csgn(I*c*x^n)^3*d^3/e^4/(e*x+d)^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^
```

```
4*ln(e*x+d)-3/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^4/(e*x+d)^2+1/6*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^3/e^4/(e*x+d)^3-1/2*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)/e^4*ln(e*x+d)-3/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2
/e^4/(e*x+d)^2+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^3/e^4/(e*x+d)^3+3/2
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^4/(e*x+d)+1/3*b*ln(x^n)*d^3/e^4/(e*x+
d)^3+3*b*ln(x^n)*d/e^4/(e*x+d)-3/2*b*ln(x^n)*d^2/e^4/(e*x+d)^2-1/6*b*n*d^2/
e^4/(e*x+d)^2-b*n/e^4*ln(e*x+d)*ln(-e*x/d)+3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2*d/e^4/(e*x+d)+3/4*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^4/(e*x+d)^2+1/3*a*d^3
/e^4/(e*x+d)^3+3*a*d/e^4/(e*x+d)-3/2*a*d^2/e^4/(e*x+d)^2+1/2*I*b*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2/e^4*ln(e*x+d)-3/2*I*b*Pi*csgn(I*c*x^n)^3*d/e^4/(e*x+d)
+7/6*b*n*d/e^4/(e*x+d)-3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^4
/(e*x+d)-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^3/e^4/(e*x+d)^3+b
*ln(c)/e^4*ln(e*x+d)+3/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^2/e^4
/(e*x+d)^2+b*ln(x^n)/e^4*ln(e*x+d)-11/6*b*n/e^4*ln(e*x)+11/6*b*n/e^4*ln(e*x
+d)-b*n/e^4*dilog(-e*x/d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*(6*e^(-4)*log(x*e + d) + (18*d*x^2*e^2 + 27*d^2*x*e + 11*d^3)/(x^3*e^7
+ 3*d*x^2*e^6 + 3*d^2*x*e^5 + d^3*e^4))*a + b*integrate((x^3*log(c) + x^3*l
og(x^n))/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2
+ 4*d^3*x*e + d^4), x)
```

Sympy [A]
time = 30.70, size = 518, normalized size = 3.67

$$- \frac{a d^{3} \left(\begin{cases} \frac{x}{d^{4}} & \text{for}\: e = 0 \\ - \frac{1}{3 e \left(d + e x\right)^{3}} & \text{otherwise} \end{cases}\right)}{e^{3}} + \frac{3 a d^{2} \left(\begin{cases} \frac{x}{d^{3}} & \text{for}\: e = 0 \\ - \frac{1}{2 e \left(d + e x\right)^{2}} & \text{otherwise} \end{cases}\right)}{e^{3}} - \frac{3 a d \left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{1}{d e + e^{2} x} & \text{otherwise} \end{cases}\right)}{e^{3}} + \frac{a \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + e x \right)}}{e} & \text{otherwise} \end{cases}\right)}{e^{3}} + \frac{b d^{3} n \left(\begin{cases} \frac{x}{d^{4}} & \text{for}\: e = 0 \\ - \frac{3 d}{6 d^{4} e + 12 d^{3} e^{2} x + 6 d^{2} e^{3} x^{2}} - \frac{2 e x}{6 d^{4} e + 12 d^{3} e^{2} x + 6 d^{2} e^{3} x^{2}} - \frac{\log{\left(x \right)}}{3 d^{3} e} + \frac{\log{\left(\frac{d}{e} + x \right)}}{3 d^{3} e} & \text{otherwise} \end{cases}\right)}{e^{3}} - \frac{b d^{3} \left(\begin{cases} \frac{x}{d^{4}} & \text{for}\: e = 0 \\ - \frac{1}{3 e \left(d + e x\right)^{3}} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{e^{3}} - \frac{3 b d^{2} n \left(\begin{cases} \frac{x}{d^{3}} & \text{for}\: e = 0 \\ - \frac{1}{2 d^{2} e + 2 d e^{2} x} - \frac{\log{\left(x \right)}}{2 d^{2} e} + \frac{\log{\left(\frac{d}{e} + x \right)}}{2 d^{2} e} & \text{otherwise} \end{cases}\right)}{e^{3}} + \frac{3 b d^{2} \left(\begin{cases} \frac{x}{d^{3}} & \text{for}\: e = 0 \\ - \frac{1}{2 e \left(d + e x\right)^{2}} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{e^{3}} + \frac{3 b d n \left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{\log{\left(x \right)}}{d e} + \frac{\log{\left(\frac{d}{e} + x \right)}}{d e} & \text{otherwise} \end{cases}\right)}{e^{3}} - \frac{3 b d \left(\begin{cases} \frac{x}{d^{2}} & \text{for}\: e = 0 \\ - \frac{1}{d e + e^{2} x} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{e^{3}} - \frac{b n \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\begin{cases} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \wedge \left|{x}\right| < 1 \\ \log{\left(d \right)} \log{\left(x \right)} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{for}\: \left|{x}\right| < 1 \\ - \log{\left(d \right)} \log{\left(\frac{1}{x} \right)} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \\ - {G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right)} \log{\left(d \right)} + {G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)} \log{\left(d \right)} - \operatorname{Li}_{2}\left(\frac{e x e^{i \pi}}{d}\right) & \text{otherwise} \end{cases}}{e} & \text{otherwise} \end{cases}\right)}{e^{3}} + \frac{b \left(\begin{cases} \frac{x}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d + e x \right)}}{e} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{e^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

```
[Out] -a*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**3 +
 3*a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**3
 - 3*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 + a*
Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + b*d**3*n*Piecewis
e((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2)
- 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e)
+ log(d/e + x)/(3*d**3*e), True))/e**3 - b*d**3*Piecewise((x/d**4, Eq(e, 0)
), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**3 - 3*b*d**2*n*Piecewise((
x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/
e + x)/(2*d**2*e), True))/e**3 + 3*b*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1
/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**3 + 3*b*d*n*Piecewise((x/d**2, E
q(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**3 - 3*b*d*Piecewis
e((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**3 - b*n*Pie
cewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Ab
s(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi
)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1
/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1
, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), Tru
e))/e, True))/e**3 + b*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*l
og(c*x**n)/e**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^4} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

3.56 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal. Leaf size=79

$$\frac{bdn}{6e^3(d+ex)^2}-\frac{2bn}{3e^3(d+ex)}+\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3}-\frac{bn\log(d+ex)}{3de^3}$$

```
[Out] 1/6*b*d*n/e^3/(e*x+d)^2-2/3*b*n/e^3/(e*x+d)+1/3*x^3*(a+b*ln(c*x^n))/d/(e*x+
d)^3-1/3*b*n*ln(e*x+d)/d/e^3
```

Rubi [A]
time = 0.05, antiderivative size = 79, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.095$, Rules used = {2373, 45}

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3}-\frac{2bn}{3e^3(d+ex)}+\frac{bdn}{6e^3(d+ex)^2}-\frac{bn\log(d+ex)}{3de^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] (b*d*n)/(6*e^3*(d + e*x)^2) - (2*b*n)/(3*e^3*(d + e*x)) + (x^3*(a + b*Log[c
*x^n]))/(3*d*(d + e*x)^3) - (b*n*Log[d + e*x])/(3*d*e^3)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{(bn)\int \frac{x^2}{(d+ex)^3}\,dx}{3d}$$
$$= \frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{(bn)\int \left(\frac{d^2}{e^2(d+ex)^3} - \frac{2d}{e^2(d+ex)^2} + \frac{1}{e^2(d+ex)}\right)dx}{3d}$$
$$= \frac{bdn}{6e^3(d+ex)^2} - \frac{2bn}{3e^3(d+ex)} + \frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{bn\log(d+ex)}{3de^3}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 172 vs. $2(79) = 158$.
time = 0.08, size = 172, normalized size = 2.18

$$-\frac{ad^2}{3e^3(d+ex)^3} + \frac{ad}{e^3(d+ex)^2} + \frac{bdn}{6e^3(d+ex)^2} - \frac{a}{e^3(d+ex)} - \frac{2bn}{3e^3(d+ex)} + \frac{bn\log(x)}{3de^3} - \frac{bd^2\log(cx^n)}{3e^3(d+ex)^3} + \frac{bd\log(cx^n)}{e^3(d+ex)^2} - \frac{b\log(cx^n)}{e^3(d+ex)} - \frac{bn\log(d+ex)}{3de^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] -1/3*(a*d^2)/(e^3*(d + e*x)^3) + (a*d)/(e^3*(d + e*x)^2) + (b*d*n)/(6*e^3*(
d + e*x)^2) - a/(e^3*(d + e*x)) - (2*b*n)/(3*e^3*(d + e*x)) + (b*n*Log[x])/
(3*d*e^3) - (b*d^2*Log[c*x^n])/(3*e^3*(d + e*x)^3) + (b*d*Log[c*x^n])/(e^3*
(d + e*x)^2) - (b*Log[c*x^n])/(e^3*(d + e*x)) - (b*n*Log[d + e*x])/(3*d*e^3
)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 553, normalized size = 7.00

method	result
risch	$-\frac{b(3e^2x^2+3dex+d^2)\ln(x^n)}{3(ex+d)^3e^3} - \frac{3i\pi b\,d^2ex\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+3i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+3i\pi bd\,e^2x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(3*e^2*x^2+3*d*e*x+d^2)/(e*x+d)^3/e^3*ln(x^n)-1/6*(-3*I*Pi*b*d^2*e*x
*csgn(I*c*x^n)^3-3*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*
b*d^3*csgn(I*c*x^n)^3-3*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+2*a*d^3+6*a*d*e^2*x^2+6*a*d^2*e*x+3*b*d^3*n+2*d^3*b*ln(c)-2*ln(-x)*b*d^3*
n+2*ln(e*x+d)*b*d^3*n+6*ln(c)*b*d*e^2*x^2+6*ln(c)*b*d^2*e*x-I*Pi*b*d^3*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi*b*d*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n
)^2+3*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi*b*d^2*e*x*csgn(I*c)
*csgn(I*c*x^n)^2+3*I*Pi*b*d^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*d^3*cs
```

```
gn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b*d*e
^2*x^2*csgn(I*c*x^n)^3-2*ln(-x)*b*e^3*n*x^3+2*ln(e*x+d)*b*e^3*n*x^3+7*b*d^2
*e*n*x+4*b*d*e^2*n*x^2+6*ln(e*x+d)*b*d^2*e*n*x-6*ln(-x)*b*d^2*e*n*x+6*ln(e*
x+d)*b*d*e^2*n*x^2-6*ln(-x)*b*d*e^2*n*x^2)/d/e^3/(e*x+d)^3
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(72) = 144$.
time = 0.28, size = 168, normalized size = 2.13

$$-\frac{1}{6}\,bn\left(\frac{2\,e^{(-3)}\log\left(xe+d\right)}{d}-\frac{2\,e^{(-3)}\log\left(x\right)}{d}+\frac{4\,xe+3\,d}{x^2e^5+2\,dxe^4+d^2e^3}\right)-\frac{\left(3\,x^2e^2+3\,dxe+d^2\right)b\log\left(cx^n\right)}{3\,\left(x^3e^6+3\,dx^2e^5+3\,d^2xe^4+d^3e^3\right)}-\frac{\left(3\,x^2e^2+3\,dxe+d^2\right)a}{3\,\left(x^3e^6+3\,dx^2e^5+3\,d^2xe^4+d^3e^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] -1/6*b*n*(2*e^(-3)*log(x*e + d)/d - 2*e^(-3)*log(x)/d + (4*x*e + 3*d)/(x^2*
e^5 + 2*d*x*e^4 + d^2*e^3)) - 1/3*(3*x^2*e^2 + 3*d*x*e + d^2)*b*log(c*x^n)/
(x^3*e^6 + 3*d*x^2*e^5 + 3*d^2*x*e^4 + d^3*e^3) - 1/3*(3*x^2*e^2 + 3*d*x*e
+ d^2)*a/(x^3*e^6 + 3*d*x^2*e^5 + 3*d^2*x*e^4 + d^3*e^3)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 169 vs. $2(72) = 144$.
time = 0.38, size = 169, normalized size = 2.14

$$\frac{2\,bnx^3e^3\log\left(x\right)-3\,bd^3n-2\,ad^3-2\,\left(2\,bdn+3\,ad\right)x^2e^2-\left(7\,bd^2n+6\,ad^2\right)xe-2\,\left(bnx^3e^3+3\,bdnx^2e^2+3\,bd^2nxe+bd^3n\right)\log\left(xe+d\right)-2\,\left(3\,bdx^2e^2+3\,bd^2xe+bd^3\right)\log\left(c\right)}{6\,\left(dx^3e^6+3\,d^2x^2e^5+3\,d^3xe^4+d^4e^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] 1/6*(2*b*n*x^3*e^3*log(x) - 3*b*d^3*n - 2*a*d^3 - 2*(2*b*d*n + 3*a*d)*x^2*e
^2 - (7*b*d^2*n + 6*a*d^2)*x*e - 2*(b*n*x^3*e^3 + 3*b*d*n*x^2*e^2 + 3*b*d^2
*n*x*e + b*d^3*n)*log(x*e + d) - 2*(3*b*d*x^2*e^2 + 3*b*d^2*x*e + b*d^3)*lo
g(c))/(d*x^3*e^6 + 3*d^2*x^2*e^5 + 3*d^3*x*e^4 + d^4*e^3)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 677 vs. $2(71) = 142$.
time = 5.99, size = 677, normalized size = 8.57

$$\begin{cases}\tilde{\infty}\left(-\frac{a}{x}-\frac{bn}{x}-\frac{b\log\left(cx^n\right)}{x}\right) & \text{for}\ d=0\wedge e=0\\ \frac{-\frac{a}{x}-\frac{bn}{x}-\frac{b\log\left(cx^n\right)}{x}}{e^4} & \text{for}\ d=0\\ \frac{\frac{ax^3}{3}-\frac{bnx^3}{9}+\frac{bx^3\log\left(cx^n\right)}{3}}{d^4} & \text{for}\ e=0\\ -\frac{2ad^3}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{6ad^2ex}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{6ade^2x^2}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{2bd^3n\log\left(\frac{d}{e}+x\right)}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{3bd^3n}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{6bd^2enx\log\left(\frac{d}{e}+x\right)}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{7bd^2enx}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{6bde^2nx^2\log\left(\frac{d}{e}+x\right)}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{4bde^2nx^2}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}-\frac{2be^3nx^3\log\left(\frac{d}{e}+x\right)}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3}+\frac{2be^3x^3\log\left(cx^n\right)}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

```
[Out] Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((-a
/x - b*n/x - b*log(c*x**n)/x)/e**4, Eq(d, 0)), ((a*x**3/3 - b*n*x**3/9 + b*
x**3*log(c*x**n)/3)/d**4, Eq(e, 0)), (-2*a*d**3/(6*d**4*e**3 + 18*d**3*e**4
```

```
*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*a*d**2*e*x/(6*d**4*e**3 + 18*d*
*3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*a*d*e**2*x**2/(6*d**4*e*
*3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 2*b*d**3*n*log(d
/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3)
- 3*b*d**3*n/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x
**3) - 6*b*d**2*e*n*x*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*
e**5*x**2 + 6*d*e**6*x**3) - 7*b*d**2*e*n*x/(6*d**4*e**3 + 18*d**3*e**4*x +
 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*b*d*e**2*n*x**2*log(d/e + x)/(6*d**
4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 4*b*d*e**2*n
*x**2/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) -
2*b*e**3*n*x**3*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x
**2 + 6*d*e**6*x**3) + 2*b*e**3*x**3*log(c*x**n)/(6*d**4*e**3 + 18*d**3*e**
4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 193 vs. 2(72) = 144.
time = 5.12, size = 193, normalized size = 2.44

$$-\frac{2\,bnx^3e^3\log\left(xe+d\right)+6\,bdnx^2e^2\log\left(xe+d\right)+6\,bd^2nxe\log\left(xe+d\right)-2\,bnx^3e^3\log\left(x\right)+4\,bdnx^2e^2+7\,bd^2nxe+2\,bd^3n\log\left(xe+d\right)+6\,bdx^2e^2\log\left(c\right)+6\,bd^2xe\log\left(c\right)+3\,bd^3n+6\,adx^2e^2+6\,ad^2xe+2\,bd^3\log\left(c\right)+2\,ad^3}{6\,\left(dx^3e^6+3\,d^2x^2e^5+3\,d^3xe^4+d^4e^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] -1/6*(2*b*n*x^3*e^3*log(x*e + d) + 6*b*d*n*x^2*e^2*log(x*e + d) + 6*b*d^2*n
*x*e*log(x*e + d) - 2*b*n*x^3*e^3*log(x) + 4*b*d*n*x^2*e^2 + 7*b*d^2*n*x*e
+ 2*b*d^3*n*log(x*e + d) + 6*b*d*x^2*e^2*log(c) + 6*b*d^2*x*e*log(c) + 3*b*
d^3*n + 6*a*d*x^2*e^2 + 6*a*d^2*x*e + 2*b*d^3*log(c) + 2*a*d^3)/(d*x^3*e^6
+ 3*d^2*x^2*e^5 + 3*d^3*x*e^4 + d^4*e^3)
```

Mupad [B]
time = 4.02, size = 167, normalized size = 2.11

$$-\frac{x^2\,\left(3\,a\,e^2+2\,b\,e^2\,n\right)+a\,d^2+x\,\left(3\,a\,d\,e+\frac{7\,b\,d\,e\,n}{2}\right)+\frac{3\,b\,d^2\,n}{2}}{3\,d^3\,e^3+9\,d^2\,e^4\,x+9\,d\,e^5\,x^2+3\,e^6\,x^3}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{3\,e^3}+\frac{b\,x^2}{e}+\frac{b\,d\,x}{e^2}\right)}{d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3}-\frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d\,e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

```
[Out] - (x^2*(3*a*e^2 + 2*b*e^2*n) + a*d^2 + x*(3*a*d*e + (7*b*d*e*n)/2) + (3*b*d
^2*n)/2)/(3*d^3*e^3 + 3*e^6*x^3 + 9*d^2*e^4*x + 9*d*e^5*x^2) - (log(c*x^n)*
((b*d^2)/(3*e^3) + (b*x^2)/e + (b*d*x)/e^2))/(d^3 + e^3*x^3 + 3*d*e^2*x^2 +
 3*d^2*e*x) - (2*b*n*atanh((2*e*x)/d + 1))/(3*d*e^3)
```

3.57 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx$

Optimal. Leaf size=117

$$-\frac{bn}{6e^2(d+ex)^2}+\frac{bn}{6de^2(d+ex)}+\frac{bn\log(x)}{6d^2e^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-\frac{bn\log(d+ex)}{6d^2e^2}$$

```
[Out] -1/6*b*n/e^2/(e*x+d)^2+1/6*b*n/d/e^2/(e*x+d)+1/6*b*n*ln(x)/d^2/e^2+1/3*d*(a
+b*ln(c*x^n))/e^2/(e*x+d)^3+1/2*(-a-b*ln(c*x^n))/e^2/(e*x+d)^2-1/6*b*n*ln(e
*x+d)/d^2/e^2
```

Rubi [A]
time = 0.06, antiderivative size = 117, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {45, 2382, 12, 78}

$$-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}+\frac{bn\log(x)}{6d^2e^2}-\frac{bn\log(d+ex)}{6d^2e^2}+\frac{bn}{6de^2(d+ex)}-\frac{bn}{6e^2(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] -1/6*(b*n)/(e^2*(d + e*x)^2) + (b*n)/(6*d*e^2*(d + e*x)) + (b*n*Log[x])/(6*
d^2*e^2) + (d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x)^3) - (a + b*Log[c*x^n])/
(2*e^2*(d + e*x)^2) - (b*n*Log[d + e*x])/(6*d^2*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 78

```
Int[((a_.) + (b_.)*(x_))*((c_) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p_
.), x_Symbol] :> Int[ExpandIntegrand[(a + b*x)*(c + d*x)^n*(e + f*x)^p, x],
 x] /; FreeQ[{a, b, c, d, e, f, n}, x] && NeQ[b*c - a*d, 0] && ((ILtQ[n, 0]
 && ILtQ[p, 0]) || EqQ[p, 1] || (IGtQ[p, 0] && ( !IntegerQ[n] || LeQ[9*p +
5*(n + 2), 0] || GeQ[n + p + 1, 0] || (GeQ[n + p + 2, 0] && RationalQ[a, b,
 c, d, e, f]))))
```

Rule 2382

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Dist[a + b*Log[c*x
^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a,
b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx &= \frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-(bn)\int \frac{-d-3ex}{6e^2x(d+ex)^3}\,dx\\ &= \frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-\frac{(bn)\int \frac{-d-3ex}{x(d+ex)^3}\,dx}{6e^2}\\ &= \frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-\frac{(bn)\int \left(-\frac{1}{d^2x}-\frac{2e}{(d+ex)^3}+\frac{e}{d(d+ex)^2}+\frac{e}{d^2(d+e}\right.}{6e^2}\\ &= -\frac{bn}{6e^2(d+ex)^2}+\frac{bn}{6de^2(d+ex)}+\frac{bn\log(x)}{6d^2e^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^{\prime}}{2e^2(d+ex)^{2}}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 135, normalized size = 1.15

$$\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}-\frac{bn\left(\frac{1}{(d+ex)^2}+\frac{2}{d(d+ex)}+\frac{2\log(x)}{d^2}-\frac{2\log(d+ex)}{d^2}\right)}{6e^2}+\frac{bn\left(\frac{1}{d(d+ex)}+\frac{\log(x)}{d^2}-\frac{\log(d+ex)}{d^2}\right)}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

```
[Out] (d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x)^3) - (a + b*Log[c*x^n])/(2*e^2*(d +
 e*x)^2) - (b*n*((d + e*x)^(-2) + 2/(d*(d + e*x)) + (2*Log[x])/d^2 - (2*Log
[d + e*x])/d^2))/(6*e^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x
]/d^2))/(2*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 403, normalized size = 3.44

method	result
risch	$-\frac{b(3ex+d)\ln(x^n)}{6(ex+d)^3e^2}-\frac{3i\pi b\,d^2ex\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+i\pi b\,d^3\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2+i\pi b\,d^3\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2-3i\pi b\,d^2ex\,\mathrm{csgn}(ic}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*b*(3*e*x+d)/(e*x+d)^3/e^2*ln(x^n)-1/12*(3*I*Pi*b*d^2*e*x*csgn(I*c)*csg
n(I*c*x^n)^2+I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*d^3*csgn(I*c)*cs
gn(I*c*x^n)^2-3*I*Pi*b*d^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*d
^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*d^3*csgn(I*c*x^n)^3-3*I*Pi*b*
d^2*e*x*csgn(I*c*x^n)^3+3*I*Pi*b*d^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-2*ln(-
x)*b*e^3*n*x^3+2*ln(e*x+d)*b*e^3*n*x^3-6*ln(-x)*b*d*e^2*n*x^2+6*ln(e*x+d)*b
*d*e^2*n*x^2-6*ln(-x)*b*d^2*e*n*x+6*ln(e*x+d)*b*d^2*e*n*x-2*b*d*e^2*n*x^2+6
*ln(c)*b*d^2*e*x-2*ln(-x)*b*d^3*n+2*ln(e*x+d)*b*d^3*n-2*b*d^2*e*n*x+2*d^3*b
*ln(c)+6*a*d^2*e*x+2*a*d^3)/e^2/d^2/(e*x+d)^3
```

Maxima [A]
time = 0.27, size = 142, normalized size = 1.21

$$\frac{1}{6}\,bn\left(\frac{x}{dx^2e^3+2\,d^2xe^2+d^3e}-\frac{e^{(-2)}\log\left(xe+d\right)}{d^2}+\frac{e^{(-2)}\log\left(x\right)}{d^2}\right)-\frac{(3\,xe+d)b\log\left(cx^n\right)}{6\,(x^3e^5+3\,dx^2e^4+3\,d^2xe^3+d^3e^2)}-\frac{(3\,xe+d)a}{6\,(x^3e^5+3\,dx^2e^4+3\,d^2xe^3+d^3e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*b*n*(x/(d*x^2*e^3 + 2*d^2*x*e^2 + d^3*e) - e^(-2)*log(x*e + d)/d^2 + e^
(-2)*log(x)/d^2) - 1/6*(3*x*e + d)*b*log(c*x^n)/(x^3*e^5 + 3*d*x^2*e^4 + 3*
d^2*x*e^3 + d^3*e^2) - 1/6*(3*x*e + d)*a/(x^3*e^5 + 3*d*x^2*e^4 + 3*d^2*x*e
^3 + d^3*e^2)
```

Fricas [A]
time = 0.37, size = 156, normalized size = 1.33

$$\frac{bdnx^2e^2-ad^3+(bd^2n-3\,ad^2)xe-(bnx^3e^3+3\,bdnx^2e^2+3\,bd^2nxe+bd^3n)\log\left(xe+d\right)-(3\,bd^2xe+bd^3)\log\left(c\right)+(bnx^3e^3+3\,bdnx^2e^2)\log\left(x\right)}{6\,(d^2x^3e^5+3\,d^3x^2e^4+3\,d^4xe^3+d^5e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] 1/6*(b*d*n*x^2*e^2 - a*d^3 + (b*d^2*n - 3*a*d^2)*x*e - (b*n*x^3*e^3 + 3*b*d
*n*x^2*e^2 + 3*b*d^2*n*x*e + b*d^3*n)*log(x*e + d) - (3*b*d^2*x*e + b*d^3)*
log(c) + (b*n*x^3*e^3 + 3*b*d*n*x^2*e^2)*log(x))/(d^2*x^3*e^5 + 3*d^3*x^2*e
^4 + 3*d^4*x*e^3 + d^5*e^2)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 661 vs. $2(112) = 224$.
time = 6.02, size = 661, normalized size = 5.65

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log\left(cx^n\right)}{2x^2}\right) & \text{for } d=0\wedge e=0\\ \frac{\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log\left(cx^n\right)}{2}}{d^4} & \text{for } e=0\\ \frac{-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log\left(cx^n\right)}{2x^2}}{e^4} & \text{for } d=0\\ -\frac{ad^3}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}-\frac{3ad^2ex}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}-\frac{bd^3n\log\left(\frac{d}{e}+x\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}-\frac{3bd^2enx\log\left(\frac{d}{e}+x\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}+\frac{bd^2enx}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}-\frac{3bde^2nx^2\log\left(\frac{d}{e}+x\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}+\frac{bde^2nx^2}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}+\frac{3bde^2x^2\log\left(cx^n\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}-\frac{be^3nx^3\log\left(\frac{d}{e}+x\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3}+\frac{be^3x^3\log\left(cx^n\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

```
[Out] Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d,
 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**4, Eq(e
, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**4, Eq(d, 0
)), (-a*d**3/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**
5*x**3) - 3*a*d**2*e*x/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 +
6*d**2*e**5*x**3) - b*d**3*n*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 1
8*d**3*e**4*x**2 + 6*d**2*e**5*x**3) - 3*b*d**2*e*n*x*log(d/e + x)/(6*d**5*
e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) + b*d**2*e*n*
x/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) - 3
*b*d*e**2*n*x**2*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*
x**2 + 6*d**2*e**5*x**3) + b*d*e**2*n*x**2/(6*d**5*e**2 + 18*d**4*e**3*x +
18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) + 3*b*d*e**2*x**2*log(c*x**n)/(6*d**5
*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) - b*e**3*n*x
**3*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2
*e**5*x**3) + b*e**3*x**3*log(c*x**n)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d*
*3*e**4*x**2 + 6*d**2*e**5*x**3), True))
```

Giac [A]
time = 4.00, size = 176, normalized size = 1.50

$$-\frac{bnx^3e^3\log(xe+d)+3\,bdnx^2e^2\log(xe+d)+3\,bd^2nxe\log(xe+d)-bnx^3e^3\log(x)-3\,bdnx^2e^2\log(x)-bdnx^2e^2-bd^2nxe+bd^3n\log(xe+d)+3\,bd^2xe\log(c)+3\,ad^2xe+bd^3\log(c)+ad^3}{6\left(d^2x^3e^5+3\,d^3x^2e^4+3\,d^4xe^3+d^5e^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] -1/6*(b*n*x^3*e^3*log(x*e + d) + 3*b*d*n*x^2*e^2*log(x*e + d) + 3*b*d^2*n*x
*e*log(x*e + d) - b*n*x^3*e^3*log(x) - 3*b*d*n*x^2*e^2*log(x) - b*d*n*x^2*e
^2 - b*d^2*n*x*e + b*d^3*n*log(x*e + d) + 3*b*d^2*x*e*log(c) + 3*a*d^2*x*e
+ b*d^3*log(c) + a*d^3)/(d^2*x^3*e^5 + 3*d^3*x^2*e^4 + 3*d^4*x*e^3 + d^5*e^
2)
```

Mupad [B]
time = 3.86, size = 141, normalized size = 1.21

$$-\frac{a\,d+x\,\left(3\,a\,e-b\,e\,n\right)-\frac{b\,e^2\,n\,x^2}{d}}{6\,d^3\,e^2+18\,d^2\,e^3\,x+18\,d\,e^4\,x^2+6\,e^5\,x^3}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{6\,e^2}+\frac{b\,x}{2\,e}\right)}{d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^2\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

```
[Out] - (a*d + x*(3*a*e - b*e*n) - (b*e^2*n*x^2)/d)/(6*d^3*e^2 + 6*e^5*x^3 + 18*d
^2*e^3*x + 18*d*e^4*x^2) - (log(c*x^n)*((b*d)/(6*e^2) + (b*x)/(2*e)))/(d^3
+ e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x) - (b*n*atanh((2*e*x)/d + 1))/(3*d^2*e^
2)
```

3.58 $\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx$

Optimal. Leaf size=95

$$\frac{bn}{6de(d+ex)^2}+\frac{bn}{3d^2e(d+ex)}+\frac{bn\log(x)}{3d^3e}-\frac{a+b\log\left(cx^n\right)}{3e(d+ex)^3}-\frac{bn\log(d+ex)}{3d^3e}$$

```
[Out] 1/6*b*n/d/e/(e*x+d)^2+1/3*b*n/d^2/e/(e*x+d)+1/3*b*n*ln(x)/d^3/e+1/3*(-a-b*l
n(c*x^n))/e/(e*x+d)^3-1/3*b*n*ln(e*x+d)/d^3/e
```

Rubi [A]
time = 0.03, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2356, 46}

$$-\frac{a+b\log\left(cx^n\right)}{3e(d+ex)^3}+\frac{bn\log(x)}{3d^3e}-\frac{bn\log(d+ex)}{3d^3e}+\frac{bn}{3d^2e(d+ex)}+\frac{bn}{6de(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x)^4,x]
```

```
[Out] (b*n)/(6*d*e*(d + e*x)^2) + (b*n)/(3*d^2*e*(d + e*x)) + (b*n*Log[x])/(3*d^3
*e) - (a + b*Log[c*x^n])/(3*e*(d + e*x)^3) - (b*n*Log[d + e*x])/(3*d^3*e)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^4}\,dx &= -\frac{a+b\log\left(cx^n\right)}{3e(d+ex)^3}+\frac{(bn)\int \frac{1}{x(d+ex)^3}\,dx}{3e} \\
&= -\frac{a+b\log\left(cx^n\right)}{3e(d+ex)^3}+\frac{(bn)\int \left(\frac{1}{d^3x}-\frac{e}{d(d+ex)^3}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d^3(d+ex)}\right)dx}{3e} \\
&= \frac{bn}{6de(d+ex)^2}+\frac{bn}{3d^2e(d+ex)}+\frac{bn\log(x)}{3d^3e}-\frac{a+b\log\left(cx^n\right)}{3e(d+ex)^3}-\frac{bn\log(d+ex)}{3d^3e}
\end{aligned}
$$

Mathematica [A]
time = 0.05, size = 66, normalized size = 0.69

$$
\frac{-\frac{a+b\log(cx^n)}{(d+ex)^3}+\frac{bn\left(\frac{d(3d+2ex)}{(d+ex)^2}+2\log(x)-2\log(d+ex)\right)}{2d^3}}{3e}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x)^4,x]
```

```
[Out] (-((a + b*Log[c*x^n])/(d + e*x)^3) + (b*n*((d*(3*d + 2*e*x))/(d + e*x)^2 +
2*Log[x] - 2*Log[d + e*x]))/(2*d^3))/(3*e)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 284, normalized size = 2.99

method	result
risch	$-\frac{b\ln(x^n)}{3e(ex+d)^3}-\frac{-2\ln(-x)b\,e^3n\,x^3+2\ln(ex+d)b\,e^3n\,x^3+i\pi b\,d^3\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-i\pi b\,d^3\mathrm{csgn}(ic\,x^n)^3-i\pi b\,d^3\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)c}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b/e/(e*x+d)^3*ln(x^n)-1/6*(-2*ln(-x)*b*e^3*n*x^3+2*ln(e*x+d)*b*e^3*n*x
^3+I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d^3*csgn(I*c*x^n)^3-I*Pi*b*d
^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)
^2-6*ln(-x)*b*d*e^2*n*x^2+6*ln(e*x+d)*b*d*e^2*n*x^2-6*ln(-x)*b*d^2*e*n*x+6*
ln(e*x+d)*b*d^2*e*n*x-2*b*d*e^2*n*x^2-2*ln(-x)*b*d^3*n+2*ln(e*x+d)*b*d^3*n-
5*b*d^2*e*n*x+2*d^3*b*ln(c)-3*b*d^3*n+2*a*d^3)/d^3/e/(e*x+d)^3
```

Maxima [A]
time = 0.27, size = 139, normalized size = 1.46

$$
\frac{1}{6}\,bn\left(\frac{2\,xe+3\,d}{d^2x^2e^3+2\,d^3xe^2+d^4e}-\frac{2\,e^{(-1)}\log\left(xe+d\right)}{d^3}+\frac{2\,e^{(-1)}\log\left(x\right)}{d^3}\right)-\frac{b\log\left(cx^n\right)}{3\,\left(x^3e^4+3\,dx^2e^3+3\,d^2xe^2+d^3e\right)}-\frac{a}{3\,\left(x^3e^4+3\,dx^2e^3+3\,d^2xe^2+d^3e\right)}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*b*n*((2*x*e + 3*d)/(d^2*x^2*e^3 + 2*d^3*x*e^2 + d^4*e) - 2*e^(-1)*log(x
*e + d)/d^3 + 2*e^(-1)*log(x)/d^3) - 1/3*b*log(c*x^n)/(x^3*e^4 + 3*d*x^2*e^
3 + 3*d^2*x*e^2 + d^3*e) - 1/3*a/(x^3*e^4 + 3*d*x^2*e^3 + 3*d^2*x*e^2 + d^3
*e)
```

Fricas [A]
time = 0.37, size = 157, normalized size = 1.65

$$\frac{2\,bdnx^2e^2+5\,bd^2nxe+3\,bd^3n-2\,bd^3\log\left(c\right)-2\,ad^3-2\left(bnx^3e^3+3\,bdnx^2e^2+3\,bd^2nxe+bd^3n\right)\log\left(xe+d\right)+2\left(bnx^3e^3+3\,bdnx^2e^2+3\,bd^2nxe\right)\log\left(x\right)}{6\left(d^3x^3e^4+3\,d^4x^2e^3+3\,d^5xe^2+d^6e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] 1/6*(2*b*d*n*x^2*e^2 + 5*b*d^2*n*x*e + 3*b*d^3*n - 2*b*d^3*log(c) - 2*a*d^3
 - 2*(b*n*x^3*e^3 + 3*b*d*n*x^2*e^2 + 3*b*d^2*n*x*e + b*d^3*n)*log(x*e + d)
 + 2*(b*n*x^3*e^3 + 3*b*d*n*x^2*e^2 + 3*b*d^2*n*x*e)*log(x))/(d^3*x^3*e^4 +
 3*d^4*x^2*e^3 + 3*d^5*x*e^2 + d^6*e)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 700 vs. $2(83) = 166$.
time = 6.00, size = 700, normalized size = 7.37

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{3x^3}-\frac{bn}{9x^3}-\frac{b\log\left(cx^n\right)}{3x^3}\right) & \text{for}\: d=0\wedge e=0 \\ \frac{-\frac{a}{3x^3}-\frac{bn}{9x^3}-\frac{b\log\left(cx^n\right)}{3x^3}}{e^4} & \text{for}\: d=0 \\ \frac{ax-bnx+bx\log\left(cx^n\right)}{d^4} & \text{for}\: e=0 \\ -\frac{2ad^3}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}-\frac{2bd^3n\log\left(\frac{d}{e}+x\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}+\frac{3bd^3n}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}-\frac{6bd^2enx\log\left(\frac{d}{e}+x\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}+\frac{5bd^2enx}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}+\frac{6bd^2ex\log\left(cx^n\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}-\frac{6bde^2nx^2\log\left(\frac{d}{e}+x\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}+\frac{2bde^2nx^2}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}+\frac{6bde^2x^2\log\left(cx^n\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}-\frac{2be^3nx^3\log\left(\frac{d}{e}+x\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3}+\frac{2be^3x^3\log\left(cx^n\right)}{6d^6e+18d^5e^2x+18d^4e^3x^2+6d^3e^4x^3} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d)**4,x)
```

```
[Out] Piecewise((zoo*(-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3)), Eq(d,
 0) & Eq(e, 0)), ((-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3))/e**
4, Eq(d, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**4, Eq(e, 0)), (-2*a*d**3/
(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 2*b*d*
*3*n*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e
**4*x**3) + 3*b*d**3*n/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d
**3*e**4*x**3) - 6*b*d**2*e*n*x*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 1
8*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 5*b*d**2*e*n*x/(6*d**6*e + 18*d**5*e
**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 6*b*d**2*e*x*log(c*x**n)/(6
*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 6*b*d*e*
*2*n*x**2*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d
**3*e**4*x**3) + 2*b*d*e**2*n*x**2/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**
3*x**2 + 6*d**3*e**4*x**3) + 6*b*d*e**2*x**2*log(c*x**n)/(6*d**6*e + 18*d**
5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 2*b*e**3*n*x**3*log(d/e
```

```
+ x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 2
*b*e**3*x**3*log(c*x**n)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6
*d**3*e**4*x**3), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 179 vs. $2(84) = 168$.
time = 3.80, size = 179, normalized size = 1.88

$$-\frac{2\,bnx^3e^3\log\left(xe+d\right)+6\,bdnx^2e^2\log\left(xe+d\right)+6\,bd^2nxe\log\left(xe+d\right)-2\,bnx^3e^3\log\left(x\right)-6\,bdnx^2e^2\log\left(x\right)-6\,bd^2nxe\log\left(x\right)-2\,bdnx^2e^2-5\,bd^2nxe+2\,bd^3n\log\left(xe+d\right)-3\,bd^3n+2\,bd^3\log\left(c\right)+2\,ad^3}{6\,\left(d^3x^3e^4+3\,d^4x^2e^3+3\,d^5xe^2+d^6e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] -1/6*(2*b*n*x^3*e^3*log(x*e + d) + 6*b*d*n*x^2*e^2*log(x*e + d) + 6*b*d^2*n
*x*e*log(x*e + d) - 2*b*n*x^3*e^3*log(x) - 6*b*d*n*x^2*e^2*log(x) - 6*b*d^2
*n*x*e*log(x) - 2*b*d*n*x^2*e^2 - 5*b*d^2*n*x*e + 2*b*d^3*n*log(x*e + d) -
3*b*d^3*n + 2*b*d^3*log(c) + 2*a*d^3)/(d^3*x^3*e^4 + 3*d^4*x^2*e^3 + 3*d^5*
x*e^2 + d^6*e)
```

Mupad [B]
time = 3.85, size = 127, normalized size = 1.34

$$\frac{\frac{3\,b\,n}{2}-a+\frac{b\,e^2\,n\,x^2}{d^2}+\frac{5\,b\,e\,n\,x}{2\,d}}{3\,d^3\,e+9\,d^2\,e^2\,x+9\,d\,e^3\,x^2+3\,e^4\,x^3}-\frac{b\,\ln\left(c\,x^n\right)}{3\,e\,\left(d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3\right)}-\frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^3\,e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x)^4,x)
```

```
[Out] ((3*b*n)/2 - a + (b*e^2*n*x^2)/d^2 + (5*b*e*n*x)/(2*d))/(3*d^3*e + 3*e^4*x^
3 + 9*d^2*e^2*x + 9*d*e^3*x^2) - (b*log(c*x^n))/(3*e*(d^3 + e^3*x^3 + 3*d*e
^2*x^2 + 3*d^2*e*x)) - (2*b*n*atanh((2*e*x)/d + 1))/(3*d^3*e)
```

3.59 $\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$

Optimal. Leaf size=174

$$-\frac{bn}{6d^2(d+ex)^2}-\frac{5bn}{6d^3(d+ex)}-\frac{5bn\log(x)}{6d^4}+\frac{a+b\log(cx^n)}{3d(d+ex)^3}+\frac{a+b\log(cx^n)}{2d^2(d+ex)^2}-\frac{ex(a+b\log(cx^n))}{d^4(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right.}{}$$

```
[Out] -1/6*b*n/d^2/(e*x+d)^2-5/6*b*n/d^3/(e*x+d)-5/6*b*n*ln(x)/d^4+1/3*(a+b*ln(c*
x^n))/d/(e*x+d)^3+1/2*(a+b*ln(c*x^n))/d^2/(e*x+d)^2-e*x*(a+b*ln(c*x^n))/d^4
/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^4+11/6*b*n*ln(e*x+d)/d^4+b*n*polylog
(2,-d/e/x)/d^4
```

Rubi [A]
time = 0.21, antiderivative size = 174, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2389, 2379, 2438, 2351, 31, 2356, 46}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}-\frac{ex(a+b\log(cx^n))}{d^4(d+ex)}+\frac{a+b\log(cx^n)}{2d^2(d+ex)^2}+\frac{a+b\log(cx^n)}{3d(d+ex)^3}+\frac{11bn\log(d+ex)}{6d^4}-\frac{5bn\log(x)}{6d^4}-\frac{5bn}{6d^3(d+ex)}-\frac{bn}{6d^2(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x)^4),x]
```

```
[Out] -1/6*(b*n)/(d^2*(d + e*x)^2) - (5*b*n)/(6*d^3*(d + e*x)) - (5*b*n*Log[x])/(
6*d^4) + (a + b*Log[c*x^n])/(3*d*(d + e*x)^3) + (a + b*Log[c*x^n])/(2*d^2*(
d + e*x)^2) - (e*x*(a + b*Log[c*x^n]))/(d^4*(d + e*x)) - (Log[1 + d/(e*x)]*
(a + b*Log[c*x^n]))/d^4 + (11*b*n*Log[d + e*x])/(6*d^4) + (b*n*PolyLog[2, -
(d/(e*x))])/d^4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
```

```
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] && !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx}{d}$$

$$= \frac{a+b\log(cx^n)}{3d(d+ex)^3} + \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{d^2} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{d^2} - \frac{(bn)\int \frac{1}{x(d+ex)^3}\,dx}{3d}$$

$$= \frac{a+b\log(cx^n)}{3d(d+ex)^3} + \frac{a+b\log(cx^n)}{2d^2(d+ex)^2} + \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx}{d^3} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d^3} - \frac{(bn)\int \frac{1}{x(d+e}}{2d^2}$$

$$= -\frac{bn}{6d^2(d+ex)^2} - \frac{bn}{3d^3(d+ex)} - \frac{bn\log(x)}{3d^4} + \frac{a+b\log(cx^n)}{3d(d+ex)^3} + \frac{a+b\log(cx^n)}{2d^2(d+ex)^2} - \frac{ex(}{}$$

$$= -\frac{bn}{6d^2(d+ex)^2} - \frac{5bn}{6d^3(d+ex)} - \frac{5bn\log(x)}{6d^4} + \frac{a+b\log(cx^n)}{3d(d+ex)^3} + \frac{a+b\log(cx^n)}{2d^2(d+ex)^2} - \frac{ex}{}$$

$$= -\frac{bn}{6d^2(d+ex)^2} - \frac{5bn}{6d^3(d+ex)} - \frac{5bn\log(x)}{6d^4} + \frac{a+b\log(cx^n)}{3d(d+ex)^3} + \frac{a+b\log(cx^n)}{2d^2(d+ex)^2} - \frac{ex}{}$$

Mathematica [A]
time = 0.12, size = 222, normalized size = 1.28

$$\frac{\frac{3a^2}{bn} + \frac{2ad^3}{(d+ex)^3} + \frac{3ad^2}{(d+ex)^2} - \frac{bd^2n}{(d+ex)^2} + \frac{6ad}{d+ex} - \frac{5bdn}{d+ex} - 11bn\log(x) + \frac{6a\log(cx^n)}{n} + \frac{2bd^3\log(cx^n)}{(d+ex)^3} + \frac{3bd^2\log(cx^n)}{(d+ex)^2} + \frac{6bd\log(cx^n)}{d+ex} + \frac{3b\log^2(cx^n)}{n} + 11bn\log(d+ex) - 6a\log\left(1+\frac{ex}{d}\right) - 6b\log(cx^n)\log\left(1+\frac{ex}{d}\right) - 6bn\operatorname{Li}_2\left(-\frac{ex}{d}\right)}{6d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^4),x]
```

```
[Out] ((3*a^2)/(b*n) + (2*a*d^3)/(d + e*x)^3 + (3*a*d^2)/(d + e*x)^2 - (b*d^2*n)/
(d + e*x)^2 + (6*a*d)/(d + e*x) - (5*b*d*n)/(d + e*x) - 11*b*n*Log[x] + (6*
a*Log[c*x^n])/n + (2*b*d^3*Log[c*x^n])/(d + e*x)^3 + (3*b*d^2*Log[c*x^n])/(
d + e*x)^2 + (6*b*d*Log[c*x^n])/(d + e*x) + (3*b*Log[c*x^n]^2)/n + 11*b*n*L
og[d + e*x] - 6*a*Log[1 + (e*x)/d] - 6*b*Log[c*x^n]*Log[1 + (e*x)/d] - 6*b*
n*PolyLog[2, -((e*x)/d)])/(6*d^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 884, normalized size = 5.08

method	result	size
risch	Expression too large to display	884

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3/(e*x+d)+1/2*I*b*Pi*csgn
(I*c*x^n)^3/d^4*ln(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/d^3/(e*x+d)-1/2*I*b*Pi
```

```
*csgn(I*c)*csgn(I*c*x^n)^2/d^4*ln(e*x+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/d^2/(e*
x+d)^2-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4*ln(e*x+d)+1/2*I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2/d^4*ln(x)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^
3/(e*x+d)-a/d^4*ln(e*x+d)+a/d^3/(e*x+d)+1/2*a/d^2/(e*x+d)^2+1/3*a/d/(e*x+d)
^3+a/d^4*ln(x)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/(e*x+d)^2
-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*ln(x)+1/2*I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2/d^3/(e*x+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/
(e*x+d)^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*ln(x)+1/2*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*ln(e*x+d)-1/6*I*b*Pi*csgn(I*c*x^n)^3/d/(e*
x+d)^3-1/2*I*b*Pi*csgn(I*c*x^n)^3/d^4*ln(x)+1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x
^n)^2/d/(e*x+d)^3+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(e*x+d)^3-1/6*b*
n/d^2/(e*x+d)^2-5/6*b*n/d^3/(e*x+d)-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)/d/(e*x+d)^3+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/(e*x+d)^2+b*n/
d^4*ln(e*x+d)*ln(-e*x/d)+b*ln(x^n)/d^4*ln(x)-b*ln(x^n)/d^4*ln(e*x+d)+b*ln(x
^n)/d^3/(e*x+d)+1/2*b*ln(x^n)/d^2/(e*x+d)^2+1/3*b*ln(x^n)/d/(e*x+d)^3+b*ln(
c)/d^4*ln(x)-1/2*b*n/d^4*ln(x)^2+b*n/d^4*dilog(-e*x/d)+b*ln(c)/d^3/(e*x+d)+
1/2*b*ln(c)/d^2/(e*x+d)^2+1/3*b*ln(c)/d/(e*x+d)^3-b*ln(c)/d^4*ln(e*x+d)+11/
6*b*n*ln(e*x+d)/d^4-11/6*b*n*ln(x)/d^4
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*a*((6*x^2*e^2 + 15*d*x*e + 11*d^2)/(d^3*x^3*e^3 + 3*d^4*x^2*e^2 + 3*d^5
*x*e + d^6) - 6*log(x*e + d)/d^4 + 6*log(x)/d^4) + b*integrate((log(c) + lo
g(x^n))/(x^5*e^4 + 4*d*x^4*e^3 + 6*d^2*x^3*e^2 + 4*d^3*x^2*e + d^4*x), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^5*e^4 + 4*d*x^4*e^3 + 6*d^2*x^3*e^2 + 4*d^3*
x^2*e + d^4*x), x)
```

Sympy [**A**]
time = 63.80, size = 510, normalized size = 2.93

$$-\frac{ae\left(\begin{cases}\frac{x}{d^4} & \text{for}\ e=0\\-\frac{1}{3e(d+ex)^3} & \text{otherwise}\end{cases}\right)}{d}-\frac{ae\left(\begin{cases}\frac{x}{d^3} & \text{for}\ e=0\\-\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{ae\left(\begin{cases}\frac{x}{d^2} & \text{for}\ e=0\\-\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{d^3}-\frac{ae\left(\begin{cases}\frac{x}{d} & \text{for}\ e=0\\\frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^4}+\frac{a\log(x)}{d^4}-\frac{be^3n\left(\begin{cases}-\frac{1}{e^4x} & \text{for}\ d=0\\-\frac{3d}{6d^2e^3+12de^4x+6e^5x^2}-\frac{4ex}{6d^2e^3+12de^4x+6e^5x^2}-\frac{\log(d+ex)}{3de^3} & \text{otherwise}\end{cases}\right)}{d^3}+\frac{be^3\left(\begin{cases}\frac{1}{e^4x} & \text{for}\ d=0\\-\frac{1}{3d\left(\frac{d}{x}+e\right)^3} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}+\frac{3be^2n\left(\begin{cases}-\frac{1}{e^3x} & \text{for}\ d=0\\-\frac{1}{2de^2+2e^3x}-\frac{\log(d+ex)}{2de^2} & \text{otherwise}\end{cases}\right)}{d^3}-\frac{3be^2\left(\begin{cases}\frac{1}{e^3x} & \text{for}\ d=0\\-\frac{1}{2d\left(\frac{d}{x}+e\right)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}-\frac{3ben\left(\begin{cases}-\frac{1}{e^2x} & \text{for}\ d=0\\-\frac{\log(d^2+dex)}{de} & \text{otherwise}\end{cases}\right)}{d^3}+\frac{3be\left(\begin{cases}\frac{1}{e^2x} & \text{for}\ d=0\\-\frac{1}{\frac{d^2}{x}+de} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}+\frac{bn\left(\begin{cases}-\frac{1}{ex} & \text{for}\ d=0\\\frac{\begin{cases}\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\\log(e)\log(x)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for}\ |x|<1\\-\log(e)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for}\ \frac{1}{|x|}<1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{d^3}-\frac{b\left(\begin{cases}\frac{1}{ex} & \text{for}\ d=0\\\frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d)**4,x)
```

```
[Out] -a*e*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d - a*e*P
iecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**2 - a*e*Piec
ewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**3 - a*e*Piecewise((
x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**4 + a*log(x)/d**4 - b*e**3*n*Pie
cewise((-1/(e**4*x), Eq(d, 0)), (-3*d/(6*d**2*e**3 + 12*d*e**4*x + 6*e**5*x
**2) - 4*e*x/(6*d**2*e**3 + 12*d*e**4*x + 6*e**5*x**2) - log(d + e*x)/(3*d*
e**3), True))/d**3 + b*e**3*Piecewise((1/(e**4*x), Eq(d, 0)), (-1/(3*d*(d/x
 + e)**3), True))*log(c*x**n)/d**3 + 3*b*e**2*n*Piecewise((-1/(e**3*x), Eq(
d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d + e*x)/(2*d*e**2), True))/d**3 -
3*b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)), (-1/(2*d*(d/x + e)**2), True))*l
og(c*x**n)/d**3 - 3*b*e*n*Piecewise((-1/(e**2*x), Eq(d, 0)), (-log(d**2 + d
*e*x)/(d*e), True))/d**3 + 3*b*e*Piecewise((1/(e**2*x), Eq(d, 0)), (-1/(d**
2/x + d*e), True))*log(c*x**n)/d**3 + b*n*Piecewise((-1/(e*x), Eq(d, 0)), (
Piecewise((polylog(2, d*exp_polar(I*pi)/(e*x)), (Abs(x) < 1) & (1/Abs(x) <
1)), (log(e)*log(x) + polylog(2, d*exp_polar(I*pi)/(e*x)), Abs(x) < 1), (-l
og(e)*log(1/x) + polylog(2, d*exp_polar(I*pi)/(e*x)), 1/Abs(x) < 1), (-meij
erg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0,
0)), x)*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x)), True))/d, True))/d**3
 - b*Piecewise((1/(e*x), Eq(d, 0)), (log(d/x + e)/d, True))*log(c*x**n)/d**
3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^4*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^4),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^4), x)
```

3.60 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$

Optimal. Leaf size=211

$$-\frac{bn}{d^4x}+\frac{ben}{6d^3(d+ex)^2}+\frac{4ben}{3d^4(d+ex)}+\frac{4ben\log(x)}{3d^5}-\frac{a+b\log\left(cx^n\right)}{d^4x}-\frac{e(a+b\log\left(cx^n\right))}{3d^2(d+ex)^3}-\frac{e(a+b\log\left(cx^n\right))}{d^3(d+ex)^2}+3$$

```
[Out] -b*n/d^4/x+1/6*b*e*n/d^3/(e*x+d)^2+4/3*b*e*n/d^4/(e*x+d)+4/3*b*e*n*ln(x)/d^
5+(-a-b*ln(c*x^n))/d^4/x-1/3*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^3-e*(a+b*ln(c*x^
n))/d^3/(e*x+d)^2+3*e^2*x*(a+b*ln(c*x^n))/d^5/(e*x+d)+4*e*ln(1+d/e/x)*(a+b*
ln(c*x^n))/d^5-13/3*b*e*n*ln(e*x+d)/d^5-4*b*e*n*polylog(2,-d/e/x)/d^5
```

Rubi [A]
time = 0.23, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {46, 2393, 2341, 2356, 2351, 31, 2379, 2438}

$$-\frac{4ben\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}+\frac{3e^2x(a+b\log\left(cx^n\right))}{d^5(d+ex)}+\frac{4e\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^5}-\frac{a+b\log\left(cx^n\right)}{d^4x}-\frac{e(a+b\log\left(cx^n\right))}{d^3(d+ex)^2}-\frac{e(a+b\log\left(cx^n\right))}{3d^2(d+ex)^3}+\frac{4ben\log(x)}{3d^5}-\frac{13ben\log(d+ex)}{3d^5}+\frac{4ben}{3d^4(d+ex)}-\frac{bn}{d^4x}+\frac{ben}{6d^3(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^4),x]
```

```
[Out] -((b*n)/(d^4*x)) + (b*e*n)/(6*d^3*(d + e*x)^2) + (4*b*e*n)/(3*d^4*(d + e*x)
) + (4*b*e*n*Log[x])/(3*d^5) - (a + b*Log[c*x^n])/(d^4*x) - (e*(a + b*Log[c
*x^n]))/(3*d^2*(d + e*x)^3) - (e*(a + b*Log[c*x^n]))/(d^3*(d + e*x)^2) + (3
*e^2*x*(a + b*Log[c*x^n]))/(d^5*(d + e*x)) + (4*e*Log[1 + d/(e*x)]*(a + b*L
og[c*x^n]))/d^5 - (13*b*e*n*Log[d + e*x])/(3*d^5) - (4*b*e*n*PolyLog[2, -(d
/(e*x))])/d^5
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \left(\frac{a+b\log(cx^n)}{d^4x^2} - \frac{4e(a+b\log(cx^n))}{d^5x} + \frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^4} + \frac{2e^2(a+b\log(cx^n}{d^3(d+ex)^3}\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^4} - \frac{(4e)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^5} + \frac{(4e^2)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^5} + \frac{(3e^2)\int \frac{a+b\log(cx^n)}{(d+ex)^2}}{d^4}$$

$$= -\frac{bn}{d^4x} - \frac{a+b\log(cx^n)}{d^4x} - \frac{e(a+b\log(cx^n))}{3d^2(d+ex)^3} - \frac{e(a+b\log(cx^n))}{d^3(d+ex)^2} + \frac{3e^2x(a+b\log(}{d^5(d+ex)}$$

$$= -\frac{bn}{d^4x} - \frac{a+b\log(cx^n)}{d^4x} - \frac{e(a+b\log(cx^n))}{3d^2(d+ex)^3} - \frac{e(a+b\log(cx^n))}{d^3(d+ex)^2} + \frac{3e^2x(a+b\log(}{d^5(d+ex)}$$

$$= -\frac{bn}{d^4x} + \frac{ben}{6d^3(d+ex)^2} + \frac{4ben}{3d^4(d+ex)} + \frac{4ben\log(x)}{3d^5} - \frac{a+b\log(cx^n)}{d^4x} - \frac{e(a+b\log}{3d^2(d+}$$

Mathematica [A]
time = 0.18, size = 231, normalized size = 1.09

$$\frac{-\frac{6bdn}{x} - \frac{6d(a+b\log(cx^n))}{x} - \frac{2d^3e(a+b\log(cx^n))}{(d+ex)^3} - \frac{6d^2e(a+b\log(cx^n))}{(d+ex)^2} - \frac{18de(a+b\log(cx^n))}{d+ex} - \frac{12e(a+b\log(cx^n))^2}{bn} + ben\left(\frac{d(3d+2ex)}{(d+ex)^2} + 2\log(x) - 2\log(d+ex)\right) + 18ben(\log(x) - \log(d+ex)) + 6ben\left(\frac{d}{d+ex} + \log(x) - \log(d+ex)\right) + 24e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 24ben\text{Li}_2\left(-\frac{ex}{d}\right)}{6d^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^4),x]
```

```
[Out] ((-6*b*d*n)/x - (6*d*(a + b*Log[c*x^n]))/x - (2*d^3*e*(a + b*Log[c*x^n]))/(
d + e*x)^3 - (6*d^2*e*(a + b*Log[c*x^n]))/(d + e*x)^2 - (18*d*e*(a + b*Log[
c*x^n]))/(d + e*x) - (12*e*(a + b*Log[c*x^n])^2)/(b*n) + b*e*n*((d*(3*d + 2
*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) + 18*b*e*n*(Log[x] - Log[d
+ e*x]) + 6*b*e*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) + 24*e*(a + b*Log[c
*x^n])*Log[1 + (e*x)/d] + 24*b*e*n*PolyLog[2, -((e*x)/d)])/(6*d^5)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 1083, normalized size = 5.13

method	result	size
risch	Expression too large to display	1083

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] 4*b*ln(c)/d^5*e*ln(e*x+d)-1/3*b*ln(c)*e/d^2/(e*x+d)^3-3*b*ln(c)*e/d^4/(e*x+
d)-b*ln(c)/d^3*e/(e*x+d)^2-4*b*ln(c)/d^5*e*ln(x)+2*I*b*Pi*csgn(I*c*x^n)^3/d
^5*e*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4/x-2*I*b*Pi*csgn(I*c*x^n
)^3/d^5*e*ln(e*x+d)+3/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^4/(e*x+d)+1/2*I*b*Pi*csg
```

```
n(I*c*x^n)^3/d^3*e/(e*x+d)^2-4*b*n/d^5*e*ln(e*x+d)*ln(-e*x/d)+1/6*I*b*Pi*cs
gn(I*c*x^n)^3*e/d^2/(e*x+d)^3+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^4/x-b*ln(x^n)/d^
3*e/(e*x+d)^2-4*b*ln(x^n)/d^5*e*ln(x)-1/3*b*ln(x^n)*e/d^2/(e*x+d)^3-3*b*ln(
x^n)*e/d^4/(e*x+d)+4*b*ln(x^n)/d^5*e*ln(e*x+d)-3/2*I*b*Pi*csgn(I*c)*csgn(I*
c*x^n)^2*e/d^4/(e*x+d)-1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2/(e*x+d)
^3-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4/x-a/d^4/x-a/d^3*e/(e*x+d)^2-4
*a/d^5*e*ln(x)-1/3*a*e/d^2/(e*x+d)^3+4*a/d^5*e*ln(e*x+d)-3*a*e/d^4/(e*x+d)+
2*b*n/d^5*e*ln(x)^2-4*b*n/d^5*e*dilog(-e*x/d)-b*n/d^4/x+3/2*I*b*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^4/(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)/d^3*e/(e*x+d)^2+1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*e/d^2/(e*x+d)^3-b*ln(x^n)/d^4/x-b*ln(c)/d^4/x-2*I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)/d^5*e*ln(e*x+d)+2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)/d^5*e*ln(x)-2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^5*e*ln(x)+2*I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2/d^5*e*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)/d^4/x-1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2/(e*x+d)^3-2*I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^5*e*ln(x)+2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2/d^5*e*ln(e*x+d)+13/3*b*e*n*ln(x)/d^5-13/3*b*e*n*ln(e*x+d)/d^5-1/2*I*b
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*e/(e*x+d)^2-3/2*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2*e/d^4/(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e/(e*x+d
)^2+1/6*b*e*n/d^3/(e*x+d)^2+4/3*b*e*n/d^4/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] -1/3*a*((12*x^3*e^3 + 30*d*x^2*e^2 + 22*d^2*x*e + 3*d^3)/(d^4*x^4*e^3 + 3*d
^5*x^3*e^2 + 3*d^6*x^2*e + d^7*x) - 12*e*log(x*e + d)/d^5 + 12*e*log(x)/d^5
) + b*integrate((log(c) + log(x^n))/(x^6*e^4 + 4*d*x^5*e^3 + 6*d^2*x^4*e^2
+ 4*d^3*x^3*e + d^4*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^6*e^4 + 4*d*x^5*e^3 + 6*d^2*x^4*e^2 + 4*d^3*
x^3*e + d^4*x^2), x)
```

Sympy [A]
time = 65.60, size = 614, normalized size = 2.91

$$\frac{ae^{2}\left(\begin{cases}\frac{x}{d^{4}} & \text{for}\: e = 0\\-\frac{1}{3e\left(d+ex\right)^{3}} & \text{otherwise}\end{cases}\right)}{d^{2}} + \frac{2ae^{2}\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e = 0\\-\frac{1}{2e\left(d+ex\right)^{2}} & \text{otherwise}\end{cases}\right)}{d^{3}} + \frac{3ae^{2}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)}{d^{4}} - \frac{a}{d^{4}x} + \frac{4ae^{2}\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log\left(d+ex\right)}{e} & \text{otherwise}\end{cases}\right)}{d^{5}} - \frac{4ae\log\left(x\right)}{d^{5}} - \frac{be^{2}n\left(\begin{cases}\frac{x}{d^{4}} & \text{for}\: e = 0\\-\frac{3d}{6d^{4}e+12d^{3}e^{2}x+6d^{2}e^{3}x^{2}} - \frac{2ex}{6d^{4}e+12d^{3}e^{2}x+6d^{2}e^{3}x^{2}} - \frac{\log\left(x\right)}{3d^{3}e} + \frac{\log\left(\frac{d}{e}+x\right)}{3d^{3}e} & \text{otherwise}\end{cases}\right)}{d^{2}} + \frac{be^{2}\left(\begin{cases}\frac{x}{d^{4}} & \text{for}\: e = 0\\-\frac{1}{3e\left(d+ex\right)^{3}} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{2}} - \frac{2be^{2}n\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e = 0\\-\frac{1}{2d^{2}e+2de^{2}x} - \frac{\log\left(x\right)}{2d^{2}e} + \frac{\log\left(\frac{d}{e}+x\right)}{2d^{2}e} & \text{otherwise}\end{cases}\right)}{d^{3}} + \frac{2be^{2}\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e = 0\\-\frac{1}{2e\left(d+ex\right)^{2}} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{3}} - \frac{3be^{2}n\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{\log\left(x\right)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{d^{4}} + \frac{3be^{2}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{4}} - \frac{bn}{d^{4}x} - \frac{b\log\left(cx^{n}\right)}{d^{4}x} - \frac{4be^{2}n\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\begin{cases}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1\\\log\left(d\right)\log\left(x\right) - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \left|x\right| < 1\\-\log\left(d\right)\log\left(\frac{1}{x}\right) - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| x\right)\log\left(d\right) + G_{2,2}^{0,2}\left(\begin{matrix}1, 1 & \\ & 0, 0\end{matrix} \middle| x\right)\log\left(d\right) - \operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^{5}} + \frac{4be^{2}\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log\left(d+ex\right)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{5}} + \frac{2ben\log\left(x\right)^{2}}{d^{5}} - \frac{4be\log\left(x\right)\log\left(cx^{n}\right)}{d^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**4,x)
```

```
[Out] a*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**2 +
2*a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**3
+ 3*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**4 -
a/(d**4*x) + 4*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d*
*5 - 4*a*e*log(x)/d**5 - b*e**2*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6*d*
*4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*
x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), True))
/d**2 + b*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))
*log(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e
+ 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/d**3 +
2*b*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c
*x**n)/d**3 - 3*b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log
(d/e + x)/(d*e), True))/d**4 + 3*b*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(
d*e + e**2*x), True))*log(c*x**n)/d**4 - b*n/(d**4*x) - b*log(c*x**n)/(d**4
*x) - 4*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp
_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2
, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*e
xp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*
log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp
_polar(I*pi)/d), True))/e, True))/d**5 + 4*b*e**2*Piecewise((x/d, Eq(e, 0))
, (log(d + e*x)/e, True))*log(c*x**n)/d**5 + 2*b*e*n*log(x)**2/d**5 - 4*b*e
*log(x)*log(c*x**n)/d**5
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^4*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x\right)}^4} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^4),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^4), x)
```

3.61 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$

Optimal. Leaf size=263

$$-\frac{bn}{4d^4x^2}+\frac{4ben}{d^5x}-\frac{be^2n}{6d^4(d+ex)^2}-\frac{11be^2n}{6d^5(d+ex)}-\frac{11be^2n\log(x)}{6d^6}-\frac{a+b\log(cx^n)}{2d^4x^2}+\frac{4e(a+b\log(cx^n))}{d^5x}+\frac{e^2(a+b}{3d^3(a}$$

```
[Out] -1/4*b*n/d^4/x^2+4*b*e*n/d^5/x-1/6*b*e^2*n/d^4/(e*x+d)^2-11/6*b*e^2*n/d^5/(
e*x+d)-11/6*b*e^2*n*ln(x)/d^6+1/2*(-a-b*ln(c*x^n))/d^4/x^2+4*e*(a+b*ln(c*x^
n))/d^5/x+1/3*e^2*(a+b*ln(c*x^n))/d^3/(e*x+d)^3+3/2*e^2*(a+b*ln(c*x^n))/d^4
/(e*x+d)^2-6*e^3*x*(a+b*ln(c*x^n))/d^6/(e*x+d)-10*e^2*ln(1+d/e/x)*(a+b*ln(c
*x^n))/d^6+47/6*b*e^2*n*ln(e*x+d)/d^6+10*b*e^2*n*polylog(2,-d/e/x)/d^6
```

Rubi [A]
time = 0.28, antiderivative size = 263, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.381, Rules used = {46, 2393, 2341, 2356, 2351, 31, 2379, 2438}

$$\frac{10be^2n\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^6}-\frac{6e^3x(a+b\log(cx^n))}{d^6(d+ex)}-\frac{10e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^6}+\frac{4e(a+b\log(cx^n))}{d^5x}+\frac{3e^2(a+b\log(cx^n))}{2d^4(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^4x^2}+\frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3}-\frac{11be^2n\log(x)}{6d^6}+\frac{47be^2n\log(d+ex)}{6d^6}-\frac{11be^2n}{6d^5(d+ex)}+\frac{4ben}{d^5x}-\frac{be^2n}{6d^4(d+ex)^2}-\frac{bn}{4d^4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^4),x]
```

```
[Out] -1/4*(b*n)/(d^4*x^2) + (4*b*e*n)/(d^5*x) - (b*e^2*n)/(6*d^4*(d + e*x)^2) -
(11*b*e^2*n)/(6*d^5*(d + e*x)) - (11*b*e^2*n*Log[x])/(6*d^6) - (a + b*Log[c
*x^n])/(2*d^4*x^2) + (4*e*(a + b*Log[c*x^n]))/(d^5*x) + (e^2*(a + b*Log[c*x
^n]))/(3*d^3*(d + e*x)^3) + (3*e^2*(a + b*Log[c*x^n]))/(2*d^4*(d + e*x)^2)
- (6*e^3*x*(a + b*Log[c*x^n]))/(d^6*(d + e*x)) - (10*e^2*Log[1 + d/(e*x)]*(
a + b*Log[c*x^n]))/d^6 + (47*b*e^2*n*Log[d + e*x])/(6*d^6) + (10*b*e^2*n*Po
lyLog[2, -(d/(e*x))])/d^6
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = \int \left(\frac{a+b\log(cx^n)}{d^4x^3} - \frac{4e(a+b\log(cx^n))}{d^5x^2} + \frac{10e^2(a+b\log(cx^n))}{d^6x} - \frac{e^3(a+b\log(cx}{d^3(d+ex)^4}\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d^4} - \frac{(4e)\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^5} + \frac{(10e^2)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^6} - \frac{(10e^3)\int \frac{a+b\log(cx^n}{d+ex}}{d^6}$$

$$= -\frac{bn}{4d^4x^2} + \frac{4ben}{d^5x} - \frac{a+b\log(cx^n)}{2d^4x^2} + \frac{4e(a+b\log(cx^n))}{d^5x} + \frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3} + \frac{3e^2}{}$$

$$= -\frac{bn}{4d^4x^2} + \frac{4ben}{d^5x} - \frac{a+b\log(cx^n)}{2d^4x^2} + \frac{4e(a+b\log(cx^n))}{d^5x} + \frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3} + \frac{3e^2}{}$$

$$= -\frac{bn}{4d^4x^2} + \frac{4ben}{d^5x} - \frac{be^2n}{6d^4(d+ex)^2} - \frac{11be^2n}{6d^5(d+ex)} - \frac{11be^2n\log(x)}{6d^6} - \frac{a+b\log(cx^n)}{2d^4x^2} +$$

Mathematica [A]
time = 0.22, size = 276, normalized size = 1.05

$$\frac{-\frac{3bd^2n}{x^2} + \frac{48bden}{x} - \frac{18bde^2n}{d+ex} - \frac{2bde^2n(3d+2ex)}{(d+ex)^2} - 22be^2n\log(x) - \frac{6d^2(a+b\log(cx^n))}{x^2} + \frac{48de(a+b\log(cx^n))}{x} + \frac{4d^3e^2(a+b\log(cx^n))}{(d+ex)^3} + \frac{18d^2e^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{72de^2(a+b\log(cx^n))}{d+ex} + \frac{60e^2(a+b\log(cx^n))^2}{bn} - 72be^2n(\log(x)-\log(d+ex)) + 22be^2n\log(d+ex) - 120e^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 120be^2n\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{12d^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^4),x]
```

```
[Out] ((-3*b*d^2*n)/x^2 + (48*b*d*e*n)/x - (18*b*d*e^2*n)/(d + e*x) - (2*b*d*e^2*
n*(3*d + 2*e*x))/(d + e*x)^2 - 22*b*e^2*n*Log[x] - (6*d^2*(a + b*Log[c*x^n]
))/x^2 + (48*d*e*(a + b*Log[c*x^n]))/x + (4*d^3*e^2*(a + b*Log[c*x^n]))/(d
+ e*x)^3 + (18*d^2*e^2*(a + b*Log[c*x^n]))/(d + e*x)^2 + (72*d*e^2*(a + b*L
og[c*x^n]))/(d + e*x) + (60*e^2*(a + b*Log[c*x^n])^2)/(b*n) - 72*b*e^2*n*(L
og[x] - Log[d + e*x]) + 22*b*e^2*n*Log[d + e*x] - 120*e^2*(a + b*Log[c*x^n]
)*Log[1 + (e*x)/d] - 120*b*e^2*n*PolyLog[2, -((e*x)/d)])/(12*d^6)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 1324, normalized size = 5.03

method	result	size
risch	Expression too large to display	1324

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*a/d^4/x^2+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4/x^2-1/4*I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4/x^2-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n
)^2/d^4/x^2+47/6*b*e^2*n*ln(e*x+d)/d^6+1/4*I*b*Pi*csgn(I*c*x^n)^3/d^4/x^2-1
```

```
0*a/d^6*e^2*ln(e*x+d)+6*a*e^2/d^5/(e*x+d)+3/2*a/d^4*e^2/(e*x+d)^2+1/3*a*e^2
/d^3/(e*x+d)^3+10*a/d^6*e^2*ln(x)+4*a/d^5*e/x+10*b*n/d^6*e^2*ln(e*x+d)*ln(-
e*x/d)+10*b*ln(c)/d^6*e^2*ln(x)+6*b*ln(c)*e^2/d^5/(e*x+d)+3/2*b*ln(c)/d^4*e
^2/(e*x+d)^2-10*b*ln(c)/d^6*e^2*ln(e*x+d)+1/3*b*ln(c)*e^2/d^3/(e*x+d)^3+4*b
*ln(c)/d^5*e/x-1/4*b*n/d^4/x^2-1/6*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3/(e*x+d)^3
-3/4*I*b*Pi*csgn(I*c*x^n)^3/d^4*e^2/(e*x+d)^2-3*I*b*Pi*csgn(I*c*x^n)^3*e^2/
d^5/(e*x+d)-3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^5/(e*x+d)-1/
2*b*ln(c)/d^4/x^2-3/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*e^2/(e
*x+d)^2-5*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^6*e^2*ln(x)-2*I*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^5*e/x-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)*e^2/d^3/(e*x+d)^3+5*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)/d^6*e^2*ln(e*x+d)-5*I*b*Pi*csgn(I*c*x^n)^3/d^6*e^2*ln(x)-10*b*ln(x^n)/
d^6*e^2*ln(e*x+d)+6*b*ln(x^n)*e^2/d^5/(e*x+d)+3/2*b*ln(x^n)/d^4*e^2/(e*x+d)
^2+1/3*b*ln(x^n)*e^2/d^3/(e*x+d)^3+5*I*b*Pi*csgn(I*c*x^n)^3/d^6*e^2*ln(e*x+
d)-5*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^6*e^2*ln(e*x+d)+2*I*b*Pi*csgn(I*c
)*csgn(I*c*x^n)^2/d^5*e/x+5*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^6*e^2*ln(x
)-5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^6*e^2*ln(e*x+d)-1/2*b*ln(x^n)/d^4/x^
2+5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^6*e^2*ln(x)+3*I*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2*e^2/d^5/(e*x+d)+3/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4*e^2
/(e*x+d)^2+2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^5*e/x+3*I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2*e^2/d^5/(e*x+d)-47/6*b*e^2*n*ln(x)/d^6+3/4*I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2/d^4*e^2/(e*x+d)^2+1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2
/d^3/(e*x+d)^3+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3/(e*x+d)^3+10*
b*ln(x^n)/d^6*e^2*ln(x)+4*b*ln(x^n)/d^5*e/x-2*I*b*Pi*csgn(I*c*x^n)^3/d^5*e/
x-5*b*n/d^6*e^2*ln(x)^2+10*b*n/d^6*e^2*dilog(-e*x/d)+4*b*e*n/d^5/x-1/6*b*e^
2*n/d^4/(e*x+d)^2-11/6*b*e^2*n/d^5/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*a*((60*x^4*e^4 + 150*d*x^3*e^3 + 110*d^2*x^2*e^2 + 15*d^3*x*e - 3*d^4)/
(d^5*x^5*e^3 + 3*d^6*x^4*e^2 + 3*d^7*x^3*e + d^8*x^2) - 60*e^2*log(x*e + d)
/d^6 + 60*e^2*log(x)/d^6) + b*integrate((log(c) + log(x^n))/(x^7*e^4 + 4*d*
x^6*e^3 + 6*d^2*x^5*e^2 + 4*d^3*x^4*e + d^4*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^7*e^4 + 4*d*x^6*e^3 + 6*d^2*x^5*e^2 + 4*d^3*
x^4*e + d^4*x^3), x)
```

Sympy [A]
time = 69.82, size = 668, normalized size = 2.54

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**4,x)
```

```
[Out] -a*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**3 -
 3*a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**4
 - a/(2*d**4*x**2) - 6*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2
*x), True))/d**5 + 4*a*e/(d**5*x) - 10*a*e**3*Piecewise((x/d, Eq(e, 0)), (l
og(d + e*x)/e, True))/d**6 + 10*a*e**2*log(x)/d**6 + b*e**3*n*Piecewise((x/
d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e
*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log
(d/e + x)/(3*d**3*e), True))/d**3 - b*e**3*Piecewise((x/d**4, Eq(e, 0)), (-
1/(3*e*(d + e*x)**3), True))*log(c*x**n)/d**3 + 3*b*e**3*n*Piecewise((x/d**
3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x
)/(2*d**2*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e
*(d + e*x)**2), True))*log(c*x**n)/d**4 - b*n/(4*d**4*x**2) - b*log(c*x**n)
/(2*d**4*x**2) + 6*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) +
log(d/e + x)/(d*e), True))/d**5 - 6*b*e**3*Piecewise((x/d**2, Eq(e, 0)), (-
1/(d*e + e**2*x), True))*log(c*x**n)/d**5 + 4*b*e*n/(d**5*x) + 4*b*e*log(c*
x**n)/(d**5*x) + 10*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylo
g(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x)
 - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - poly
log(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylo
g(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**6 - 10*b*e**3*Piecewise((x
/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**6 - 5*b*e**2*n*log(x)
**2/d**6 + 10*b*e**2*log(x)*log(c*x**n)/d**6
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^4*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\,{\left(d+e\,x\right)}^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)^4),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)^4), x)
```

3.62 $\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=329

$$\frac{28bdnx}{e^8}-\frac{d(280a+341bn)x}{10e^8}-\frac{7bnx^2}{e^7}-\frac{28bdx\log(cx^n)}{e^8}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^7(8a+bn+8b\log(cx^n))}{30e^2(d+ex)^5}-x^6$$

```
[Out] 28*b*d*n*x/e^8-1/10*d*(341*b*n+280*a)*x/e^8-7*b*n*x^2/e^7-28*b*d*x*ln(c*x^n
)/e^8-1/6*x^8*(a+b*ln(c*x^n))/e/(e*x+d)^6-1/30*x^7*(8*a+b*n+8*b*ln(c*x^n))/
e^2/(e*x+d)^5-1/120*x^6*(56*a+15*b*n+56*b*ln(c*x^n))/e^3/(e*x+d)^4-1/180*x^
5*(168*a+73*b*n+168*b*ln(c*x^n))/e^4/(e*x+d)^3+1/20*x^2*(280*a+341*b*n+280*
b*ln(c*x^n))/e^7-1/360*x^4*(840*a+533*b*n+840*b*ln(c*x^n))/e^5/(e*x+d)^2-1/
90*x^3*(840*a+743*b*n+840*b*ln(c*x^n))/e^6/(e*x+d)+1/10*d^2*(280*a+341*b*n+
280*b*ln(c*x^n))*ln(1+e*x/d)/e^9+28*b*d^2*n*polylog(2,-e*x/d)/e^9
```

Rubi [A]
time = 0.66, antiderivative size = 329, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {2384, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{28bd^2n\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^9}+\frac{d^2\log\left(\frac{ex}{d}+1\right)(280a+280b\log(cx^n)+341bn)}{10e^9}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{90e^6(d+ex)}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{360e^5(d+ex)^2}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{180e^4(d+ex)^3}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{120e^3(d+ex)^4}-\frac{x^7(8a+8b\log(cx^n)+bn)}{30e^2(d+ex)^5}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}+\frac{x^2(280a+280b\log(cx^n)+341bn)}{20e^7}-\frac{dx(280a+341bn)}{10e^8}-\frac{28bdx\log(cx^n)}{e^8}+\frac{28bdnx}{e^8}-\frac{7bnx^2}{e^7}$$

Antiderivative was successfully verified.

```
[In] Int[(x^8*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (28*b*d*n*x)/e^8 - (d*(280*a + 341*b*n)*x)/(10*e^8) - (7*b*n*x^2)/e^7 - (28
*b*d*x*Log[c*x^n])/e^8 - (x^8*(a + b*Log[c*x^n]))/(6*e*(d + e*x)^6) - (x^7*
(8*a + b*n + 8*b*Log[c*x^n]))/(30*e^2*(d + e*x)^5) - (x^6*(56*a + 15*b*n +
56*b*Log[c*x^n]))/(120*e^3*(d + e*x)^4) - (x^5*(168*a + 73*b*n + 168*b*Log[
c*x^n]))/(180*e^4*(d + e*x)^3) + (x^2*(280*a + 341*b*n + 280*b*Log[c*x^n]))
/(20*e^7) - (x^4*(840*a + 533*b*n + 840*b*Log[c*x^n]))/(360*e^5*(d + e*x)^2
) - (x^3*(840*a + 743*b*n + 840*b*Log[c*x^n]))/(90*e^6*(d + e*x)) + (d^2*(2
80*a + 341*b*n + 280*b*Log[c*x^n])*Log[1 + (e*x)/d])/(10*e^9) + (28*b*d^2*n
*PolyLog[2, -((e*x)/d)])/e^9
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \left(-\frac{7d(a+b\log(cx^n))}{e^8} + \frac{x(a+b\log(cx^n))}{e^7} + \frac{d^8(a+b\log(cx^n))}{e^8(d+ex)^7} - \frac{8d^7(a+}{e^8(d}\right.$$

$$= -\frac{(7d)\int(a+b\log(cx^n))\,dx}{e^8} + \frac{(28d^2)\int\frac{a+b\log(cx^n)}{d+ex}\,dx}{e^8} - \frac{(56d^3)\int\frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^8}$$

$$= -\frac{7adx}{e^8} - \frac{bnx^2}{4e^7} + \frac{x^2(a+b\log(cx^n))}{2e^7} - \frac{d^8(a+b\log(cx^n))}{6e^9(d+ex)^6} + \frac{8d^7(a+b\log(cx^n}{5e^9(d+ex)^5}$$

$$= -\frac{7adx}{e^8} + \frac{7bdnx}{e^8} - \frac{bnx^2}{4e^7} - \frac{7bdx\log(cx^n)}{e^8} + \frac{x^2(a+b\log(cx^n))}{2e^7} - \frac{d^8(a+b\log}{6e^9(d+e}$$

$$= -\frac{7adx}{e^8} + \frac{7bdnx}{e^8} - \frac{bnx^2}{4e^7} + \frac{bd^7n}{30e^9(d+ex)^5} - \frac{43bd^6n}{120e^9(d+ex)^4} + \frac{167bd^5n}{90e^9(d+ex)^3} -$$

Mathematica [A]
time = 0.31, size = 403, normalized size = 1.22

$$\frac{-2520adex + 2520bdenx + 180ae^2x^2 - 90be^2nx^2 - \frac{60ad^8}{(d+ex)^6} + \frac{576ad^7}{(d+ex)^5} + \frac{12bd^7n}{(d+ex)^5} - \frac{2520ad^6}{(d+ex)^4} - \frac{129bd^6n}{(d+ex)^4} + \frac{6720ad^5}{(d+ex)^3} + \frac{668bd^5n}{(d+ex)^3} - \frac{12600ad^4}{(d+ex)^2} - \frac{2358bd^4n}{(d+ex)^2} + \frac{20160ad^3}{d+ex} + \frac{7884bd^3n}{d+ex} - 12276bd^2n\log(x) - 2520bdex\log(cx^n) + 180be^2x^2\log(cx^n) - \frac{60bd^8\log(cx^n)}{(d+ex)^6} + \frac{576bd^7\log(cx^n)}{(d+ex)^5} - \frac{2520bd^6\log(cx^n)}{(d+ex)^4} + \frac{6720bd^5\log(cx^n)}{(d+ex)^3} - \frac{12600bd^4\log(cx^n)}{(d+ex)^2} + \frac{20160bd^3\log(cx^n)}{d+ex} + 12276bd^2n\log(d+ex) + 10080ad^2\log\left(1+\frac{ex}{d}\right) + 10080bd^2\log(cx^n)\log\left(1+\frac{ex}{d}\right) + 10080bd^2n\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{360e^9}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^8*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (-2520*a*d*e*x + 2520*b*d*e*n*x + 180*a*e^2*x^2 - 90*b*e^2*n*x^2 - (60*a*d^
8)/(d + e*x)^6 + (576*a*d^7)/(d + e*x)^5 + (12*b*d^7*n)/(d + e*x)^5 - (2520
*a*d^6)/(d + e*x)^4 - (129*b*d^6*n)/(d + e*x)^4 + (6720*a*d^5)/(d + e*x)^3
+ (668*b*d^5*n)/(d + e*x)^3 - (12600*a*d^4)/(d + e*x)^2 - (2358*b*d^4*n)/(d
 + e*x)^2 + (20160*a*d^3)/(d + e*x) + (7884*b*d^3*n)/(d + e*x) - 12276*b*d^
2*n*Log[x] - 2520*b*d*e*x*Log[c*x^n] + 180*b*e^2*x^2*Log[c*x^n] - (60*b*d^8
*Log[c*x^n])/(d + e*x)^6 + (576*b*d^7*Log[c*x^n])/(d + e*x)^5 - (2520*b*d^6
*Log[c*x^n])/(d + e*x)^4 + (6720*b*d^5*Log[c*x^n])/(d + e*x)^3 - (12600*b*d
^4*Log[c*x^n])/(d + e*x)^2 + (20160*b*d^3*Log[c*x^n])/(d + e*x) + 12276*b*d
^2*n*Log[d + e*x] + 10080*a*d^2*Log[1 + (e*x)/d] + 10080*b*d^2*Log[c*x^n]*L
og[1 + (e*x)/d] + 10080*b*d^2*n*PolyLog[2, -((e*x)/d)])/(360*e^9)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 1768, normalized size = 5.37

method	result	size
risch	Expression too large to display	1768

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^8*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -28*b*n/e^9*d^2*ln(e*x+d)*ln(-e*x/d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e
^7*x^2+28/3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^9*d^5/(e*x+d)^3+28/3*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2/e^9*d^5/(e*x+d)^3+56/3*b*ln(x^n)/e^9*d^5/(e*x+d
)^3+28*b*ln(x^n)/e^9*d^2*ln(e*x+d)+8/5*b*ln(x^n)/e^9*d^7/(e*x+d)^5-7*b*ln(x
^n)/e^9*d^6/(e*x+d)^4+35/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^9*d
^4/(e*x+d)^2-28*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^9*d^3/(e*x+d)-
28/3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^9*d^5/(e*x+d)^3-28*I*b*Pi
*csgn(I*c*x^n)^3/e^9*d^3/(e*x+d)+35/2*I*b*Pi*csgn(I*c*x^n)^3/e^9*d^4/(e*x+d
)^2-131/20*b*n/e^9*d^4/(e*x+d)^2+167/90*b*n/e^9*d^5/(e*x+d)^3-43/120*b*n/e^
9*d^6/(e*x+d)^4+1/30*b*n/e^9*d^7/(e*x+d)^5-28*b*n/e^9*d^2*dilog(-e*x/d)-35*
b*ln(x^n)/e^9*d^4/(e*x+d)^2-1/6*b*ln(x^n)*d^8/e^9/(e*x+d)^6-341/10*b*n/e^9*
d^2*ln(e*x)+341/10*b*n/e^9*d^2*ln(e*x+d)+219/10*b*n/e^9*d^3/(e*x+d)+56*a/e^
9*d^3/(e*x+d)-35*a/e^9*d^4/(e*x+d)^2-1/6*a*d^8/e^9/(e*x+d)^6+1/2*a/e^7*x^2-
1/4*I*b*Pi*csgn(I*c*x^n)^3/e^7*x^2-7*a/e^8*d*x+56/3*a/e^9*d^5/(e*x+d)^3+28*
a/e^9*d^2*ln(e*x+d)+8/5*a/e^9*d^7/(e*x+d)^5-7*a/e^9*d^6/(e*x+d)^4-1/4*b*n*x
^2/e^7+1/12*I*b*Pi*csgn(I*c*x^n)^3*d^8/e^9/(e*x+d)^6+1/2*b*ln(c)/e^7*x^2+29
/4*b*n/e^9*d^2-7*b*ln(c)/e^8*d*x+56/3*b*ln(c)/e^9*d^5/(e*x+d)^3+8/5*b*ln(c)
/e^9*d^7/(e*x+d)^5-7*b*ln(c)/e^9*d^6/(e*x+d)^4+56*b*ln(c)/e^9*d^3/(e*x+d)-3
5*b*ln(c)/e^9*d^4/(e*x+d)^2-1/6*b*ln(c)*d^8/e^9/(e*x+d)^6+28*b*ln(c)/e^9*d^
2*ln(e*x+d)+1/12*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^8/e^9/(e*x+d)
^6-14*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^9*d^2*ln(e*x+d)+56*b*ln(
x^n)/e^9*d^3/(e*x+d)+7/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^8*d*x
-4/5*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^9*d^7/(e*x+d)^5+7/2*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^9*d^6/(e*x+d)^4+28*I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2/e^9*d^3/(e*x+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)/e^7*x^2-7/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^8*d*x+14*I*b*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2/e^9*d^2*ln(e*x+d)+14*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^
2/e^9*d^2*ln(e*x+d)+4/5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^9*d^7/(e*x+d)^5-
14*I*b*Pi*csgn(I*c*x^n)^3/e^9*d^2*ln(e*x+d)-4/5*I*b*Pi*csgn(I*c*x^n)^3/e^9*
d^7/(e*x+d)^5+7/2*I*b*Pi*csgn(I*c*x^n)^3/e^9*d^6/(e*x+d)^4+1/4*I*b*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2/e^7*x^2+7/2*I*b*Pi*csgn(I*c*x^n)^3/e^8*d*x-28/3*I*b*
Pi*csgn(I*c*x^n)^3/e^9*d^5/(e*x+d)^3-35/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/
e^9*d^4/(e*x+d)^2-1/12*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^8/e^9/(e*x+d)^6-7
/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^8*d*x-7*b*ln(x^n)/e^8*d*x+1/2*b*ln(
x^n)/e^7*x^2-35/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^9*d^4/(e*x+d)^2-1/12
*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^8/e^9/(e*x+d)^6+4/5*I*b*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2/e^9*d^7/(e*x+d)^5-7/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/
e^9*d^6/(e*x+d)^4-7/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^9*d^6/(e*x+d)^4+28
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^9*d^3/(e*x+d)+7*b*d*n*x/e^8
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/30*(840*d^2*e^(-9)*log(x*e + d) + 15*(x^2*e - 14*d*x)*e^(-8) + (1680*d^3*
x^5*e^5 + 7350*d^4*x^4*e^4 + 13160*d^5*x^3*e^3 + 11970*d^6*x^2*e^2 + 5508*d
^7*x*e + 1023*d^8)/(x^6*e^15 + 6*d*x^5*e^14 + 15*d^2*x^4*e^13 + 20*d^3*x^3*
e^12 + 15*d^4*x^2*e^11 + 6*d^5*x*e^10 + d^6*e^9))*a + b*integrate((x^8*log(
c) + x^8*log(x^n))/(x^7*e^7 + 7*d*x^6*e^6 + 21*d^2*x^5*e^5 + 35*d^3*x^4*e^4
 + 35*d^4*x^3*e^3 + 21*d^5*x^2*e^2 + 7*d^6*x*e + d^7), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] integral((b*x^8*log(c*x^n) + a*x^8)/(x^7*e^7 + 7*d*x^6*e^6 + 21*d^2*x^5*e^5
 + 35*d^3*x^4*e^4 + 35*d^4*x^3*e^3 + 21*d^5*x^2*e^2 + 7*d^6*x*e + d^7), x)
```

Sympy [A]
time = 152.94, size = 1686, normalized size = 5.12

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**8*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] a*d**8*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**8 -
8*a*d**7*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e**8
+ 28*a*d**6*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/e*
*8 - 56*a*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))
/e**8 + 70*a*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), Tru
e))/e**8 - 56*a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True
))/e**8 + 28*a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**8
 - 7*a*d*x/e**8 + a*x**2/(2*e**7) - b*d**8*n*Piecewise((x/d**7, Eq(e, 0)),
(-137*d**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**
7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x/(360
*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1
800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d**10*e
+ 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*
e**5*x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*
e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 +
360*d**5*e**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d
**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x
**5) - log(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True))/e**8 + b*d**8*Pi
```

```
ecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/e**8
 + 8*b*d**7*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7
*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 52
*d**2*e*x/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4
*x**3 + 60*d**4*e**5*x**4) - 42*d*e**2*x**2/(60*d**8*e + 240*d**7*e**2*x +
360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 12*e**3*x**3
/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 6
0*d**4*e**5*x**4) - log(x)/(5*d**5*e) + log(d/e + x)/(5*d**5*e), True))/e**
8 - 8*b*d**7*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))*l
og(c*x**n)/e**8 - 28*b*d**6*n*Piecewise((x/d**5, Eq(e, 0)), (-11*d**2/(24*d
**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - 15*d*e*x/
(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - 6*e*
*2*x**2/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3
) - log(x)/(4*d**4*e) + log(d/e + x)/(4*d**4*e), True))/e**8 + 28*b*d**6*Pi
ecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))*log(c*x**n)/e**8
 + 56*b*d**5*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2
*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**
2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), True))/e**8 - 56*b*d**5*P
iecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**
8 - 70*b*d**4*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) -
 log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**8 + 70*b*d**4*Piece
wise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**8 +
56*b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*
e), True))/e**8 - 56*b*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x
), True))*log(c*x**n)/e**8 - 28*b*d**2*n*Piecewise((x/d, Eq(e, 0)), (Piecew
ise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (l
og(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log
(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log
(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**8 + 28*b*d**2*
Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**8 + 7*b*d
*n*x/e**8 - 7*b*d*x*log(c*x**n)/e**8 - b*n*x**2/(4*e**7) + b*x**2*log(c*x**
n)/(2*e**7)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^8/(x*e + d)^7, x)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^8 (a + b \ln(c x^n))}{(d + e x)^7} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^8*(a + b*log(c*x^n)))/(d + e*x)^7,x)
[Out] int((x^8*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

3.63 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=285

$$-\frac{7bnx}{e^7}+\frac{(140a+223bn)x}{20e^7}+\frac{7bx\log(cx^n)}{e^7}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^6(7a+bn+7b\log(cx^n))}{30e^2(d+ex)^5}-\frac{x^5(42a+13bn+}{120e^3(d}$$

```
[Out] -7*b*n*x/e^7+1/20*(223*b*n+140*a)*x/e^7+7*b*x*ln(c*x^n)/e^7-1/6*x^7*(a+b*ln
(c*x^n))/e/(e*x+d)^6-1/30*x^6*(7*a+b*n+7*b*ln(c*x^n))/e^2/(e*x+d)^5-1/120*x
^5*(42*a+13*b*n+42*b*ln(c*x^n))/e^3/(e*x+d)^4-1/40*x^2*(140*a+153*b*n+140*b
*ln(c*x^n))/e^6/(e*x+d)-1/360*x^4*(210*a+107*b*n+210*b*ln(c*x^n))/e^4/(e*x+
d)^3-1/360*x^3*(420*a+319*b*n+420*b*ln(c*x^n))/e^5/(e*x+d)^2-1/20*d*(140*a+
223*b*n+140*b*ln(c*x^n))*ln(1+e*x/d)/e^8-7*b*d*n*polylog(2,-e*x/d)/e^8
```

Rubi [A]
time = 0.57, antiderivative size = 285, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2384, 45, 2393, 2332, 2354, 2438}

$$-\frac{7bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^8}-\frac{d\log\left(\frac{ex}{d}+1\right)(140a+140b\log(cx^n)+223bn)}{20e^8}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{40e^6(d+ex)}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{360e^5(d+ex)^2}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{360e^4(d+ex)^3}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{120e^3(d+ex)^4}-\frac{x^6(7a+7b\log(cx^n)+bn)}{30e^2(d+ex)^5}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}+\frac{x(140a+223bn)}{20e^7}+\frac{7bx\log(cx^n)}{e^7}-\frac{7bnx}{e^7}$$

Antiderivative was successfully verified.

```
[In] Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (-7*b*n*x)/e^7 + ((140*a + 223*b*n)*x)/(20*e^7) + (7*b*x*Log[c*x^n])/e^7 -
(x^7*(a + b*Log[c*x^n]))/(6*e*(d + e*x)^6) - (x^6*(7*a + b*n + 7*b*Log[c*x^
n]))/(30*e^2*(d + e*x)^5) - (x^5*(42*a + 13*b*n + 42*b*Log[c*x^n]))/(120*e^
3*(d + e*x)^4) - (x^2*(140*a + 153*b*n + 140*b*Log[c*x^n]))/(40*e^6*(d + e*
x)) - (x^4*(210*a + 107*b*n + 210*b*Log[c*x^n]))/(360*e^4*(d + e*x)^3) - (x
^3*(420*a + 319*b*n + 420*b*Log[c*x^n]))/(360*e^5*(d + e*x)^2) - (d*(140*a
+ 223*b*n + 140*b*Log[c*x^n])*Log[1 + (e*x)/d])/(20*e^8) - (7*b*d*n*PolyLog
[2, -((e*x)/d)])/e^8
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \left(\frac{a+b\log(cx^n)}{e^7} - \frac{d^7(a+b\log(cx^n))}{e^7(d+ex)^7} + \frac{7d^6(a+b\log(cx^n))}{e^7(d+ex)^6} - \frac{21d^5(a+b\log(cx^n))}{e^7(d+e\ldots}\right.$$

$$= \frac{\int (a+b\log(cx^n))\,dx}{e^7} - \frac{(7d)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^7} + \frac{(21d^2)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^7} - \frac{(35d^3)\ldots}{}$$

$$= \frac{ax}{e^7} + \frac{d^7(a+b\log(cx^n))}{6e^8(d+ex)^6} - \frac{7d^6(a+b\log(cx^n))}{5e^8(d+ex)^5} + \frac{21d^5(a+b\log(cx^n))}{4e^8(d+ex)^4} - \frac{35d^4\ldots}{3\ldots}$$

$$= \frac{ax}{e^7} - \frac{bnx}{e^7} + \frac{bx\log(cx^n)}{e^7} + \frac{d^7(a+b\log(cx^n))}{6e^8(d+ex)^6} - \frac{7d^6(a+b\log(cx^n))}{5e^8(d+ex)^5} + \frac{21d^5(a\ldots}{4e\ldots}$$

$$= \frac{ax}{e^7} - \frac{bnx}{e^7} - \frac{bd^6n}{30e^8(d+ex)^5} + \frac{37bd^5n}{120e^8(d+ex)^4} - \frac{241bd^4n}{180e^8(d+ex)^3} + \frac{153bd^3n}{40e^8(d+ex\ldots}$$

Mathematica [A]
time = 0.35, size = 356, normalized size = 1.25

$$-\frac{-360aex+360benx-\frac{60ad^7}{(d+ex)^6}+\frac{504ad^6}{(d+ex)^5}+\frac{12bd^6n}{(d+ex)^5}-\frac{1890ad^5}{(d+ex)^4}-\frac{111bd^5n}{(d+ex)^4}+\frac{4200ad^4}{(d+ex)^3}+\frac{482bd^4n}{(d+ex)^3}-\frac{6300ad^3}{(d+ex)^2}-\frac{1377bd^3n}{(d+ex)^2}+\frac{7560ad^2}{d+ex}+\frac{3546bd^2n}{d+ex}-4014bdn\log(x)-360bex\log(cx^n)-\frac{60bd^7\log(cx^n)}{(d+ex)^6}+\frac{504bd^6\log(cx^n)}{(d+ex)^5}-\frac{1890bd^5\log(cx^n)}{(d+ex)^4}+\frac{4200bd^4\log(cx^n)}{(d+ex)^3}-\frac{6300bd^3\log(cx^n)}{(d+ex)^2}+\frac{7560bd^2\log(cx^n)}{d+ex}+4014bdn\log(d+ex)+2520ad\log\left(1+\frac{ex}{d}\right)+2520bd\log(cx^n)\log\left(1+\frac{ex}{d}\right)+2520bdn\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{360e^8}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/360*(-360*a*e*x + 360*b*e*n*x - (60*a*d^7)/(d + e*x)^6 + (504*a*d^6)/(d
+ e*x)^5 + (12*b*d^6*n)/(d + e*x)^5 - (1890*a*d^5)/(d + e*x)^4 - (111*b*d^5
*n)/(d + e*x)^4 + (4200*a*d^4)/(d + e*x)^3 + (482*b*d^4*n)/(d + e*x)^3 - (6
300*a*d^3)/(d + e*x)^2 - (1377*b*d^3*n)/(d + e*x)^2 + (7560*a*d^2)/(d + e*x
) + (3546*b*d^2*n)/(d + e*x) - 4014*b*d*n*Log[x] - 360*b*e*x*Log[c*x^n] - (
60*b*d^7*Log[c*x^n])/(d + e*x)^6 + (504*b*d^6*Log[c*x^n])/(d + e*x)^5 - (18
90*b*d^5*Log[c*x^n])/(d + e*x)^4 + (4200*b*d^4*Log[c*x^n])/(d + e*x)^3 - (6
300*b*d^3*Log[c*x^n])/(d + e*x)^2 + (7560*b*d^2*Log[c*x^n])/(d + e*x) + 401
4*b*d*n*Log[d + e*x] + 2520*a*d*Log[1 + (e*x)/d] + 2520*b*d*Log[c*x^n]*Log[
1 + (e*x)/d] + 2520*b*d*n*PolyLog[2, -((e*x)/d)])/e^8
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 1584, normalized size = 5.56

method	result	size
risch	Expression too large to display	1584

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^7*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] 223/20*b*n/e^8*d*ln(e*x)-223/20*b*n/e^8*d*ln(e*x+d)-197/20*b*n/e^8*d^2/(e*x
+d)+153/40*b*n/e^8*d^3/(e*x+d)^2-241/180*b*n/e^8*d^4/(e*x+d)^3+37/120*b*n/e
^8*d^5/(e*x+d)^4-1/30*b*n/e^8*d^6/(e*x+d)^5+7*b*n/e^8*d*dilog(-e*x/d)+7/10*
I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^8*d^6/(e*x+d)^5-21/8*I*b*Pi*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^8*d^5/(e*x+d)^4+7/10*I*b*Pi*csgn(I*c*x^
n)^3/e^8*d^6/(e*x+d)^5-1/12*I*b*Pi*csgn(I*c*x^n)^3*d^7/e^8/(e*x+d)^6-35/4*I
*b*Pi*csgn(I*c*x^n)^3/e^8*d^3/(e*x+d)^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^
2/e^7*x+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^7*x-1/2*I*b*Pi*csgn(I*c*x^
n)^3/e^7*x+7/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^8*d*ln(e*x+d)+1
/6*b*ln(c)*d^7/e^8/(e*x+d)^6-7*b*ln(c)/e^8*d*ln(e*x+d)-35/3*b*ln(c)/e^8*d^4
/(e*x+d)^3-7/5*b*ln(c)/e^8*d^6/(e*x+d)^5+21/4*b*ln(c)/e^8*d^5/(e*x+d)^4-21*
b*ln(c)/e^8*d^2/(e*x+d)+35/2*b*ln(c)/e^8*d^3/(e*x+d)^2+1/6*a*d^7/e^8/(e*x+d
)^6+35/2*a/e^8*d^3/(e*x+d)^2-35/3*a/e^8*d^4/(e*x+d)^3-7*a/e^8*d*ln(e*x+d)-7
/5*a/e^8*d^6/(e*x+d)^5+21/4*a/e^8*d^5/(e*x+d)^4-21*a/e^8*d^2/(e*x+d)+a/e^7*
x+7*b*n/e^8*d*ln(e*x+d)*ln(-e*x/d)-35/3*b*ln(x^n)/e^8*d^4/(e*x+d)^3-b*n*x/e
^7-7*b*ln(x^n)/e^8*d*ln(e*x+d)-7/5*b*ln(x^n)/e^8*d^6/(e*x+d)^5+21/4*b*ln(x^
n)/e^8*d^5/(e*x+d)^4-21*b*ln(x^n)/e^8*d^2/(e*x+d)+35/2*b*ln(x^n)/e^8*d^3/(e
```

```
*x+d)^2+1/6*b*ln(x^n)*d^7/e^8/(e*x+d)^6+b*ln(x^n)/e^7*x-b*n/e^8*d-35/6*I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^8*d^4/(e*x+d)^3+1/12*I*b*Pi*csgn(I*c)*csgn
(I*c*x^n)^2*d^7/e^8/(e*x+d)^6+35/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^8*d^3
/(e*x+d)^2+21/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^8*d^5/(e*x+d)^4-21/2*I*b
*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^8*d^2/(e*x+d)-21/8*I*b*Pi*csgn(I*c*x^n)^3/e
^8*d^5/(e*x+d)^4+21/2*I*b*Pi*csgn(I*c*x^n)^3/e^8*d^2/(e*x+d)+35/6*I*b*Pi*cs
gn(I*c*x^n)^3/e^8*d^4/(e*x+d)^3+7/2*I*b*Pi*csgn(I*c*x^n)^3/e^8*d*ln(e*x+d)-
21/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^8*d^2/(e*x+d)+35/4*I*b*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2/e^8*d^3/(e*x+d)^2+1/12*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n
)^2*d^7/e^8/(e*x+d)^6-7/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^8*d*ln(e*x+d
)-7/10*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^8*d^6/(e*x+d)^5+b*ln(c)/e^7*x+2
1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^8*d^5/(e*x+d)^4-35/6*I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2/e^8*d^4/(e*x+d)^3-7/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/
e^8*d*ln(e*x+d)-7/10*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^8*d^6/(e*x+d)^5-1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^7*x+21/2*I*b*Pi*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)/e^8*d^2/(e*x+d)-35/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)/e^8*d^3/(e*x+d)^2-1/12*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*d^7/e^8/(e*x+d)^6+35/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^8*d^
4/(e*x+d)^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] -1/60*(420*d*e^(-8)*log(x*e + d) - 60*x*e^(-7) + (1260*d^2*x^5*e^5 + 5250*d
^3*x^4*e^4 + 9100*d^4*x^3*e^3 + 8085*d^5*x^2*e^2 + 3654*d^6*x*e + 669*d^7)/
(x^6*e^14 + 6*d*x^5*e^13 + 15*d^2*x^4*e^12 + 20*d^3*x^3*e^11 + 15*d^4*x^2*e
^10 + 6*d^5*x*e^9 + d^6*e^8))*a + b*integrate((x^7*log(c) + x^7*log(x^n))/(
x^7*e^7 + 7*d*x^6*e^6 + 21*d^2*x^5*e^5 + 35*d^3*x^4*e^4 + 35*d^4*x^3*e^3 +
21*d^5*x^2*e^2 + 7*d^6*x*e + d^7), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] integral((b*x^7*log(c*x^n) + a*x^7)/(x^7*e^7 + 7*d*x^6*e^6 + 21*d^2*x^5*e^5
 + 35*d^3*x^4*e^4 + 35*d^4*x^3*e^3 + 21*d^5*x^2*e^2 + 7*d^6*x*e + d^7), x)
```

Sympy [A]
time = 109.88, size = 1632, normalized size = 5.73

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] -a*d**7*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**7 +
 7*a*d**6*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e**7
 - 21*a*d**5*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/e
**7 + 35*a*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True)
)/e**7 - 35*a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), Tr
ue))/e**7 + 21*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tru
e))/e**7 - 7*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**7 +
a*x/e**7 + b*d**7*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e +
 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e
**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2
*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*
d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600
*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6
*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x
**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*
e**4*x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7
*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e)
+ log(d/e + x)/(6*d**6*e), True))/e**7 - b*d**7*Piecewise((x/d**7, Eq(e, 0)
), (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/e**7 - 7*b*d**6*n*Piecewise((
x/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x
**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 52*d**2*e*x/(60*d**8*e + 24
0*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4
) - 42*d*e**2*x**2/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*
d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 12*e**3*x**3/(60*d**8*e + 240*d**7*e*
*2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - log(x
)/(5*d**5*e) + log(d/e + x)/(5*d**5*e), True))/e**7 + 7*b*d**6*Piecewise((x
/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))*log(c*x**n)/e**7 + 21*b*d*
*5*n*Piecewise((x/d**5, Eq(e, 0)), (-11*d**2/(24*d**6*e + 72*d**5*e**2*x +
72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - 15*d*e*x/(24*d**6*e + 72*d**5*e**2
*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - 6*e**2*x**2/(24*d**6*e + 72*d
**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - log(x)/(4*d**4*e) + l
og(d/e + x)/(4*d**4*e), True))/e**7 - 21*b*d**5*Piecewise((x/d**5, Eq(e, 0)
), (-1/(4*e*(d + e*x)**4), True))*log(c*x**n)/e**7 - 35*b*d**4*n*Piecewise(
(x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) -
2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) +
log(d/e + x)/(3*d**3*e), True))/e**7 + 35*b*d**4*Piecewise((x/d**4, Eq(e, 0
)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**7 + 35*b*d**3*n*Piecewise
```

```
((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(
d/e + x)/(2*d**2*e), True))/e**7 - 35*b*d**3*Piecewise((x/d**3, Eq(e, 0)),
(-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**7 - 21*b*d**2*n*Piecewise((x/
d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**7 + 21*b*d*
*2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**
7 + 7*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_pola
r(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x
*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_po
lar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d
) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_pola
r(I*pi)/d), True))/e, True))/e**7 - 7*b*d*Piecewise((x/d, Eq(e, 0)), (log(d
 + e*x)/e, True))*log(c*x**n)/e**7 - b*n*x/e**7 + b*x*log(c*x**n)/e**7
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^7/(x*e + d)^7, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^7\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^7*(a + b*log(c*x^n)))/(d + e*x)^7,x)
[Out] int((x^7*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

3.64 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=243

$$-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^5(6a+bn+6b\log(cx^n))}{30e^2(d+ex)^5}-\frac{x^2(20a+19bn+20b\log(cx^n))}{40e^5(d+ex)^2}-\frac{x(20a+29bn+20b\log(}{20e^6(d+ex)}$$

```
[Out] -1/6*x^6*(a+b*ln(c*x^n))/e/(e*x+d)^6-1/30*x^5*(6*a+b*n+6*b*ln(c*x^n))/e^2/(
e*x+d)^5-1/40*x^2*(20*a+19*b*n+20*b*ln(c*x^n))/e^5/(e*x+d)^2-1/20*x*(20*a+2
9*b*n+20*b*ln(c*x^n))/e^6/(e*x+d)-1/120*x^4*(30*a+11*b*n+30*b*ln(c*x^n))/e^
3/(e*x+d)^4-1/180*x^3*(60*a+37*b*n+60*b*ln(c*x^n))/e^4/(e*x+d)^3+1/20*(20*a
+49*b*n+20*b*ln(c*x^n))*ln(1+e*x/d)/e^7+b*n*polylog(2,-e*x/d)/e^7
```

Rubi [A]

time = 0.33, antiderivative size = 243, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2384, 2354, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^7}+\frac{\log\left(\frac{ex}{d}+1\right)(20a+20b\log(cx^n)+49bn)}{20e^7}-\frac{x(20a+20b\log(cx^n)+29bn)}{20e^6(d+ex)}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{40e^5(d+ex)^2}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{180e^4(d+ex)^3}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{120e^3(d+ex)^4}-\frac{x^5(6a+6b\log(cx^n)+bn)}{30e^2(d+ex)^5}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

Antiderivative was successfully verified.

```
[In] Int[(x^6*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/6*(x^6*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) - (x^5*(6*a + b*n + 6*b*Log[c
*x^n]))/(30*e^2*(d + e*x)^5) - (x^2*(20*a + 19*b*n + 20*b*Log[c*x^n]))/(40*
e^5*(d + e*x)^2) - (x*(20*a + 29*b*n + 20*b*Log[c*x^n]))/(20*e^6*(d + e*x))
 - (x^4*(30*a + 11*b*n + 30*b*Log[c*x^n]))/(120*e^3*(d + e*x)^4) - (x^3*(60
*a + 37*b*n + 60*b*Log[c*x^n]))/(180*e^4*(d + e*x)^3) + ((20*a + 49*b*n + 2
0*b*Log[c*x^n])*Log[1 + (e*x)/d])/(20*e^7) + (b*n*PolyLog[2, -((e*x)/d)])/e
^7
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx &= \int \left(\frac{d^6(a+b\log(cx^n))}{e^6(d+ex)^7} - \frac{6d^5(a+b\log(cx^n))}{e^6(d+ex)^6} + \frac{15d^4(a+b\log(cx^n))}{e^6(d+ex)^5} - \frac{20d^3(\ldots}{e^{\ldots}}\right. \\
&= \frac{\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{e^6} - \frac{(6d)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e^6} + \frac{(15d^2)\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{e^6} - \frac{(20d^3)\int \frac{a+b\ldots}{(d\ldots}}{e^6} \\
&= -\frac{d^6(a+b\log(cx^n))}{6e^7(d+ex)^6} + \frac{6d^5(a+b\log(cx^n))}{5e^7(d+ex)^5} - \frac{15d^4(a+b\log(cx^n))}{4e^7(d+ex)^4} + \frac{20d^3(a+\ldots}{3e^7(\ldots} \\
&= -\frac{d^6(a+b\log(cx^n))}{6e^7(d+ex)^6} + \frac{6d^5(a+b\log(cx^n))}{5e^7(d+ex)^5} - \frac{15d^4(a+b\log(cx^n))}{4e^7(d+ex)^4} + \frac{20d^3(a+\ldots}{3e^7(\ldots} \\
&= \frac{bd^5n}{30e^7(d+ex)^5} - \frac{31bd^4n}{120e^7(d+ex)^4} + \frac{163bd^3n}{180e^7(d+ex)^3} - \frac{79bd^2n}{40e^7(d+ex)^2} + \frac{71bd\ldots}{20e^7(d+\ldots}
\end{aligned}$$

Mathematica [A]
time = 0.30, size = 333, normalized size = 1.37

$$\frac{-882bn\log(x) + \frac{-60ad^6+432ad^5(d+ex)+12bd^5n(d+ex)-1350ad^4(d+ex)^2-93bd^4n(d+ex)^2+2400ad^3(d+ex)^3+326bd^3n(d+ex)^3-2700ad^2(d+ex)^4-711bd^2n(d+ex)^4+2160ad(d+ex)^5+1278bdn(d+ex)^5-60bd^6\log(cx^n)+432bd^5(d+ex)\log(cx^n)-1350bd^4(d+ex)^2\log(cx^n)+2400bd^3(d+ex)^3\log(cx^n)-2700bd^2(d+ex)^4\log(cx^n)+2160bd(d+ex)^5\log(cx^n)+882bn(d+ex)^6\log(d+ex)+360a(d+ex)^6\log(1+\frac{ex}{d})+360b(d+ex)^6\log(cx^n)\log(1+\frac{ex}{d})}{(d+ex)^6} + 360bn\text{Li}_2\left(-\frac{ex}{d}\right)}{360e^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^6*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (-882*b*n*Log[x] + (-60*a*d^6 + 432*a*d^5*(d + e*x) + 12*b*d^5*n*(d + e*x)
- 1350*a*d^4*(d + e*x)^2 - 93*b*d^4*n*(d + e*x)^2 + 2400*a*d^3*(d + e*x)^3
+ 326*b*d^3*n*(d + e*x)^3 - 2700*a*d^2*(d + e*x)^4 - 711*b*d^2*n*(d + e*x)^
4 + 2160*a*d*(d + e*x)^5 + 1278*b*d*n*(d + e*x)^5 - 60*b*d^6*Log[c*x^n] + 4
32*b*d^5*(d + e*x)*Log[c*x^n] - 1350*b*d^4*(d + e*x)^2*Log[c*x^n] + 2400*b*
d^3*(d + e*x)^3*Log[c*x^n] - 2700*b*d^2*(d + e*x)^4*Log[c*x^n] + 2160*b*d*(
d + e*x)^5*Log[c*x^n] + 882*b*n*(d + e*x)^6*Log[d + e*x] + 360*a*(d + e*x)^
6*Log[1 + (e*x)/d] + 360*b*(d + e*x)^6*Log[c*x^n]*Log[1 + (e*x)/d])/(d + e*
x)^6 + 360*b*n*PolyLog[2, -((e*x)/d)])/(360*e^7)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 1416, normalized size = 5.83

method	result	size

risch	Expression too large to display	1416

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^6*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] 15/8*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^4/e^7/(e*x+d)^4+6/5*a*d^5
/e^7/(e*x+d)^5+6*a*d/e^7/(e*x+d)-15/2*a*d^2/e^7/(e*x+d)^2-1/6*a*d^6/e^7/(e*
x+d)^6-1/6*b*ln(x^n)*d^6/e^7/(e*x+d)^6+3/5*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2*d^5/e^7/(e*x+d)^5-1/12*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^6/e^7/(e*x+d
)^6+20/3*b*ln(c)*d^3/e^7/(e*x+d)^3-15/4*b*ln(c)*d^4/e^7/(e*x+d)^4+a/e^7*ln(
e*x+d)-15/4*b*ln(x^n)*d^4/e^7/(e*x+d)^4+6/5*b*ln(x^n)*d^5/e^7/(e*x+d)^5+6*b
*ln(x^n)*d/e^7/(e*x+d)-15/2*b*ln(x^n)*d^2/e^7/(e*x+d)^2+1/12*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)*d^6/e^7/(e*x+d)^6-10/3*I*b*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)*d^3/e^7/(e*x+d)^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/
e^7*ln(e*x+d)+1/12*I*b*Pi*csgn(I*c*x^n)^3*d^6/e^7/(e*x+d)^6-3*I*b*Pi*csgn(I
*c*x^n)^3*d/e^7/(e*x+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3/e^7*ln(e*x+d)+20/3*a*d^3
/e^7/(e*x+d)^3-15/4*a*d^4/e^7/(e*x+d)^4-3/5*I*b*Pi*csgn(I*c*x^n)^3*d^5/e^7/
(e*x+d)^5+b*ln(x^n)/e^7*ln(e*x+d)+b*ln(c)/e^7*ln(e*x+d)-3/5*I*b*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*d^5/e^7/(e*x+d)^5-3*I*b*Pi*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)*d/e^7/(e*x+d)+15/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*d^2/e^7/(e*x+d)^2-49/20*b*n/e^7*ln(e*x)+49/20*b*n/e^7*ln(e*x+d)-b*n/e^7*
dilog(-e*x/d)+71/20*b*n*d/e^7/(e*x+d)-79/40*b*n*d^2/e^7/(e*x+d)^2+163/180*b
*n*d^3/e^7/(e*x+d)^3-31/120*b*n*d^4/e^7/(e*x+d)^4+1/30*b*n*d^5/e^7/(e*x+d)^
5-b*n/e^7*ln(e*x+d)*ln(-e*x/d)+10/3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^3/
e^7/(e*x+d)^3-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^7*ln(e*x+d)-
15/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^7/(e*x+d)^2+10/3*I*b*Pi*csgn(I*
c)*csgn(I*c*x^n)^2*d^3/e^7/(e*x+d)^3-15/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^
2*d^2/e^7/(e*x+d)^2+6/5*b*ln(c)*d^5/e^7/(e*x+d)^5+6*b*ln(c)*d/e^7/(e*x+d)-1
5/2*b*ln(c)*d^2/e^7/(e*x+d)^2-1/6*b*ln(c)*d^6/e^7/(e*x+d)^6+15/8*I*b*Pi*csg
n(I*c*x^n)^3*d^4/e^7/(e*x+d)^4+15/4*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^7/(e*x+d)^
2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^7*ln(e*x+d)-10/3*I*b*Pi*csgn(I*c
*x^n)^3*d^3/e^7/(e*x+d)^3+3/5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^5/e^7/(e*x
+d)^5-15/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^4/e^7/(e*x+d)^4+3*I*b*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2*d/e^7/(e*x+d)-1/12*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2
*d^6/e^7/(e*x+d)^6-15/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^4/e^7/(e*x+d)^4+
3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d/e^7/(e*x+d)+20/3*b*ln(x^n)*d^3/e^7/(
e*x+d)^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/60*(60*e^(-7)*log(x*e + d) + (360*d*x^5*e^5 + 1350*d^2*x^4*e^4 + 2200*d^3
*x^3*e^3 + 1875*d^4*x^2*e^2 + 822*d^5*x*e + 147*d^6)/(x^6*e^13 + 6*d*x^5*e^
12 + 15*d^2*x^4*e^11 + 20*d^3*x^3*e^10 + 15*d^4*x^2*e^9 + 6*d^5*x*e^8 + d^6
*e^7))*a + b*integrate((x^6*log(c) + x^6*log(x^n))/(x^7*e^7 + 7*d*x^6*e^6 +
 21*d^2*x^5*e^5 + 35*d^3*x^4*e^4 + 35*d^4*x^3*e^3 + 21*d^5*x^2*e^2 + 7*d^6*
x*e + d^7), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] integral((b*x^6*log(c*x^n) + a*x^6)/(x^7*e^7 + 7*d*x^6*e^6 + 21*d^2*x^5*e^5
 + 35*d^3*x^4*e^4 + 35*d^4*x^3*e^3 + 21*d^5*x^2*e^2 + 7*d^6*x*e + d^7), x)
```

Sympy [A]
time = 77.26, size = 1588, normalized size = 6.53

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] a*d**6*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**6 -
6*a*d**5*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e**6
+ 15*a*d**4*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/e*
*6 - 20*a*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))
/e**6 + 15*a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), Tru
e))/e**6 - 6*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e
**6 + a*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**6 - b*d**6*n*
Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e**2*x +
3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*
e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*
x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 47
0*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 36
00*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*
x**3/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4
*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**4/(360*d**10
*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d*
*6*e**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(d/e + x)/(6*d*
*6*e), True))/e**6 + b*d**6*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x
```

```
)**6), True))*log(c*x**n)/e**6 + 6*b*d**5*n*Piecewise((x/d**6, Eq(e, 0)), (
-25*d**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*
x**3 + 60*d**4*e**5*x**4) - 52*d**2*e*x/(60*d**8*e + 240*d**7*e**2*x + 360*
d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 42*d*e**2*x**2/(
60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*
d**4*e**5*x**4) - 12*e**3*x**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3
*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - log(x)/(5*d**5*e) + log(d
/e + x)/(5*d**5*e), True))/e**6 - 6*b*d**5*Piecewise((x/d**6, Eq(e, 0)), (-
1/(5*e*(d + e*x)**5), True))*log(c*x**n)/e**6 - 15*b*d**4*n*Piecewise((x/d*
*5, Eq(e, 0)), (-11*d**2/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 +
24*d**3*e**4*x**3) - 15*d*e*x/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x*
*2 + 24*d**3*e**4*x**3) - 6*e**2*x**2/(24*d**6*e + 72*d**5*e**2*x + 72*d**4
*e**3*x**2 + 24*d**3*e**4*x**3) - log(x)/(4*d**4*e) + log(d/e + x)/(4*d**4*
e), True))/e**6 + 15*b*d**4*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x
)**4), True))*log(c*x**n)/e**6 + 20*b*d**3*n*Piecewise((x/d**4, Eq(e, 0)),
(-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12
*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3
*e), True))/e**6 - 20*b*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*
x)**3), True))*log(c*x**n)/e**6 - 15*b*d**2*n*Piecewise((x/d**3, Eq(e, 0)),
 (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e),
 True))/e**6 + 15*b*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**
2), True))*log(c*x**n)/e**6 + 6*b*d*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x
)/(d*e) + log(d/e + x)/(d*e), True))/e**6 - 6*b*d*Piecewise((x/d**2, Eq(e,
0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**6 - b*n*Piecewise((x/d, Eq(e
, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Ab
s(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1)
, (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-m
eijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (
0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**
6 + b*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**6
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^6/(x*e + d)^7, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^6\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^6*(a + b*log(c*x^n)))/(d + e*x)^7,x)
[Out] int((x^6*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

3.65 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=136

$$-\frac{bd^4n}{30e^6(d+ex)^5}+\frac{5bd^3n}{24e^6(d+ex)^4}-\frac{5bd^2n}{9e^6(d+ex)^3}+\frac{5bdn}{6e^6(d+ex)^2}-\frac{5bn}{6e^6(d+ex)}+\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\log(d+ex)}{6de^6}$$

```
[Out] -1/30*b*d^4*n/e^6/(e*x+d)^5+5/24*b*d^3*n/e^6/(e*x+d)^4-5/9*b*d^2*n/e^6/(e*x
+d)^3+5/6*b*d*n/e^6/(e*x+d)^2-5/6*b*n/e^6/(e*x+d)+1/6*x^6*(a+b*ln(c*x^n))/d
/(e*x+d)^6-1/6*b*n*ln(e*x+d)/d/e^6
```

Rubi [A]
time = 0.08, antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2373, 45}

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bd^4n}{30e^6(d+ex)^5}+\frac{5bd^3n}{24e^6(d+ex)^4}-\frac{5bd^2n}{9e^6(d+ex)^3}-\frac{5bn}{6e^6(d+ex)}+\frac{5bdn}{6e^6(d+ex)^2}-\frac{bn\log(d+ex)}{6de^6}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/30*(b*d^4*n)/(e^6*(d + e*x)^5) + (5*b*d^3*n)/(24*e^6*(d + e*x)^4) - (5*b
*d^2*n)/(9*e^6*(d + e*x)^3) + (5*b*d*n)/(6*e^6*(d + e*x)^2) - (5*b*n)/(6*e^
6*(d + e*x)) + (x^6*(a + b*Log[c*x^n]))/(6*d*(d + e*x)^6) - (b*n*Log[d + e*
x])/(6*d*e^6)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6} - \frac{(bn)\int \frac{x^5}{(d+ex)^6}\,dx}{6d}$$

$$= \frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6} - \frac{(bn)\int \left(-\frac{d^5}{e^5(d+ex)^6} + \frac{5d^4}{e^5(d+ex)^5} - \frac{10d^3}{e^5(d+ex)^4} + \frac{10d^2}{e^5(d+ex)^3} - \frac{}{e^5(}\right.}{6d}$$

$$= -\frac{bd^4n}{30e^6(d+ex)^5} + \frac{5bd^3n}{24e^6(d+ex)^4} - \frac{5bd^2n}{9e^6(d+ex)^3} + \frac{5bdn}{6e^6(d+ex)^2} - \frac{5bn}{6e^6(d+ex}$$

Mathematica [**B**] Leaf count is larger than twice the leaf count of optimal. 335 vs. $2(136) = 272$.
time = 0.20, size = 335, normalized size = 2.46

$$-\frac{60ad^6+137bd^6n+360ad^5ex+762bd^5enx+900ad^4e^2x^2+1725bd^4e^2nx^2+1200ad^3e^3x^3+2000bd^3e^3nx^3+900ad^2e^4x^4+1200bd^2e^4nx^4+360ade^5x^5+300bde^5nx^5-60bn(d+ex)^6\log(x)+60bd(d^5+6d^4ex+15d^3e^2x^2+20d^2e^3x^3+15de^4x^4+6e^5x^5)\log(cx^n)+60bd^6n\log(d+ex)+360bd^5enx\log(d+ex)+900bd^4e^2nx^2\log(d+ex)+1200bd^3e^3nx^3\log(d+ex)+900bd^2e^4nx^4\log(d+ex)+360bde^5nx^5\log(d+ex)+60be^6nx^6\log(d+ex)}{360de^6(d+ex)^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/360*(60*a*d^6 + 137*b*d^6*n + 360*a*d^5*e*x + 762*b*d^5*e*n*x + 900*a*d^
4*e^2*x^2 + 1725*b*d^4*e^2*n*x^2 + 1200*a*d^3*e^3*x^3 + 2000*b*d^3*e^3*n*x^
3 + 900*a*d^2*e^4*x^4 + 1200*b*d^2*e^4*n*x^4 + 360*a*d*e^5*x^5 + 300*b*d*e^
5*n*x^5 - 60*b*n*(d + e*x)^6*Log[x] + 60*b*d*(d^5 + 6*d^4*e*x + 15*d^3*e^2*
x^2 + 20*d^2*e^3*x^3 + 15*d*e^4*x^4 + 6*e^5*x^5)*Log[c*x^n] + 60*b*d^6*n*Lo
g[d + e*x] + 360*b*d^5*e*n*x*Log[d + e*x] + 900*b*d^4*e^2*n*x^2*Log[d + e*x
] + 1200*b*d^3*e^3*n*x^3*Log[d + e*x] + 900*b*d^2*e^4*n*x^4*Log[d + e*x] +
360*b*d*e^5*n*x^5*Log[d + e*x] + 60*b*e^6*n*x^6*Log[d + e*x])/(d*e^6*(d + e
*x)^6)
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 1165, normalized size = 8.57

method	result	size
risch	Expression too large to display	1165

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*b*(6*e^5*x^5+15*d*e^4*x^4+20*d^2*e^3*x^3+15*d^3*e^2*x^2+6*d^4*e*x+d^5)
/(e*x+d)^6/e^6*ln(x^n)+1/360*(-60*ln(c)*b*d^6-600*I*Pi*b*d^3*e^3*x^3*csgn(I
*c)*csgn(I*c*x^n)^2-450*I*Pi*b*d^4*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-450*I*
Pi*b*d^4*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-360*ln(e*x+d)*b*d*e^5*n*x^5-90
0*ln(e*x+d)*b*d^2*e^4*n*x^4-1200*ln(e*x+d)*b*d^3*e^3*n*x^3-900*ln(e*x+d)*b*
```

```
d^4*e^2*n*x^2-360*ln(e*x+d)*b*d^5*e*n*x+360*ln(-x)*b*d*e^5*n*x^5+900*ln(-x)
*b*d^2*e^4*n*x^4+1200*ln(-x)*b*d^3*e^3*n*x^3-360*a*d*e^5*x^5-900*a*d^2*e^4*
x^4-1200*a*d^3*e^3*x^3-900*a*d^4*e^2*x^2-360*a*d^5*e*x-137*b*d^6*n-600*I*Pi
*b*d^3*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+180*I*Pi*b*d*e^5*x^5*csgn(I*c*x^
n)^3+450*I*Pi*b*d^2*e^4*x^4*csgn(I*c*x^n)^3+900*ln(-x)*b*d^4*e^2*n*x^2+360*
ln(-x)*b*d^5*e*n*x-30*I*Pi*b*d^6*csgn(I*x^n)*csgn(I*c*x^n)^2-180*I*Pi*b*d*e
^5*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2-450*I*Pi*b*d^2*e^4*x^4*csgn(I*c)*csgn(I*
c*x^n)^2+600*I*Pi*b*d^3*e^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+450*I*P
i*b*d^4*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+180*I*Pi*b*d^5*e*x*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-60*a*d^6-180*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(
I*c*x^n)^2-180*I*Pi*b*d^5*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-180*I*Pi*b*d*e^5*
x^5*csgn(I*c)*csgn(I*c*x^n)^2-60*ln(e*x+d)*b*d^6*n+60*ln(-x)*b*d^6*n-1725*b
*d^4*e^2*n*x^2-762*b*d^5*e*n*x-300*b*d*e^5*n*x^5-1200*b*d^2*e^4*n*x^4-2000*
b*d^3*e^3*n*x^3-450*I*Pi*b*d^2*e^4*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-30*I*Pi*
b*d^6*csgn(I*c)*csgn(I*c*x^n)^2-60*ln(e*x+d)*b*e^6*n*x^6+60*ln(-x)*b*e^6*n*
x^6-360*ln(c)*b*d*e^5*x^5+30*I*Pi*b*d^6*csgn(I*c*x^n)^3-900*ln(c)*b*d^2*e^4
*x^4-1200*ln(c)*b*d^3*e^3*x^3-900*ln(c)*b*d^4*e^2*x^2-360*ln(c)*b*d^5*e*x+6
00*I*Pi*b*d^3*e^3*x^3*csgn(I*c*x^n)^3+450*I*Pi*b*d^4*e^2*x^2*csgn(I*c*x^n)^
3+180*I*Pi*b*d^5*e*x*csgn(I*c*x^n)^3+30*I*Pi*b*d^6*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+180*I*Pi*b*d*e^5*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+450*I*
Pi*b*d^2*e^4*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/d/e^6/(e*x+d)^6
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 348 vs. $2(123) = 246$.
time = 0.30, size = 348, normalized size = 2.56

$$-\frac{1}{360}\,bn\left(\frac{60\,e^{(-6)}\log\left(xe+d\right)}{d}-\frac{60\,e^{(-6)}\log\left(x\right)}{d}+\frac{300\,x^4e^4+900\,dx^3e^3+1100\,d^2x^2e^2+625\,d^3xe+137\,d^4}{x^5e^{11}+5\,dx^4e^{10}+10\,d^2x^3e^9+10\,d^3x^2e^8+5\,d^4xe^7+d^5e^6}\right)-\frac{\left(6\,x^5e^5+15\,dx^4e^4+20\,d^2x^3e^3+15\,d^3x^2e^2+6\,d^4xe+d^5\right)b\log\left(cx^n\right)}{6\left(x^6e^{12}+6\,dx^5e^{11}+15\,d^2x^4e^{10}+20\,d^3x^3e^9+15\,d^4x^2e^8+6\,d^5xe^7+d^6e^6\right)}-\frac{\left(6\,x^5e^5+15\,dx^4e^4+20\,d^2x^3e^3+15\,d^3x^2e^2+6\,d^4xe+d^5\right)a}{6\left(x^6e^{12}+6\,dx^5e^{11}+15\,d^2x^4e^{10}+20\,d^3x^3e^9+15\,d^4x^2e^8+6\,d^5xe^7+d^6e^6\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] -1/360*b*n*(60*e^(-6)*log(x*e + d)/d - 60*e^(-6)*log(x)/d + (300*x^4*e^4 +
900*d*x^3*e^3 + 1100*d^2*x^2*e^2 + 625*d^3*x*e + 137*d^4)/(x^5*e^11 + 5*d*x
^4*e^10 + 10*d^2*x^3*e^9 + 10*d^3*x^2*e^8 + 5*d^4*x*e^7 + d^5*e^6)) - 1/6*(
6*x^5*e^5 + 15*d*x^4*e^4 + 20*d^2*x^3*e^3 + 15*d^3*x^2*e^2 + 6*d^4*x*e + d^
5)*b*log(c*x^n)/(x^6*e^12 + 6*d*x^5*e^11 + 15*d^2*x^4*e^10 + 20*d^3*x^3*e^9
 + 15*d^4*x^2*e^8 + 6*d^5*x*e^7 + d^6*e^6) - 1/6*(6*x^5*e^5 + 15*d*x^4*e^4
+ 20*d^2*x^3*e^3 + 15*d^3*x^2*e^2 + 6*d^4*x*e + d^5)*a/(x^6*e^12 + 6*d*x^5*
e^11 + 15*d^2*x^4*e^10 + 20*d^3*x^3*e^9 + 15*d^4*x^2*e^8 + 6*d^5*x*e^7 + d^
6*e^6)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 331 vs. $2(123) = 246$.
time = 0.36, size = 331, normalized size = 2.43

$$\frac{60\,bnx^6e^6\log\left(x\right)-137\,bd^6n-60\,ad^6-60\left(5\,bdn+6\,ad\right)x^5e^5-300\left(4\,bd^2n+3\,ad^2\right)x^4e^4-400\left(5\,bd^3n+3\,ad^3\right)x^3e^3-75\left(23\,bd^4n+12\,ad^4\right)x^2e^2-6\left(127\,bd^5n+60\,ad^5\right)xe-60\left(bnx^6e^6+6\,bdnx^5e^5+15\,bd^2nx^4e^4+20\,bd^3nx^3e^3+15\,bd^4nx^2e^2+6\,bd^5nxe+bd^6n\right)\log\left(xe+d\right)-60\left(6\,bdx^5e^5+15\,bd^2x^4e^4+20\,bd^3x^3e^3+15\,bd^4x^2e^2+6\,bd^5xe+bd^6\right)\log\left(c\right)}{360\left(dx^6e^{12}+6\,d^2x^5e^{11}+15\,d^3x^4e^{10}+20\,d^4x^3e^9+15\,d^5x^2e^8+6\,d^6xe^7+d^7e^6\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] 1/360*(60*b*n*x^6*e^6*log(x) - 137*b*d^6*n - 60*a*d^6 - 60*(5*b*d*n + 6*a*d
)*x^5*e^5 - 300*(4*b*d^2*n + 3*a*d^2)*x^4*e^4 - 400*(5*b*d^3*n + 3*a*d^3)*x
^3*e^3 - 75*(23*b*d^4*n + 12*a*d^4)*x^2*e^2 - 6*(127*b*d^5*n + 60*a*d^5)*x*
e - 60*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3
*e^3 + 15*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x*e + b*d^6*n)*log(x*e + d) - 60*(6*b
*d*x^5*e^5 + 15*b*d^2*x^4*e^4 + 20*b*d^3*x^3*e^3 + 15*b*d^4*x^2*e^2 + 6*b*d
^5*x*e + b*d^6)*log(c))/(d*x^6*e^12 + 6*d^2*x^5*e^11 + 15*d^3*x^4*e^10 + 20
*d^4*x^3*e^9 + 15*d^5*x^2*e^8 + 6*d^6*x*e^7 + d^7*e^6)
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1911 vs. $2(133) = 266$.
time = 85.69, size = 1911, normalized size = 14.05

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((-a
/x - b*n/x - b*log(c*x**n)/x)/e**7, Eq(d, 0)), ((a*x**6/6 - b*n*x**6/36 + b
*x**6*log(c*x**n)/6)/d**7, Eq(e, 0)), (-60*a*d**6/(360*d**7*e**6 + 2160*d**
6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4
 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 360*a*d**5*e*x/(360*d**7*e**6
 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3
*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 900*a*d**4*e**2*x*
*2/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9
*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 1
200*a*d**3*e**3*x**3/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**
2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360
*d*e**12*x**6) - 900*a*d**2*e**4*x**4/(360*d**7*e**6 + 2160*d**6*e**7*x + 5
400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2
*e**11*x**5 + 360*d*e**12*x**6) - 360*a*d*e**5*x**5/(360*d**7*e**6 + 2160*d
**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x*
*4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 60*b*d**6*n*log(d/e + x)/(3
60*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3
 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 137*b*
d**6*n/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*
e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6)
 - 360*b*d**5*e*n*x*log(d/e + x)/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d
**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**1
1*x**5 + 360*d*e**12*x**6) - 762*b*d**5*e*n*x/(360*d**7*e**6 + 2160*d**6*e*
*7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2
```

```
160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 900*b*d**4*e**2*n*x**2*log(d/e +
x)/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9
*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 1
725*b*d**4*e**2*n*x**2/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x
**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 3
60*d*e**12*x**6) - 1200*b*d**3*e**3*n*x**3*log(d/e + x)/(360*d**7*e**6 + 21
60*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**1
0*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 2000*b*d**3*e**3*n*x**3
/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x
**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 900
*b*d**2*e**4*n*x**4*log(d/e + x)/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d
**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**1
1*x**5 + 360*d*e**12*x**6) - 1200*b*d**2*e**4*n*x**4/(360*d**7*e**6 + 2160*
d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x
**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 360*b*d*e**5*n*x**5*log(d/
e + x)/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*
e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6)
 - 300*b*d*e**5*n*x**5/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x
**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 3
60*d*e**12*x**6) - 60*b*e**6*n*x**6*log(d/e + x)/(360*d**7*e**6 + 2160*d**6
*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4
+ 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) + 60*b*e**6*x**6*log(c*x**n)/(36
0*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3
+ 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 388 vs. 2(123) = 246.
time = 3.29, size = 388, normalized size = 2.85

$$-\frac{60\,bnx^{6}e^{6}\log\left(xe+d\right)+360\,bdnx^{5}e^{5}\log\left(xe+d\right)+900\,bd^{2}nx^{4}e^{4}\log\left(xe+d\right)+1200\,bd^{3}nx^{3}e^{3}\log\left(xe+d\right)+900\,bd^{4}nx^{2}e^{2}\log\left(xe+d\right)+360\,bd^{5}nxe\log\left(xe+d\right)-60\,bnx^{6}e^{6}\log\left(x\right)+300\,bdnx^{5}e^{5}+1200\,bd^{2}nx^{4}e^{4}+2000\,bd^{3}nx^{3}e^{3}+1725\,bd^{4}nx^{2}e^{2}+762\,bd^{5}nxe+60\,bd^{6}n\log\left(xe+d\right)+360\,bdx^{5}e^{5}\log\left(c\right)+900\,bd^{2}x^{4}e^{4}\log\left(c\right)+1200\,bd^{3}x^{3}e^{3}\log\left(c\right)+900\,bd^{4}x^{2}e^{2}\log\left(c\right)+360\,bd^{5}xe\log\left(c\right)+137\,bd^{6}n+360\,adx^{5}e^{5}+900\,ad^{2}x^{4}e^{4}+1200\,ad^{3}x^{3}e^{3}+900\,ad^{4}x^{2}e^{2}+360\,ad^{5}xe+60\,bd^{6}\log\left(c\right)+60\,ad^{6}}{360\,\left(dx^{6}e^{12}+6\,d^{2}x^{5}e^{11}+15\,d^{3}x^{4}e^{10}+20\,d^{4}x^{3}e^{9}+15\,d^{5}x^{2}e^{8}+6\,d^{6}xe^{7}+d^{7}e^{6}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] -1/360*(60*b*n*x^6*e^6*log(x*e + d) + 360*b*d*n*x^5*e^5*log(x*e + d) + 900*
b*d^2*n*x^4*e^4*log(x*e + d) + 1200*b*d^3*n*x^3*e^3*log(x*e + d) + 900*b*d^
4*n*x^2*e^2*log(x*e + d) + 360*b*d^5*n*x*e*log(x*e + d) - 60*b*n*x^6*e^6*lo
g(x) + 300*b*d*n*x^5*e^5 + 1200*b*d^2*n*x^4*e^4 + 2000*b*d^3*n*x^3*e^3 + 17
25*b*d^4*n*x^2*e^2 + 762*b*d^5*n*x*e + 60*b*d^6*n*log(x*e + d) + 360*b*d*x^
5*e^5*log(c) + 900*b*d^2*x^4*e^4*log(c) + 1200*b*d^3*x^3*e^3*log(c) + 900*b
*d^4*x^2*e^2*log(c) + 360*b*d^5*x*e*log(c) + 137*b*d^6*n + 360*a*d*x^5*e^5
+ 900*a*d^2*x^4*e^4 + 1200*a*d^3*x^3*e^3 + 900*a*d^4*x^2*e^2 + 360*a*d^5*x*
e + 60*b*d^6*log(c) + 60*a*d^6)/(d*x^6*e^12 + 6*d^2*x^5*e^11 + 15*d^3*x^4*e
^10 + 20*d^4*x^3*e^9 + 15*d^5*x^2*e^8 + 6*d^6*x*e^7 + d^7*e^6)
```

Mupad [B]

time = 4.48, size = 341, normalized size = 2.51

$$-\frac{x^5\,\left(6\,a\,e^5+5\,b\,e^5\,n\right)+x\,\left(6\,a\,d^4\,e+\frac{127\,b\,d^4\,e\,n}{10}\right)+a\,d^5+x^3\,\left(20\,a\,d^2\,e^3+\frac{100\,b\,d^2\,e^3\,n}{3}\right)+x^2\,\left(15\,a\,d^3\,e^2+\frac{115\,b\,d^3\,e^2\,n}{4}\right)+x^4\,\left(15\,a\,d\,e^4+20\,b\,d\,e^4\,n\right)+\frac{137\,b\,d^5\,n}{60}}{6\,d^6\,e^6+36\,d^5\,e^7\,x+90\,d^4\,e^8\,x^2+120\,d^3\,e^9\,x^3+90\,d^2\,e^{10}\,x^4+36\,d\,e^{11}\,x^5+6\,e^{12}\,x^6}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^5}{6\,e^6}+\frac{b\,x^5}{e}+\frac{10\,b\,d^2\,x^3}{3\,e^3}+\frac{5\,b\,d^3\,x^2}{2\,e^4}+\frac{5\,b\,d\,x^4}{2\,e^2}+\frac{b\,d^4\,x}{e^5}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d\,e^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

```
[Out] - (x^5*(6*a*e^5 + 5*b*e^5*n) + x*(6*a*d^4*e + (127*b*d^4*e*n)/10) + a*d^5 +
 x^3*(20*a*d^2*e^3 + (100*b*d^2*e^3*n)/3) + x^2*(15*a*d^3*e^2 + (115*b*d^3*
e^2*n)/4) + x^4*(15*a*d*e^4 + 20*b*d*e^4*n) + (137*b*d^5*n)/60)/(6*d^6*e^6
+ 6*e^12*x^6 + 36*d^5*e^7*x + 36*d*e^11*x^5 + 90*d^4*e^8*x^2 + 120*d^3*e^9*
x^3 + 90*d^2*e^10*x^4) - (log(c*x^n)*((b*d^5)/(6*e^6) + (b*x^5)/e + (10*b*d
^2*x^3)/(3*e^3) + (5*b*d^3*x^2)/(2*e^4) + (5*b*d*x^4)/(2*e^2) + (b*d^4*x)/e
^5))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^
2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(3*d*e^6)
```

3.66 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=163

$$-\frac{bnx^5}{30d^2(d+ex)^5}+\frac{bd^2n}{120e^5(d+ex)^4}-\frac{2bdn}{45e^5(d+ex)^3}+\frac{bn}{10e^5(d+ex)^2}-\frac{2bn}{15de^5(d+ex)}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}+\frac{x^5(a}{30}$$

```
[Out] -1/30*b*n*x^5/d^2/(e*x+d)^5+1/120*b*d^2*n/e^5/(e*x+d)^4-2/45*b*d*n/e^5/(e*x
+d)^3+1/10*b*n/e^5/(e*x+d)^2-2/15*b*n/d/e^5/(e*x+d)+1/6*x^5*(a+b*ln(c*x^n))
/d/(e*x+d)^6+1/30*x^5*(a+b*ln(c*x^n))/d^2/(e*x+d)^5-1/30*b*n*ln(e*x+d)/d^2/
e^5
```

Rubi [A]
time = 0.09, antiderivative size = 163, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {47, 37, 2382, 12, 79, 45}

$$\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}+\frac{bd^2n}{120e^5(d+ex)^4}-\frac{bn\log(d+ex)}{30d^2e^5}-\frac{bnx^5}{30d^2(d+ex)^5}-\frac{2bn}{15de^5(d+ex)}+\frac{bn}{10e^5(d+ex)^2}-\frac{2bdn}{45e^5(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/30*(b*n*x^5)/(d^2*(d + e*x)^5) + (b*d^2*n)/(120*e^5*(d + e*x)^4) - (2*b*
d*n)/(45*e^5*(d + e*x)^3) + (b*n)/(10*e^5*(d + e*x)^2) - (2*b*n)/(15*d*e^5*
(d + e*x)) + (x^5*(a + b*Log[c*x^n]))/(6*d*(d + e*x)^6) + (x^5*(a + b*Log[c
*x^n]))/(30*d^2*(d + e*x)^5) - (b*n*Log[d + e*x])/(30*d^2*e^5)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 37

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp
[(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] /; FreeQ[{
a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n + 2, 0] && NeQ[m, -
1]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 47

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*(S
implify[m + n + 2]/((b*c - a*d)*(m + 1))), Int[(a + b*x)^Simplify[m + 1]*(c
 + d*x)^n, x], x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[b*c - a*d, 0] && I
LtQ[Simplify[m + n + 2], 0] && NeQ[m, -1] &&  !(LtQ[m, -1] && LtQ[n, -1] &&
 (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && (SumSimpler
Q[m, 1] ||  !SumSimplerQ[n, 1])
```

Rule 79

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/
(f*(p + 1)*(c*f - d*e))), x] - Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c
*f*(p + 1)))/(f*(p + 1)*(c*f - d*e)), Int[(c + d*x)^n*(e + f*x)^(p + 1), x]
, x] /; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || I
ntegerQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))
))
```

Rule 2382

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Dist[a + b*Log[c*x
^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a,
b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6} + \frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5} - (bn)\int \frac{x^4(6d+ex)}{30d^2(d+ex)^6}\,dx$$

$$= \frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6} + \frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5} - \frac{(bn)\int \frac{x^4(6d+ex)}{(d+ex)^6}\,dx}{30d^2}$$

$$= -\frac{bnx^5}{30d^2(d+ex)^5} + \frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6} + \frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5} - \frac{(bn)\int \frac{x^4}{(d+ex)^5}\,dx}{30d^2}$$

$$= -\frac{bnx^5}{30d^2(d+ex)^5} + \frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6} + \frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5} - \frac{(bn)\int \left(\frac{d^4}{e^4(d+ex)^5}\right.}{}$$

$$= -\frac{bnx^5}{30d^2(d+ex)^5} + \frac{bd^2n}{120e^5(d+ex)^4} - \frac{2bdn}{45e^5(d+ex)^3} + \frac{bn}{10e^5(d+ex)^2} - \frac{2b}{15de^5(}$$

Mathematica [A]

time = 0.19, size = 316, normalized size = 1.94

$$-\frac{12ad^6+13bd^6n+72ad^5ex+66bd^5enx+180ad^4e^2x^2+129bd^4e^2nx^2+240ad^3e^3x^3+112bd^3e^3nx^3+180ad^2e^4x^4+24bd^2e^4nx^4-12bde^5nx^5-12bn(d+ex)^6\log(x)+12bd^2(d^4+6d^3ex+15d^2e^2x^2+20de^3x^3+15e^4x^4)\log\left(cx^n\right)+12bd^6n\log(d+ex)+72bd^5enx\log(d+ex)+180bd^4e^2nx^2\log(d+ex)+240bd^3e^3nx^3\log(d+ex)+180bd^2e^4nx^4\log(d+ex)+72bde^5nx^5\log(d+ex)+12be^6nx^6\log(d+ex)}{360d^2e^5(d+ex)^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/360*(12*a*d^6 + 13*b*d^6*n + 72*a*d^5*e*x + 66*b*d^5*e*n*x + 180*a*d^4*e
^2*x^2 + 129*b*d^4*e^2*n*x^2 + 240*a*d^3*e^3*x^3 + 112*b*d^3*e^3*n*x^3 + 18
0*a*d^2*e^4*x^4 + 24*b*d^2*e^4*n*x^4 - 12*b*d*e^5*n*x^5 - 12*b*n*(d + e*x)^
6*Log[x] + 12*b*d^2*(d^4 + 6*d^3*e*x + 15*d^2*e^2*x^2 + 20*d*e^3*x^3 + 15*e
^4*x^4)*Log[c*x^n] + 12*b*d^6*n*Log[d + e*x] + 72*b*d^5*e*n*x*Log[d + e*x]
+ 180*b*d^4*e^2*n*x^2*Log[d + e*x] + 240*b*d^3*e^3*n*x^3*Log[d + e*x] + 180
*b*d^2*e^4*n*x^4*Log[d + e*x] + 72*b*d*e^5*n*x^5*Log[d + e*x] + 12*b*e^6*n*
x^6*Log[d + e*x])/(d^2*e^5*(d + e*x)^6)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 1022, normalized size = 6.27

method	result
risch	$-\frac{b\left(15x^4e^4+20d\,x^3e^3+15d^2x^2e^2+6d^3xe+d^4\right)\ln\left(x^n\right)}{30\left(ex+d\right)^6e^5}+\frac{-12\ln\left(c\right)b\,d^6-72\ln\left(ex+d\right)bd\,e^5n\,x^5-180\ln\left(ex+d\right)b\,d^2e^4n\,x^4-240\ln\left(ex+d\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/30*b*(15*e^4*x^4+20*d*e^3*x^3+15*d^2*e^2*x^2+6*d^3*e*x+d^4)/(e*x+d)^6/e^
5*ln(x^n)+1/360*(-12*ln(c)*b*d^6-120*I*Pi*b*d^3*e^3*x^3*csgn(I*c)*csgn(I*c*
x^n)^2-36*I*Pi*b*d^5*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-120*I*Pi*b*d^3*e^3*x^3
*csgn(I*x^n)*csgn(I*c*x^n)^2-6*I*Pi*b*d^6*csgn(I*x^n)*csgn(I*c*x^n)^2-72*ln
(e*x+d)*b*d*e^5*n*x^5-180*ln(e*x+d)*b*d^2*e^4*n*x^4-240*ln(e*x+d)*b*d^3*e^3
*n*x^3-180*ln(e*x+d)*b*d^4*e^2*n*x^2-72*ln(e*x+d)*b*d^5*e*n*x+72*ln(-x)*b*d
*e^5*n*x^5+180*ln(-x)*b*d^2*e^4*n*x^4+240*ln(-x)*b*d^3*e^3*n*x^3+90*I*Pi*b*
d^2*e^4*x^4*csgn(I*c*x^n)^3+120*I*Pi*b*d^3*e^3*x^3*csgn(I*c*x^n)^3+90*I*Pi*
b*d^4*e^2*x^2*csgn(I*c*x^n)^3-90*I*Pi*b*d^2*e^4*x^4*csgn(I*x^n)*csgn(I*c*x^
n)^2-180*a*d^2*e^4*x^4-240*a*d^3*e^3*x^3-180*a*d^4*e^2*x^2-72*a*d^5*e*x-13*
b*d^6*n-6*I*Pi*b*d^6*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*b*d^5*e*x*csgn(I*c*x
^n)^3+6*I*Pi*b*d^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+180*ln(-x)*b*d^4*e^2
*n*x^2+72*ln(-x)*b*d^5*e*n*x-36*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(I*c*x^n)^2-90
*I*Pi*b*d^4*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-90*I*Pi*b*d^4*e^2*x^2*csgn(I*
x^n)*csgn(I*c*x^n)^2-90*I*Pi*b*d^2*e^4*x^4*csgn(I*c)*csgn(I*c*x^n)^2-12*a*d
^6-12*ln(e*x+d)*b*d^6*n+12*ln(-x)*b*d^6*n-129*b*d^4*e^2*n*x^2-66*b*d^5*e*n*
x+12*b*d*e^5*n*x^5-24*b*d^2*e^4*n*x^4-112*b*d^3*e^3*n*x^3-12*ln(e*x+d)*b*e^
6*n*x^6+12*ln(-x)*b*e^6*n*x^6+90*I*Pi*b*d^2*e^4*x^4*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-180*ln(c)*b*d^2*e^4*x^4-240*ln(c)*b*d^3*e^3*x^3-180*ln(c)*b*d^
```

```
4*e^2*x^2-72*ln(c)*b*d^5*e*x+6*I*Pi*b*d^6*csgn(I*c*x^n)^3+36*I*Pi*b*d^5*e*x
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+120*I*Pi*b*d^3*e^3*x^3*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+90*I*Pi*b*d^4*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n))/d^2/e^5/(e*x+d)^6
```

Maxima [**B**] Leaf count of result is larger than twice the leaf count of optimal. 331 vs. $2(150) = 300$.
time = 0.31, size = 331, normalized size = 2.03

$$\frac{1}{360}\,bn\left(\frac{12\,x^4e^4-36\,dx^3e^3-76\,d^2x^2e^2-53\,d^3xe-13\,d^4}{dx^5e^{10}+5\,d^2x^4e^9+10\,d^3x^3e^8+10\,d^4x^2e^7+5\,d^5xe^6+d^6e^5}-\frac{12\,e^{(-5)}\log\left(xe+d\right)}{d^2}+\frac{12\,e^{(-5)}\log\left(x\right)}{d^2}\right)-\frac{(15\,x^4e^4+20\,dx^3e^3+15\,d^2x^2e^2+6\,d^3xe+d^4)b\log\left(cx^n\right)}{30\left(x^6e^{11}+6\,dx^5e^{10}+15\,d^2x^4e^9+20\,d^3x^3e^8+15\,d^4x^2e^7+6\,d^5xe^6+d^6e^5\right)}-\frac{(15\,x^4e^4+20\,dx^3e^3+15\,d^2x^2e^2+6\,d^3xe+d^4)a}{30\left(x^6e^{11}+6\,dx^5e^{10}+15\,d^2x^4e^9+20\,d^3x^3e^8+15\,d^4x^2e^7+6\,d^5xe^6+d^6e^5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/360*b*n*((12*x^4*e^4 - 36*d*x^3*e^3 - 76*d^2*x^2*e^2 - 53*d^3*x*e - 13*d^
4)/(d*x^5*e^10 + 5*d^2*x^4*e^9 + 10*d^3*x^3*e^8 + 10*d^4*x^2*e^7 + 5*d^5*x*
e^6 + d^6*e^5) - 12*e^(-5)*log(x*e + d)/d^2 + 12*e^(-5)*log(x)/d^2) - 1/30*
(15*x^4*e^4 + 20*d*x^3*e^3 + 15*d^2*x^2*e^2 + 6*d^3*x*e + d^4)*b*log(c*x^n)
/(x^6*e^11 + 6*d*x^5*e^10 + 15*d^2*x^4*e^9 + 20*d^3*x^3*e^8 + 15*d^4*x^2*e^
7 + 6*d^5*x*e^6 + d^6*e^5) - 1/30*(15*x^4*e^4 + 20*d*x^3*e^3 + 15*d^2*x^2*e
^2 + 6*d^3*x*e + d^4)*a/(x^6*e^11 + 6*d*x^5*e^10 + 15*d^2*x^4*e^9 + 20*d^3*
x^3*e^8 + 15*d^4*x^2*e^7 + 6*d^5*x*e^6 + d^6*e^5)
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 329 vs. $2(150) = 300$.
time = 0.36, size = 329, normalized size = 2.02

$$\frac{12\,bdnx^5e^5-13\,bd^6n-12\,ad^6-12\,(2\,bd^2n+15\,ad^2)x^4e^4-16\,(7\,bd^3n+15\,ad^3)x^3e^3-3\,(43\,bd^4n+60\,ad^4)x^2e^2-6\,(11\,bd^5n+12\,ad^5)xe-12\,(bnx^6e^6+6\,bdnx^5e^5+15\,bd^2nx^4e^4+20\,bd^3nx^3e^3+15\,bd^4nx^2e^2+6\,bd^5nxe+bd^6n)\log\left(xe+d\right)-12\,(15\,bd^2x^4e^4+20\,bd^3x^3e^3+15\,bd^4x^2e^2+6\,bd^5xe+bd^6)\log\left(c\right)+12\,(bnx^6e^6+6\,bdnx^5e^5)\log\left(x\right)}{360\left(d^2x^6e^{11}+6\,d^3x^5e^{10}+15\,d^4x^4e^9+20\,d^5x^3e^8+15\,d^6x^2e^7+6\,d^7xe^6+d^8e^5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] 1/360*(12*b*d*n*x^5*e^5 - 13*b*d^6*n - 12*a*d^6 - 12*(2*b*d^2*n + 15*a*d^2)
*x^4*e^4 - 16*(7*b*d^3*n + 15*a*d^3)*x^3*e^3 - 3*(43*b*d^4*n + 60*a*d^4)*x^
2*e^2 - 6*(11*b*d^5*n + 12*a*d^5)*x*e - 12*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 +
 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3*e^3 + 15*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x
*e + b*d^6*n)*log(x*e + d) - 12*(15*b*d^2*x^4*e^4 + 20*b*d^3*x^3*e^3 + 15*b
*d^4*x^2*e^2 + 6*b*d^5*x*e + b*d^6)*log(c) + 12*(b*n*x^6*e^6 + 6*b*d*n*x^5*
e^5)*log(x))/(d^2*x^6*e^11 + 6*d^3*x^5*e^10 + 15*d^4*x^4*e^9 + 20*d^5*x^3*e
^8 + 15*d^6*x^2*e^7 + 6*d^7*x*e^6 + d^8*e^5)
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1972 vs. $2(155) = 310$.
time = 84.83, size = 1972, normalized size = 12.10

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d,
 0) & Eq(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**
7, Eq(d, 0)), ((a*x**5/5 - b*n*x**5/25 + b*x**5*log(c*x**n)/5)/d**7, Eq(e,
0)), (-12*a*d**6/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 +
7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2
*e**11*x**6) - 72*a*d**5*e*x/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*
e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**
5 + 360*d**2*e**11*x**6) - 180*a*d**4*e**2*x**2/(360*d**8*e**5 + 2160*d**7*
e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 +
2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 240*a*d**3*e**3*x**3/(360*d**
8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 540
0*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 180*a*d**2
*e**4*x**4/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d
**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11
*x**6) - 12*b*d**6*n*log(d/e + x)/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*
d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**1
0*x**5 + 360*d**2*e**11*x**6) - 13*b*d**6*n/(360*d**8*e**5 + 2160*d**7*e**6
*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160
*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 72*b*d**5*e*n*x*log(d/e + x)/(360
*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 +
 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 66*b*d
**5*e*n*x/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d*
*5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*
x**6) - 180*b*d**4*e**2*n*x**2*log(d/e + x)/(360*d**8*e**5 + 2160*d**7*e**6
*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160
*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 129*b*d**4*e**2*n*x**2/(360*d**8*
e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*
d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 240*b*d**3*e
**3*n*x**3*log(d/e + x)/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*
x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 3
60*d**2*e**11*x**6) - 112*b*d**3*e**3*n*x**3/(360*d**8*e**5 + 2160*d**7*e**
6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 216
0*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 180*b*d**2*e**4*n*x**4*log(d/e +
 x)/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**
8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6)
- 24*b*d**2*e**4*n*x**4/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*
x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 3
60*d**2*e**11*x**6) - 72*b*d*e**5*n*x**5*log(d/e + x)/(360*d**8*e**5 + 2160
*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x
**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) + 12*b*d*e**5*n*x**5/(360
*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 +
```

```
 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) + 72*b*d
*e**5*x**5*log(c*x**n)/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x
**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 36
0*d**2*e**11*x**6) - 12*b*e**6*n*x**6*log(d/e + x)/(360*d**8*e**5 + 2160*d*
*7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4
 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) + 12*b*e**6*x**6*log(c*x**n)
/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x
**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6), Tr
ue))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 382 vs. 2(150) = 300.
time = 4.39, size = 382, normalized size = 2.34

$$-\frac{12\,bnx^6e^6\log\left(xe+d\right)+72\,bdnx^5e^5\log\left(xe+d\right)+180\,bd^2nx^4e^4\log\left(xe+d\right)+240\,bd^3nx^3e^3\log\left(xe+d\right)+180\,bd^4nx^2e^2\log\left(xe+d\right)+72\,bd^5nxe\log\left(xe+d\right)-12\,bnx^6e^6\log\left(x\right)-72\,bdnx^5e^5\log\left(x\right)-12\,bdnx^5e^5+24\,bd^2nx^4e^4+112\,bd^3nx^3e^3+129\,bd^4nx^2e^2+66\,bd^5nxe+12\,bd^6n\log\left(xe+d\right)+180\,bd^2x^4e^4\log\left(c\right)+240\,bd^3x^3e^3\log\left(c\right)+180\,bd^4x^2e^2\log\left(c\right)+72\,bd^5xe\log\left(c\right)+13\,bd^6n+180\,ad^2x^4e^4+240\,ad^3x^3e^3+180\,ad^4x^2e^2+72\,ad^5xe+12\,bd^6\log\left(c\right)+12\,ad^6}{360\,\left(d^2x^6e^{11}+6\,d^3x^5e^{10}+15\,d^4x^4e^9+20\,d^5x^3e^8+15\,d^6x^2e^7+6\,d^7xe^6+d^8e^5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] -1/360*(12*b*n*x^6*e^6*log(x*e + d) + 72*b*d*n*x^5*e^5*log(x*e + d) + 180*b
*d^2*n*x^4*e^4*log(x*e + d) + 240*b*d^3*n*x^3*e^3*log(x*e + d) + 180*b*d^4*
n*x^2*e^2*log(x*e + d) + 72*b*d^5*n*x*e*log(x*e + d) - 12*b*n*x^6*e^6*log(x
) - 72*b*d*n*x^5*e^5*log(x) - 12*b*d*n*x^5*e^5 + 24*b*d^2*n*x^4*e^4 + 112*b
*d^3*n*x^3*e^3 + 129*b*d^4*n*x^2*e^2 + 66*b*d^5*n*x*e + 12*b*d^6*n*log(x*e
+ d) + 180*b*d^2*x^4*e^4*log(c) + 240*b*d^3*x^3*e^3*log(c) + 180*b*d^4*x^2*
e^2*log(c) + 72*b*d^5*x*e*log(c) + 13*b*d^6*n + 180*a*d^2*x^4*e^4 + 240*a*d
^3*x^3*e^3 + 180*a*d^4*x^2*e^2 + 72*a*d^5*x*e + 12*b*d^6*log(c) + 12*a*d^6)
/(d^2*x^6*e^11 + 6*d^3*x^5*e^10 + 15*d^4*x^4*e^9 + 20*d^5*x^3*e^8 + 15*d^6*
x^2*e^7 + 6*d^7*x*e^6 + d^8*e^5)
```

Mupad [B]
time = 4.26, size = 320, normalized size = 1.96

$$-\frac{x^4\,\left(15\,a\,e^4+2\,b\,e^4\,n\right)+x\,\left(6\,a\,d^3\,e+\frac{11\,b\,d^3\,e\,n}{2}\right)+a\,d^4+x^2\,\left(15\,a\,d^2\,e^2+\frac{43\,b\,d^2\,e^2\,n}{4}\right)+x^3\,\left(20\,a\,d\,e^3+\frac{28\,b\,d\,e^3\,n}{3}\right)+\frac{13\,b\,d^4\,n}{12}-\frac{b\,e^5\,n\,x^5}{d}}{30\,d^6\,e^5+180\,d^5\,e^6\,x+450\,d^4\,e^7\,x^2+600\,d^3\,e^8\,x^3+450\,d^2\,e^9\,x^4+180\,d\,e^{10}\,x^5+30\,e^{11}\,x^6}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^4}{30\,e^5}+\frac{b\,x^4}{2\,e}+\frac{b\,d^2\,x^2}{2\,e^3}+\frac{2\,b\,d\,x^3}{3\,e^2}+\frac{b\,d^3\,x}{5\,e^4}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{15\,d^2\,e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

```
[Out] - (x^4*(15*a*e^4 + 2*b*e^4*n) + x*(6*a*d^3*e + (11*b*d^3*e*n)/2) + a*d^4 +
x^2*(15*a*d^2*e^2 + (43*b*d^2*e^2*n)/4) + x^3*(20*a*d*e^3 + (28*b*d*e^3*n)/
3) + (13*b*d^4*n)/12 - (b*e^5*n*x^5)/d)/(30*d^6*e^5 + 30*e^11*x^6 + 180*d^5
*e^6*x + 180*d*e^10*x^5 + 450*d^4*e^7*x^2 + 600*d^3*e^8*x^3 + 450*d^2*e^9*x
^4) - (log(c*x^n)*((b*d^4)/(30*e^5) + (b*x^4)/(2*e) + (b*d^2*x^2)/(2*e^3) +
 (2*b*d*x^3)/(3*e^2) + (b*d^3*x)/(5*e^4)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 1
5*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((
2*e*x)/d + 1))/(15*d^2*e^5)
```

3.67 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7} dx$

Optimal. Leaf size=226

$$-\frac{bd^2n}{30e^4(d+ex)^5}+\frac{13bdn}{120e^4(d+ex)^4}-\frac{19bn}{180e^4(d+ex)^3}+\frac{bn}{120de^4(d+ex)^2}+\frac{bn}{60d^2e^4(d+ex)}+\frac{bn\log(x)}{60d^3e^4}+\frac{d^3(a+b\ldots}{6e^4(d\ldots}$$

```
[Out] -1/30*b*d^2*n/e^4/(e*x+d)^5+13/120*b*d*n/e^4/(e*x+d)^4-19/180*b*n/e^4/(e*x+
d)^3+1/120*b*n/d/e^4/(e*x+d)^2+1/60*b*n/d^2/e^4/(e*x+d)+1/60*b*n*ln(x)/d^3/
e^4+1/6*d^3*(a+b*ln(c*x^n))/e^4/(e*x+d)^6-3/5*d^2*(a+b*ln(c*x^n))/e^4/(e*x+
d)^5+3/4*d*(a+b*ln(c*x^n))/e^4/(e*x+d)^4+1/3*(-a-b*ln(c*x^n))/e^4/(e*x+d)^3
-1/60*b*n*ln(e*x+d)/d^3/e^4
```

Rubi [A]
time = 0.14, antiderivative size = 226, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {45, 2382, 12, 1634}

$$\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}+\frac{bn\log(x)}{60d^3e^4}-\frac{bn\log(d+ex)}{60d^3e^4}-\frac{bd^2n}{30e^4(d+ex)^5}+\frac{bn}{60d^2e^4(d+ex)}+\frac{13bdn}{120e^4(d+ex)^4}-\frac{19bn}{180e^4(d+ex)^3}+\frac{bn}{120de^4(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/30*(b*d^2*n)/(e^4*(d + e*x)^5) + (13*b*d*n)/(120*e^4*(d + e*x)^4) - (19*
b*n)/(180*e^4*(d + e*x)^3) + (b*n)/(120*d*e^4*(d + e*x)^2) + (b*n)/(60*d^2*
e^4*(d + e*x)) + (b*n*Log[x])/(60*d^3*e^4) + (d^3*(a + b*Log[c*x^n]))/(6*e^
4*(d + e*x)^6) - (3*d^2*(a + b*Log[c*x^n]))/(5*e^4*(d + e*x)^5) + (3*d*(a +
 b*Log[c*x^n]))/(4*e^4*(d + e*x)^4) - (a + b*Log[c*x^n])/(3*e^4*(d + e*x)^3
) - (b*n*Log[d + e*x])/(60*d^3*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 1634

```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
```

```
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2]) && GtQ[E
xpon[Px, x], 2]
```

Rule 2382

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Dist[a + b*Log[c*x
^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a,
b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6} - \frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5} + \frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4} - \frac{a+b\log(cx^n)}{3e^4(d+ex)}$$

$$= \frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6} - \frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5} + \frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4} - \frac{a+b\log(cx}{3e^4(d+ex)}$$

$$= \frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6} - \frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5} + \frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4} - \frac{a+b\log(cx}{3e^4(d+ex)}$$

$$= -\frac{bd^2n}{30e^4(d+ex)^5} + \frac{13bdn}{120e^4(d+ex)^4} - \frac{19bn}{180e^4(d+ex)^3} + \frac{bn}{120de^4(d+ex)^2} + \frac{}{60d^2}$$

Mathematica [A]
time = 0.16, size = 281, normalized size = 1.24

$$\frac{ad^3}{6e^4(d+ex)^6} - \frac{3ad^2}{5e^4(d+ex)^5} - \frac{bd^2n}{30e^4(d+ex)^5} + \frac{3ad}{4e^4(d+ex)^4} + \frac{13bdn}{120e^4(d+ex)^4} - \frac{a}{3e^4(d+ex)^3} - \frac{19bn}{180e^4(d+ex)^3} + \frac{bn}{120de^4(d+ex)^2} + \frac{bn}{60d^2e^4(d+ex)} + \frac{bn\log(x)}{60d^3e^4} + \frac{bd^3\log(cx^n)}{6e^4(d+ex)^6} - \frac{3bd^2\log(cx^n)}{5e^4(d+ex)^5} + \frac{3bd\log(cx^n)}{4e^4(d+ex)^4} - \frac{b\log(cx^n)}{3e^4(d+ex)^3} - \frac{bn\log(d+ex)}{60d^3e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (a*d^3)/(6*e^4*(d + e*x)^6) - (3*a*d^2)/(5*e^4*(d + e*x)^5) - (b*d^2*n)/(30
*e^4*(d + e*x)^5) + (3*a*d)/(4*e^4*(d + e*x)^4) + (13*b*d*n)/(120*e^4*(d +
e*x)^4) - a/(3*e^4*(d + e*x)^3) - (19*b*n)/(180*e^4*(d + e*x)^3) + (b*n)/(1
20*d*e^4*(d + e*x)^2) + (b*n)/(60*d^2*e^4*(d + e*x)) + (b*n*Log[x])/(60*d^3
*e^4) + (b*d^3*Log[c*x^n])/(6*e^4*(d + e*x)^6) - (3*b*d^2*Log[c*x^n])/(5*e^
4*(d + e*x)^5) + (3*b*d*Log[c*x^n])/(4*e^4*(d + e*x)^4) - (b*Log[c*x^n])/(3
*e^4*(d + e*x)^3) - (b*n*Log[d + e*x])/(60*d^3*e^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 867, normalized size = 3.84

method	result
risch	$-\frac{b(20e^3x^3+15d\,e^2x^2+6d^2ex+d^3)\ln(x^n)}{60(ex+d)^6e^4}+\frac{-6\ln(c)b\,d^6-36\ln(ex+d)bd\,e^5n\,x^5-90\ln(ex+d)b\,d^2e^4n\,x^4-120\ln(ex+d)b\,d^3e^3n\,x^3-9}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/60*b*(20*e^3*x^3+15*d*e^2*x^2+6*d^2*e*x+d^3)/(e*x+d)^6/e^4*ln(x^n)+1/360
*(3*I*Pi*b*d^6*csgn(I*c*x^n)^3-6*ln(c)*b*d^6-45*I*Pi*b*d^4*e^2*x^2*csgn(I*x
^n)*csgn(I*c*x^n)^2-36*ln(e*x+d)*b*d*e^5*n*x^5-90*ln(e*x+d)*b*d^2*e^4*n*x^4
-120*ln(e*x+d)*b*d^3*e^3*n*x^3-90*ln(e*x+d)*b*d^4*e^2*n*x^2-36*ln(e*x+d)*b*
d^5*e*n*x+36*ln(-x)*b*d*e^5*n*x^5+90*ln(-x)*b*d^2*e^4*n*x^4+120*ln(-x)*b*d^
3*e^3*n*x^3-60*I*Pi*b*d^3*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-120*a*d^3*e^3
*x^3-90*a*d^4*e^2*x^2-36*a*d^5*e*x-2*b*d^6*n-60*I*Pi*b*d^3*e^3*x^3*csgn(I*c
)*csgn(I*c*x^n)^2-18*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(I*c*x^n)^2-3*I*Pi*b*d^6*
csgn(I*c)*csgn(I*c*x^n)^2-3*I*Pi*b*d^6*csgn(I*x^n)*csgn(I*c*x^n)^2-18*I*Pi*
b*d^5*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+45*I*Pi*b*d^4*e^2*x^2*csgn(I*c*x^n)^3
-45*I*Pi*b*d^4*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+90*ln(-x)*b*d^4*e^2*n*x^2+
36*ln(-x)*b*d^5*e*n*x-6*a*d^6-6*ln(e*x+d)*b*d^6*n+6*ln(-x)*b*d^6*n+3*b*d^4*
e^2*n*x^2-6*b*d^5*e*n*x+6*b*d*e^5*n*x^5+33*b*d^2*e^4*n*x^4+34*b*d^3*e^3*n*x
^3-6*ln(e*x+d)*b*e^6*n*x^6+6*ln(-x)*b*e^6*n*x^6-120*ln(c)*b*d^3*e^3*x^3-90*
ln(c)*b*d^4*e^2*x^2-36*ln(c)*b*d^5*e*x+45*I*Pi*b*d^4*e^2*x^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+60*I*Pi*b*d^3*e^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)+60*I*Pi*b*d^3*e^3*x^3*csgn(I*c*x^n)^3+18*I*Pi*b*d^5*e*x*csgn(I*c*x^n)^
3+3*I*Pi*b*d^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+18*I*Pi*b*d^5*e*x*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n))/e^4/d^3/(e*x+d)^6
```

Maxima [A]
time = 0.29, size = 313, normalized size = 1.38

$$\frac{1}{360}\,bn\left(\frac{6\,x^4e^4+27\,dx^3e^3+7\,d^2x^2e^2-4\,d^3xe-2\,d^4}{d^2x^5e^9+5\,d^3x^4e^8+10\,d^4x^3e^7+10\,d^5x^2e^6+5\,d^6xe^5+d^7e^4}-\frac{6\,e^{(-4)}\log\left(xe+d\right)}{d^3}+\frac{6\,e^{(-4)}\log\left(x\right)}{d^3}\right)-\frac{(20\,x^3e^3+15\,dx^2e^2+6\,d^2xe+d^3)b\log\left(cx^n\right)}{60\,(x^6e^{10}+6\,dx^5e^9+15\,d^2x^4e^8+20\,d^3x^3e^7+15\,d^4x^2e^6+6\,d^5xe^5+d^6e^4)}-\frac{(20\,x^3e^3+15\,dx^2e^2+6\,d^2xe+d^3)a}{60\,(x^6e^{10}+6\,dx^5e^9+15\,d^2x^4e^8+20\,d^3x^3e^7+15\,d^4x^2e^6+6\,d^5xe^5+d^6e^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/360*b*n*((6*x^4*e^4 + 27*d*x^3*e^3 + 7*d^2*x^2*e^2 - 4*d^3*x*e - 2*d^4)/(
d^2*x^5*e^9 + 5*d^3*x^4*e^8 + 10*d^4*x^3*e^7 + 10*d^5*x^2*e^6 + 5*d^6*x*e^5
 + d^7*e^4) - 6*e^(-4)*log(x*e + d)/d^3 + 6*e^(-4)*log(x)/d^3) - 1/60*(20*x
^3*e^3 + 15*d*x^2*e^2 + 6*d^2*x*e + d^3)*b*log(c*x^n)/(x^6*e^10 + 6*d*x^5*e
^9 + 15*d^2*x^4*e^8 + 20*d^3*x^3*e^7 + 15*d^4*x^2*e^6 + 6*d^5*x*e^5 + d^6*e
^4) - 1/60*(20*x^3*e^3 + 15*d*x^2*e^2 + 6*d^2*x*e + d^3)*a/(x^6*e^10 + 6*d*
x^5*e^9 + 15*d^2*x^4*e^8 + 20*d^3*x^3*e^7 + 15*d^4*x^2*e^6 + 6*d^5*x*e^5 +
d^6*e^4)
```

Fricas [**A**]
time = 0.36, size = 319, normalized size = 1.41

$$\frac{6\,bdnx^5e^5 + 33\,bd^2nx^4e^4 - 2\,bd^6n - 6\,ad^6 + 2\,(17\,bd^3n - 60\,ad^3)x^3e^3 + 3\,(bd^4n - 30\,ad^4)x^2e^2 - 6\,(bd^5n + 6\,ad^5)xe - 6\,(bnx^6e^6 + 6\,bdnx^5e^5 + 15\,bd^2nx^4e^4 + 20\,bd^3nx^3e^3 + 15\,bd^4nx^2e^2 + 6\,bd^5nxe + bd^6n)\log\left(xe + d\right) - 6\,(20\,bd^3x^3e^3 + 15\,bd^4x^2e^2 + 6\,bd^5xe + bd^6)\log\left(c\right) + 6\,(bnx^6e^6 + 6\,bdnx^5e^5 + 15\,bd^2nx^4e^4)\log\left(x\right)}{360\,(d^3x^6e^{10} + 6\,d^4x^5e^9 + 15\,d^5x^4e^8 + 20\,d^6x^3e^7 + 15\,d^7x^2e^6 + 6\,d^8xe^5 + d^9e^4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] 1/360*(6*b*d*n*x^5*e^5 + 33*b*d^2*n*x^4*e^4 - 2*b*d^6*n - 6*a*d^6 + 2*(17*b
*d^3*n - 60*a*d^3)*x^3*e^3 + 3*(b*d^4*n - 30*a*d^4)*x^2*e^2 - 6*(b*d^5*n +
6*a*d^5)*x*e - 6*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 + 20*b
*d^3*n*x^3*e^3 + 15*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x*e + b*d^6*n)*log(x*e + d)
 - 6*(20*b*d^3*x^3*e^3 + 15*b*d^4*x^2*e^2 + 6*b*d^5*x*e + b*d^6)*log(c) + 6
*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4)*log(x))/(d^3*x^6*e^10
 + 6*d^4*x^5*e^9 + 15*d^5*x^4*e^8 + 20*d^6*x^3*e^7 + 15*d^7*x^2*e^6 + 6*d^8
*x*e^5 + d^9*e^4)
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1979 vs. $2(224) = 448$.
time = 84.07, size = 1979, normalized size = 8.76

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] Piecewise((zoo*(-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3)), Eq(d,
 0) & Eq(e, 0)), ((a*x**4/4 - b*n*x**4/16 + b*x**4*log(c*x**n)/4)/d**7, Eq(
e, 0)), ((-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3))/e**7, Eq(d,
0)), (-6*a*d**6/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7
200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e
**10*x**6) - 36*a*d**5*e*x/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e*
*6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 +
 360*d**3*e**10*x**6) - 90*a*d**4*e**2*x**2/(360*d**9*e**4 + 2160*d**8*e**5
*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160
*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 120*a*d**3*e**3*x**3/(360*d**9*e**
4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**
5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 6*b*d**6*n*log(d
/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6
*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**
6) - 2*b*d**6*n/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7
200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e
**10*x**6) - 36*b*d**5*e*n*x*log(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x
 + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d
**4*e**9*x**5 + 360*d**3*e**10*x**6) - 6*b*d**5*e*n*x/(360*d**9*e**4 + 2160
```

```
*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x
**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 90*b*d**4*e**2*n*x**2*lo
g(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d
**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*
x**6) + 3*b*d**4*e**2*n*x**2/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*
e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5
 + 360*d**3*e**10*x**6) - 120*b*d**3*e**3*n*x**3*log(d/e + x)/(360*d**9*e**
4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**
5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) + 34*b*d**3*e**3*n
*x**3/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e
**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6)
 - 90*b*d**2*e**4*n*x**4*log(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5
400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*
e**9*x**5 + 360*d**3*e**10*x**6) + 33*b*d**2*e**4*n*x**4/(360*d**9*e**4 + 2
160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**
8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) + 90*b*d**2*e**4*x**4*l
og(c*x**n)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d
**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*
x**6) - 36*b*d*e**5*n*x**5*log(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x +
 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**
4*e**9*x**5 + 360*d**3*e**10*x**6) + 6*b*d*e**5*n*x**5/(360*d**9*e**4 + 216
0*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*
x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) + 36*b*d*e**5*x**5*log(c*
x**n)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e
**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6)
 - 6*b*e**6*n*x**6*log(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d*
*7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x
**5 + 360*d**3*e**10*x**6) + 6*b*e**6*x**6*log(c*x**n)/(360*d**9*e**4 + 216
0*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*
x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6), True))
```

Giac [A]
time = 2.63, size = 372, normalized size = 1.65

$$-\frac{6\,bnx^6e^6\log\left(xe+d\right)+36\,bdnx^5e^5\log\left(xe+d\right)+90\,bd^2nx^4e^4\log\left(xe+d\right)+120\,bd^3nx^3e^3\log\left(xe+d\right)+90\,bd^4nx^2e^2\log\left(xe+d\right)+36\,bd^5nxe\log\left(xe+d\right)-6\,bnx^6e^6\log\left(x\right)-36\,bdnx^5e^5\log\left(x\right)-90\,bd^2nx^4e^4\log\left(x\right)-6\,bdnx^5e^5-33\,bd^2nx^4e^4-34\,bd^3nx^3e^3-3\,bd^4nx^2e^2+6\,bd^5nxe+6\,bd^6n\log\left(xe+d\right)+120\,bd^3x^3e^3\log\left(c\right)+90\,bd^4x^2e^2\log\left(c\right)+36\,bd^5xe\log\left(c\right)+2\,bd^6n+120\,ad^3x^3e^3+90\,ad^4x^2e^2+36\,ad^5xe+6\,bd^6\log\left(c\right)+6\,ad^6}{360\left(d^3x^6e^{10}+6\,d^4x^5e^9+15\,d^5x^4e^8+20\,d^6x^3e^7+15\,d^7x^2e^6+6\,d^8xe^5+d^9e^4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] -1/360*(6*b*n*x^6*e^6*log(x*e + d) + 36*b*d*n*x^5*e^5*log(x*e + d) + 90*b*d
^2*n*x^4*e^4*log(x*e + d) + 120*b*d^3*n*x^3*e^3*log(x*e + d) + 90*b*d^4*n*x
^2*e^2*log(x*e + d) + 36*b*d^5*n*x*e*log(x*e + d) - 6*b*n*x^6*e^6*log(x) -
36*b*d*n*x^5*e^5*log(x) - 90*b*d^2*n*x^4*e^4*log(x) - 6*b*d*n*x^5*e^5 - 33*
b*d^2*n*x^4*e^4 - 34*b*d^3*n*x^3*e^3 - 3*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x*e +
6*b*d^6*n*log(x*e + d) + 120*b*d^3*x^3*e^3*log(c) + 90*b*d^4*x^2*e^2*log(c)
```

```
 + 36*b*d^5*x*e*log(c) + 2*b*d^6*n + 120*a*d^3*x^3*e^3 + 90*a*d^4*x^2*e^2 +
 36*a*d^5*x*e + 6*b*d^6*log(c) + 6*a*d^6)/(d^3*x^6*e^10 + 6*d^4*x^5*e^9 + 1
5*d^5*x^4*e^8 + 20*d^6*x^3*e^7 + 15*d^7*x^2*e^6 + 6*d^8*x*e^5 + d^9*e^4)
```

Mupad [B]
time = 4.23, size = 296, normalized size = 1.31

$$-\frac{x^3\,\left(20\,a\,e^3-\frac{17\,b\,e^3\,n}{3}\right)+x\,\left(6\,a\,d^2\,e+b\,d^2\,e\,n\right)+a\,d^3+x^2\,\left(15\,a\,d\,e^2-\frac{b\,d\,e^2\,n}{2}\right)+\frac{b\,d^3\,n}{3}-\frac{11\,b\,e^4\,n\,x^4}{2\,d}-\frac{b\,e^5\,n\,x^5}{d^2}}{60\,d^6\,e^4+360\,d^5\,e^5\,x+900\,d^4\,e^6\,x^2+1200\,d^3\,e^7\,x^3+900\,d^2\,e^8\,x^4+360\,d\,e^9\,x^5+60\,e^{10}\,x^6}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{60\,e^4}+\frac{b\,x^3}{3\,e}+\frac{b\,d\,x^2}{4\,e^2}+\frac{b\,d^2\,x}{10\,e^3}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{30\,d^3\,e^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

```
[Out] - (x^3*(20*a*e^3 - (17*b*e^3*n)/3) + x*(6*a*d^2*e + b*d^2*e*n) + a*d^3 + x^
2*(15*a*d*e^2 - (b*d*e^2*n)/2) + (b*d^3*n)/3 - (11*b*e^4*n*x^4)/(2*d) - (b*
e^5*n*x^5)/d^2)/(60*d^6*e^4 + 60*e^10*x^6 + 360*d^5*e^5*x + 360*d*e^9*x^5 +
 900*d^4*e^6*x^2 + 1200*d^3*e^7*x^3 + 900*d^2*e^8*x^4) - (log(c*x^n)*((b*d^
3)/(60*e^4) + (b*x^3)/(3*e) + (b*d*x^2)/(4*e^2) + (b*d^2*x)/(10*e^3)))/(d^6
 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4
 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(30*d^3*e^4)
```

3.68 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=199

$$\frac{bdn}{30e^3(d+ex)^5}-\frac{7bn}{120e^3(d+ex)^4}+\frac{bn}{180de^3(d+ex)^3}+\frac{bn}{120d^2e^3(d+ex)^2}+\frac{bn}{60d^3e^3(d+ex)}+\frac{bn\log(x)}{60d^4e^3}-\frac{d^2(a+b}{6e^3(d}$$

```
[Out] 1/30*b*d*n/e^3/(e*x+d)^5-7/120*b*n/e^3/(e*x+d)^4+1/180*b*n/d/e^3/(e*x+d)^3+
1/120*b*n/d^2/e^3/(e*x+d)^2+1/60*b*n/d^3/e^3/(e*x+d)+1/60*b*n*ln(x)/d^4/e^3
-1/6*d^2*(a+b*ln(c*x^n))/e^3/(e*x+d)^6+2/5*d*(a+b*ln(c*x^n))/e^3/(e*x+d)^5+
1/4*(-a-b*ln(c*x^n))/e^3/(e*x+d)^4-1/60*b*n*ln(e*x+d)/d^4/e^3
```

Rubi [A]
time = 0.12, antiderivative size = 199, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = $\{45, 2382, 12, 907\}$

$$-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}+\frac{bn\log(x)}{60d^4e^3}-\frac{bn\log(d+ex)}{60d^4e^3}+\frac{bn}{60d^3e^3(d+ex)}+\frac{bn}{120d^2e^3(d+ex)^2}+\frac{bdn}{30e^3(d+ex)^5}-\frac{7bn}{120e^3(d+ex)^4}+\frac{bn}{180de^3(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (b*d*n)/(30*e^3*(d + e*x)^5) - (7*b*n)/(120*e^3*(d + e*x)^4) + (b*n)/(180*d
*e^3*(d + e*x)^3) + (b*n)/(120*d^2*e^3*(d + e*x)^2) + (b*n)/(60*d^3*e^3*(d
+ e*x)) + (b*n*Log[x])/(60*d^4*e^3) - (d^2*(a + b*Log[c*x^n]))/(6*e^3*(d +
e*x)^6) + (2*d*(a + b*Log[c*x^n]))/(5*e^3*(d + e*x)^5) - (a + b*Log[c*x^n])
/(4*e^3*(d + e*x)^4) - (b*n*Log[d + e*x])/(60*d^4*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 907

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f + g
*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ
[e*f - d*g, 0] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && I
```

```
ntegerQ[p] && ((EqQ[p, 1] && IntegersQ[m, n]) || (ILtQ[m, 0] && ILtQ[n, 0])
)
```

Rule 2382

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Dist[a + b*Log[c*x
^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a,
b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6} + \frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5} - \frac{a+b\log(cx^n)}{4e^3(d+ex)^4} - (bn)\int \frac{-d^2-6\ldots}{60e^3x\ldots}$$

$$= -\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6} + \frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5} - \frac{a+b\log(cx^n)}{4e^3(d+ex)^4} - \frac{(bn)\int \frac{-d^2-6dex-\ldots}{x(d+ex\ldots}}{60e^3}$$

$$= -\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6} + \frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5} - \frac{a+b\log(cx^n)}{4e^3(d+ex)^4} - \frac{(bn)\int\left(-\frac{1}{d^4x}+\ldots\right.}{\ldots}$$

$$= \frac{bdn}{30e^3(d+ex)^5} - \frac{7bn}{120e^3(d+ex)^4} + \frac{bn}{180de^3(d+ex)^3} + \frac{bn}{120d^2e^3(d+ex)^2} + \frac{\ldots}{60d\ldots}$$

Mathematica [A]
time = 0.13, size = 192, normalized size = 0.96

$$\frac{-60ad^6+144ad^5(d+ex)+12bd^5n(d+ex)-90ad^4(d+ex)^2-21bd^4n(d+ex)^2+2bd^3n(d+ex)^3+3bd^2n(d+ex)^4+6bdn(d+ex)^5+6bn(d+ex)^6\log(x)-60bd^6\log(cx^n)+144bd^5(d+ex)\log(cx^n)-90bd^4(d+ex)^2\log(cx^n)-6bn(d+ex)^6\log(d+ex)}{360d^4e^3(d+ex)^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (-60*a*d^6 + 144*a*d^5*(d + e*x) + 12*b*d^5*n*(d + e*x) - 90*a*d^4*(d + e*x
)^2 - 21*b*d^4*n*(d + e*x)^2 + 2*b*d^3*n*(d + e*x)^3 + 3*b*d^2*n*(d + e*x)^
4 + 6*b*d*n*(d + e*x)^5 + 6*b*n*(d + e*x)^6*Log[x] - 60*b*d^6*Log[c*x^n] +
144*b*d^5*(d + e*x)*Log[c*x^n] - 90*b*d^4*(d + e*x)^2*Log[c*x^n] - 6*b*n*(d
 + e*x)^6*Log[d + e*x])/(360*d^4*e^3*(d + e*x)^6)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 712, normalized size = 3.58

method	result

risch	$-\frac{b(15e^2x^2+6dex+d^2)\ln(x^n)}{60(ex+d)^6e^3} - \frac{6\ln(c)b\,d^6+36\ln(ex+d)bd\,e^5n\,x^5+90\ln(ex+d)b\,d^2e^4n\,x^4+120\ln(ex+d)b\,d^3e^3n\,x^3+90\ln(ex+d)b\,\ldots}{\ldots}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/60*b*(15*e^2*x^2+6*d*e*x+d^2)/(e*x+d)^6/e^3*ln(x^n)-1/360*(-3*I*Pi*b*d^6
*csgn(I*c*x^n)^3+18*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(I*c*x^n)^2+18*I*Pi*b*d^5*
e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+45*I*Pi*b*d^4*e^2*x^2*csgn(I*c)*csgn(I*c*x^
n)^2-45*I*Pi*b*d^4*e^2*x^2*csgn(I*c*x^n)^3-18*I*Pi*b*d^5*e*x*csgn(I*c*x^n)^
3-3*I*Pi*b*d^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*ln(c)*b*d^6+36*ln(e*x+
d)*b*d*e^5*n*x^5+90*ln(e*x+d)*b*d^2*e^4*n*x^4+120*ln(e*x+d)*b*d^3*e^3*n*x^3
+90*ln(e*x+d)*b*d^4*e^2*n*x^2+36*ln(e*x+d)*b*d^5*e*n*x-36*ln(-x)*b*d*e^5*n*
x^5-90*ln(-x)*b*d^2*e^4*n*x^4-120*ln(-x)*b*d^3*e^3*n*x^3+90*a*d^4*e^2*x^2+3
6*a*d^5*e*x-2*b*d^6*n+45*I*Pi*b*d^4*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+3*I
*Pi*b*d^6*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi*b*d^6*csgn(I*x^n)*csgn(I*c*x^n)^
2-90*ln(-x)*b*d^4*e^2*n*x^2-36*ln(-x)*b*d^5*e*n*x+6*a*d^6+6*ln(e*x+d)*b*d^6
*n-6*ln(-x)*b*d^6*n-63*b*d^4*e^2*n*x^2-18*b*d^5*e*n*x-6*b*d*e^5*n*x^5-33*b*
d^2*e^4*n*x^4-74*b*d^3*e^3*n*x^3+6*ln(e*x+d)*b*e^6*n*x^6-6*ln(-x)*b*e^6*n*x
^6+90*ln(c)*b*d^4*e^2*x^2+36*ln(c)*b*d^5*e*x-45*I*Pi*b*d^4*e^2*x^2*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)-18*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n))/d^4/e^3/(e*x+d)^6
```

Maxima [A]
time = 0.30, size = 293, normalized size = 1.47

$$\frac{1}{360}\,bn\left(\frac{6\,x^4e^4+27\,dx^3e^3+47\,d^2x^2e^2+16\,d^3xe+2\,d^4}{d^3x^5e^8+5\,d^4x^4e^7+10\,d^5x^3e^6+10\,d^6x^2e^5+5\,d^7xe^4+d^8e^3}-\frac{6\,e^{(-3)}\log\left(xe+d\right)}{d^4}+\frac{6\,e^{(-3)}\log\left(x\right)}{d^4}\right)-\frac{(15\,x^2e^2+6\,dxe+d^2)b\log\left(cx^n\right)}{60\,(x^6e^9+6\,dx^5e^8+15\,d^2x^4e^7+20\,d^3x^3e^6+15\,d^4x^2e^5+6\,d^5xe^4+d^6e^3)}-\frac{(15\,x^2e^2+6\,dxe+d^2)a}{60\,(x^6e^9+6\,dx^5e^8+15\,d^2x^4e^7+20\,d^3x^3e^6+15\,d^4x^2e^5+6\,d^5xe^4+d^6e^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/360*b*n*((6*x^4*e^4 + 27*d*x^3*e^3 + 47*d^2*x^2*e^2 + 16*d^3*x*e + 2*d^4)
/(d^3*x^5*e^8 + 5*d^4*x^4*e^7 + 10*d^5*x^3*e^6 + 10*d^6*x^2*e^5 + 5*d^7*x*e
^4 + d^8*e^3) - 6*e^(-3)*log(x*e + d)/d^4 + 6*e^(-3)*log(x)/d^4) - 1/60*(15
*x^2*e^2 + 6*d*x*e + d^2)*b*log(c*x^n)/(x^6*e^9 + 6*d*x^5*e^8 + 15*d^2*x^4*
e^7 + 20*d^3*x^3*e^6 + 15*d^4*x^2*e^5 + 6*d^5*x*e^4 + d^6*e^3) - 1/60*(15*x
^2*e^2 + 6*d*x*e + d^2)*a/(x^6*e^9 + 6*d*x^5*e^8 + 15*d^2*x^4*e^7 + 20*d^3*
x^3*e^6 + 15*d^4*x^2*e^5 + 6*d^5*x*e^4 + d^6*e^3)
```

Fricas [A]
time = 0.35, size = 312, normalized size = 1.57

$$\frac{6\,bdnx^5e^5+33\,bd^2nx^4e^4+74\,bd^3nx^3e^3+2\,bd^6n-6\,ad^6+9\,(7\,bd^4n-10\,ad^4)x^2e^2+18\,(bd^5n-2\,ad^5)xe-6\,(bnx^6e^6+6\,bdnx^5e^5+15\,bd^2nx^4e^4+20\,bd^3nx^3e^3+15\,bd^4nx^2e^2+6\,bd^5nxe+bd^6n)\log\left(xe+d\right)-6\,(15\,bd^4x^2e^2+6\,bd^5xe+bd^6)\log\left(c\right)+6\,(bnx^6e^6+6\,bdnx^5e^5+15\,bd^2nx^4e^4+20\,bd^3nx^3e^3)\log\left(x\right)}{360\,(d^4x^6e^9+6\,d^5x^5e^8+15\,d^6x^4e^7+20\,d^7x^3e^6+15\,d^8x^2e^5+6\,d^9xe^4+d^{10}e^3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] 1/360*(6*b*d*n*x^5*e^5 + 33*b*d^2*n*x^4*e^4 + 74*b*d^3*n*x^3*e^3 + 2*b*d^6*
n - 6*a*d^6 + 9*(7*b*d^4*n - 10*a*d^4)*x^2*e^2 + 18*(b*d^5*n - 2*a*d^5)*x*e
 - 6*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3*e
^3 + 15*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x*e + b*d^6*n)*log(x*e + d) - 6*(15*b*d
^4*x^2*e^2 + 6*b*d^5*x*e + b*d^6)*log(c) + 6*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5
 + 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3*e^3)*log(x))/(d^4*x^6*e^9 + 6*d^5*x^
5*e^8 + 15*d^6*x^4*e^7 + 20*d^7*x^3*e^6 + 15*d^8*x^2*e^5 + 6*d^9*x*e^4 + d^
10*e^3)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1986 vs. $2(196) = 392$.
time = 85.27, size = 1986, normalized size = 9.98

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] Piecewise((zoo*(-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4)), Eq(d
, 0) & Eq(e, 0)), ((-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4))/e
**7, Eq(d, 0)), ((a*x**3/3 - b*n*x**3/9 + b*x**3*log(c*x**n)/3)/d**7, Eq(e,
 0)), (-6*a*d**6/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 +
 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4
*e**9*x**6) - 36*a*d**5*e*x/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*
e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5
 + 360*d**4*e**9*x**6) - 90*a*d**4*e**2*x**2/(360*d**10*e**3 + 2160*d**9*e*
*4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 21
60*d**5*e**8*x**5 + 360*d**4*e**9*x**6) - 6*b*d**6*n*log(d/e + x)/(360*d**1
0*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 540
0*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 2*b*d**6*n/(
360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x*
*3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) - 36*b
*d**5*e*n*x*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**
5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 +
360*d**4*e**9*x**6) + 18*b*d**5*e*n*x/(360*d**10*e**3 + 2160*d**9*e**4*x +
5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5
*e**8*x**5 + 360*d**4*e**9*x**6) - 90*b*d**4*e**2*n*x**2*log(d/e + x)/(360*
d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 +
 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 63*b*d**
4*e**2*n*x**2/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 72
00*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e*
*9*x**6) - 120*b*d**3*e**3*n*x**3*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*
e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 +
2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 74*b*d**3*e**3*n*x**3/(360*d**1
```

```
0*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 540
0*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 120*b*d**3*e
**3*x**3*log(c*x**n)/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x*
*2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*
d**4*e**9*x**6) - 90*b*d**2*e**4*n*x**4*log(d/e + x)/(360*d**10*e**3 + 2160
*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x
**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 33*b*d**2*e**4*n*x**4/(36
0*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3
 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 90*b*d
**2*e**4*x**4*log(c*x**n)/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e*
*5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 +
 360*d**4*e**9*x**6) - 36*b*d*e**5*n*x**5*log(d/e + x)/(360*d**10*e**3 + 21
60*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7
*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 6*b*d*e**5*n*x**5/(360*
d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 +
 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 36*b*d*e
**5*x**5*log(c*x**n)/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x*
*2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*
d**4*e**9*x**6) - 6*b*e**6*n*x**6*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*
e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 +
2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) + 6*b*e**6*x**6*log(c*x**n)/(360*
d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 +
 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 362 vs. 2(178) = 356.
time = 3.80, size = 362, normalized size = 1.82

$$-\frac{6\,bnx^6e^6\log\left(xe+d\right)+36\,bdnx^5e^5\log\left(xe+d\right)+90\,bd^2nx^4e^4\log\left(xe+d\right)+120\,bd^3nx^3e^3\log\left(xe+d\right)+90\,bd^4nx^2e^2\log\left(xe+d\right)+36\,bd^5nxe\log\left(xe+d\right)-6\,bnx^6e^6\log\left(x\right)-36\,bdnx^5e^5\log\left(x\right)-90\,bd^2nx^4e^4\log\left(x\right)-120\,bd^3nx^3e^3\log\left(x\right)-6\,bdnx^5e^5-33\,bd^2nx^4e^4-74\,bd^3nx^3e^3-63\,bd^4nx^2e^2-18\,bd^5nxe+6\,bd^6n\log\left(xe+d\right)+90\,bd^4x^2e^2\log\left(c\right)+36\,bd^5xe\log\left(c\right)-2\,bd^6n+90\,ad^4x^2e^2+36\,ad^5xe+6\,bd^6\log\left(c\right)+6\,ad^6}{360\,\left(d^4x^6e^9+6\,d^5x^5e^8+15\,d^6x^4e^7+20\,d^7x^3e^6+15\,d^8x^2e^5+6\,d^9xe^4+d^{10}e^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] -1/360*(6*b*n*x^6*e^6*log(x*e + d) + 36*b*d*n*x^5*e^5*log(x*e + d) + 90*b*d
^2*n*x^4*e^4*log(x*e + d) + 120*b*d^3*n*x^3*e^3*log(x*e + d) + 90*b*d^4*n*x
^2*e^2*log(x*e + d) + 36*b*d^5*n*x*e*log(x*e + d) - 6*b*n*x^6*e^6*log(x) -
36*b*d*n*x^5*e^5*log(x) - 90*b*d^2*n*x^4*e^4*log(x) - 120*b*d^3*n*x^3*e^3*l
og(x) - 6*b*d*n*x^5*e^5 - 33*b*d^2*n*x^4*e^4 - 74*b*d^3*n*x^3*e^3 - 63*b*d^
4*n*x^2*e^2 - 18*b*d^5*n*x*e + 6*b*d^6*n*log(x*e + d) + 90*b*d^4*x^2*e^2*lo
g(c) + 36*b*d^5*x*e*log(c) - 2*b*d^6*n + 90*a*d^4*x^2*e^2 + 36*a*d^5*x*e +
6*b*d^6*log(c) + 6*a*d^6)/(d^4*x^6*e^9 + 6*d^5*x^5*e^8 + 15*d^6*x^4*e^7 + 2
0*d^7*x^3*e^6 + 15*d^8*x^2*e^5 + 6*d^9*x*e^4 + d^10*e^3)
```

Mupad [B]
time = 3.93, size = 275, normalized size = 1.38

$$\frac{\frac{b\,d^2\,n}{3}-a\,d^2-x\,\left(6\,a\,d\,e-3\,b\,d\,e\,n\right)-x^2\,\left(15\,a\,e^2-\frac{21\,b\,e^2\,n}{2}\right)+\frac{37\,b\,e^3\,n\,x^3}{3\,d}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^2}+\frac{b\,e^5\,n\,x^5}{d^3}}{60\,d^6\,e^3+360\,d^5\,e^4\,x+900\,d^4\,e^5\,x^2+1200\,d^3\,e^6\,x^3+900\,d^2\,e^7\,x^4+360\,d\,e^8\,x^5+60\,e^9\,x^6}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{60\,e^3}+\frac{b\,x^2}{4\,e}+\frac{b\,d\,x}{10\,e^2}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{30\,d^4\,e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

```
[Out] ((b*d^2*n)/3 - a*d^2 - x*(6*a*d*e - 3*b*d*e*n) - x^2*(15*a*e^2 - (21*b*e^2*
n)/2) + (37*b*e^3*n*x^3)/(3*d) + (11*b*e^4*n*x^4)/(2*d^2) + (b*e^5*n*x^5)/d
^3)/(60*d^6*e^3 + 60*e^9*x^6 + 360*d^5*e^4*x + 360*d*e^8*x^5 + 900*d^4*e^5*
x^2 + 1200*d^3*e^6*x^3 + 900*d^2*e^7*x^4) - (log(c*x^n)*((b*d^2)/(60*e^3) +
 (b*x^2)/(4*e) + (b*d*x)/(10*e^2)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e
^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/
d + 1))/(30*d^4*e^3)
```

3.69 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$

Optimal. Leaf size=174

$$-\frac{bn}{30e^2(d+ex)^5}+\frac{bn}{120de^2(d+ex)^4}+\frac{bn}{90d^2e^2(d+ex)^3}+\frac{bn}{60d^3e^2(d+ex)^2}+\frac{bn}{30d^4e^2(d+ex)}+\frac{bn\log(x)}{30d^5e^2}+\frac{d(a+b}{6e^2(}$$

```
[Out] -1/30*b*n/e^2/(e*x+d)^5+1/120*b*n/d/e^2/(e*x+d)^4+1/90*b*n/d^2/e^2/(e*x+d)^
3+1/60*b*n/d^3/e^2/(e*x+d)^2+1/30*b*n/d^4/e^2/(e*x+d)+1/30*b*n*ln(x)/d^5/e^
2+1/6*d*(a+b*ln(c*x^n))/e^2/(e*x+d)^6+1/5*(-a-b*ln(c*x^n))/e^2/(e*x+d)^5-1/
30*b*n*ln(e*x+d)/d^5/e^2
```

Rubi [A]
time = 0.09, antiderivative size = 174, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {45, 2382, 12, 78}

$$-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}+\frac{bn\log(x)}{30d^5e^2}-\frac{bn\log(d+ex)}{30d^5e^2}+\frac{bn}{30d^4e^2(d+ex)}+\frac{bn}{60d^3e^2(d+ex)^2}+\frac{bn}{90d^2e^2(d+ex)^3}+\frac{bn}{120de^2(d+ex)^4}-\frac{bn}{30e^2(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] -1/30*(b*n)/(e^2*(d + e*x)^5) + (b*n)/(120*d*e^2*(d + e*x)^4) + (b*n)/(90*d
^2*e^2*(d + e*x)^3) + (b*n)/(60*d^3*e^2*(d + e*x)^2) + (b*n)/(30*d^4*e^2*(d
 + e*x)) + (b*n*Log[x])/(30*d^5*e^2) + (d*(a + b*Log[c*x^n]))/(6*e^2*(d + e
*x)^6) - (a + b*Log[c*x^n])/(5*e^2*(d + e*x)^5) - (b*n*Log[d + e*x])/(30*d^
5*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 78

```
Int[((a_.) + (b_.)*(x_))*((c_) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p_
.), x_Symbol] :> Int[ExpandIntegrand[(a + b*x)*(c + d*x)^n*(e + f*x)^p, x],
 x] /; FreeQ[{a, b, c, d, e, f, n}, x] && NeQ[b*c - a*d, 0] && ((ILtQ[n, 0]
 && ILtQ[p, 0]) || EqQ[p, 1] || (IGtQ[p, 0] && ( !IntegerQ[n] || LeQ[9*p +
```

```
5*(n + 2), 0] || GeQ[n + p + 1, 0] || (GeQ[n + p + 2, 0] && RationalQ[a, b,
 c, d, e, f]))))
```

Rule 2382

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Dist[a + b*Log[c*x
^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a,
b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx &= \frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6} - \frac{a+b\log(cx^n)}{5e^2(d+ex)^5} - (bn)\int \frac{-d-6ex}{30e^2x(d+ex)^6}\,dx \\ &= \frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6} - \frac{a+b\log(cx^n)}{5e^2(d+ex)^5} - \frac{(bn)\int \frac{-d-6ex}{x(d+ex)^6}\,dx}{30e^2} \\ &= \frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6} - \frac{a+b\log(cx^n)}{5e^2(d+ex)^5} - \frac{(bn)\int \left(-\frac{1}{d^5x} - \frac{5e}{(d+ex)^6} + \frac{e}{d(d+ex)^5} + \frac{e}{d^2(d+e}\right.}{30e} \\ &= -\frac{bn}{30e^2(d+ex)^5} + \frac{bn}{120de^2(d+ex)^4} + \frac{bn}{90d^2e^2(d+ex)^3} + \frac{bn}{60d^3e^2(d+ex)^2} + \frac{}{30d}\end{aligned}$$

Mathematica [A]
time = 0.10, size = 160, normalized size = 0.92

$$\frac{60ad^6-72ad^5(d+ex)-12bd^5n(d+ex)+3bd^4n(d+ex)^2+4bd^3n(d+ex)^3+6bd^2n(d+ex)^4+12bdn(d+ex)^5+12bn(d+ex)^6\log(x)+60bd^6\log(cx^n)-72bd^5(d+ex)\log(cx^n)-12bn(d+ex)^6\log(d+ex)}{360d^5e^2(d+ex)^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

```
[Out] (60*a*d^6 - 72*a*d^5*(d + e*x) - 12*b*d^5*n*(d + e*x) + 3*b*d^4*n*(d + e*x)
^2 + 4*b*d^3*n*(d + e*x)^3 + 6*b*d^2*n*(d + e*x)^4 + 12*b*d*n*(d + e*x)^5 +
 12*b*n*(d + e*x)^6*Log[x] + 60*b*d^6*Log[c*x^n] - 72*b*d^5*(d + e*x)*Log[c
*x^n] - 12*b*n*(d + e*x)^6*Log[d + e*x])/(360*d^5*e^2*(d + e*x)^6)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 557, normalized size = 3.20

method	result
risch	$-\frac{b(6ex+d)\ln(x^n)}{30(ex+d)^6e^2} - \frac{12\ln(c)bd^6+72\ln(ex+d)bde^5nx^5+180\ln(ex+d)bd^2e^4nx^4+240\ln(ex+d)bd^3e^3nx^3+180\ln(ex+d)bd^4e^2n}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/30*b*(6*e*x+d)/(e*x+d)^6/e^2*ln(x^n)-1/360*(36*I*Pi*b*d^5*e*x*csgn(I*x^n
)*csgn(I*c*x^n)^2+36*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(I*c*x^n)^2+12*ln(c)*b*d^
6-36*I*Pi*b*d^5*e*x*csgn(I*c*x^n)^3+72*ln(e*x+d)*b*d*e^5*n*x^5+180*ln(e*x+d
)*b*d^2*e^4*n*x^4+240*ln(e*x+d)*b*d^3*e^3*n*x^3+180*ln(e*x+d)*b*d^4*e^2*n*x
^2+72*ln(e*x+d)*b*d^5*e*n*x-72*ln(-x)*b*d*e^5*n*x^5-180*ln(-x)*b*d^2*e^4*n*
x^4-240*ln(-x)*b*d^3*e^3*n*x^3-6*I*Pi*b*d^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)+6*I*Pi*b*d^6*csgn(I*c)*csgn(I*c*x^n)^2+6*I*Pi*b*d^6*csgn(I*x^n)*csgn(I
*c*x^n)^2-6*I*Pi*b*d^6*csgn(I*c*x^n)^3+72*a*d^5*e*x-13*b*d^6*n-180*ln(-x)*b
*d^4*e^2*n*x^2-72*ln(-x)*b*d^5*e*n*x+12*a*d^6+12*ln(e*x+d)*b*d^6*n-12*ln(-x
)*b*d^6*n-171*b*d^4*e^2*n*x^2-90*b*d^5*e*n*x-12*b*d*e^5*n*x^5-66*b*d^2*e^4*
n*x^4-148*b*d^3*e^3*n*x^3+12*ln(e*x+d)*b*e^6*n*x^6-12*ln(-x)*b*e^6*n*x^6-36
*I*Pi*b*d^5*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+72*ln(c)*b*d^5*e*x)/e^2
/d^5/(e*x+d)^6
```

Maxima [A]
time = 0.32, size = 273, normalized size = 1.57

$$\frac{1}{360}\,bn\left(\frac{12\,x^4e^4+54\,dx^3e^3+94\,d^2x^2e^2+77\,d^3xe+13\,d^4}{d^4x^5e^7+5\,d^5x^4e^6+10\,d^6x^3e^5+10\,d^7x^2e^4+5\,d^8xe^3+d^9e^2}-\frac{12\,e^{(-2)}\log\left(xe+d\right)}{d^5}+\frac{12\,e^{(-2)}\log\left(x\right)}{d^5}\right)-\frac{(6\,xe+d)b\log\left(cx^n\right)}{30\,(x^6e^8+6\,dx^5e^7+15\,d^2x^4e^6+20\,d^3x^3e^5+15\,d^4x^2e^4+6\,d^5xe^3+d^6e^2)}-\frac{(6\,xe+d)a}{30\,(x^6e^8+6\,dx^5e^7+15\,d^2x^4e^6+20\,d^3x^3e^5+15\,d^4x^2e^4+6\,d^5xe^3+d^6e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/360*b*n*((12*x^4*e^4 + 54*d*x^3*e^3 + 94*d^2*x^2*e^2 + 77*d^3*x*e + 13*d^
4)/(d^4*x^5*e^7 + 5*d^5*x^4*e^6 + 10*d^6*x^3*e^5 + 10*d^7*x^2*e^4 + 5*d^8*x
*e^3 + d^9*e^2) - 12*e^(-2)*log(x*e + d)/d^5 + 12*e^(-2)*log(x)/d^5) - 1/30
*(6*x*e + d)*b*log(c*x^n)/(x^6*e^8 + 6*d*x^5*e^7 + 15*d^2*x^4*e^6 + 20*d^3*
x^3*e^5 + 15*d^4*x^2*e^4 + 6*d^5*x*e^3 + d^6*e^2) - 1/30*(6*x*e + d)*a/(x^6
*e^8 + 6*d*x^5*e^7 + 15*d^2*x^4*e^6 + 20*d^3*x^3*e^5 + 15*d^4*x^2*e^4 + 6*d
^5*x*e^3 + d^6*e^2)
```

Fricas [A]
time = 0.38, size = 305, normalized size = 1.75

$$\frac{12\,bdnx^5e^5+66\,bd^2nx^4e^4+148\,bd^3nx^3e^3+171\,bd^4nx^2e^2+13\,bd^6n-12\,ad^6+18\,(5\,bd^5n-4\,ad^5)xe-12\,(bnx^6e^6+6\,bdnx^5e^5+15\,bd^2nx^4e^4+20\,bd^3nx^3e^3+15\,bd^4nx^2e^2+6\,bd^5nxe+bd^6n)\log\left(xe+d\right)-12\,(6\,bd^5xe+bd^6)\log\left(c\right)+12\,(bnx^6e^6+6\,bdnx^5e^5+15\,bd^2nx^4e^4+20\,bd^3nx^3e^3+15\,bd^4nx^2e^2)\log\left(x\right)}{360\,(d^5x^6e^8+6\,d^6x^5e^7+15\,d^7x^4e^6+20\,d^8x^3e^5+15\,d^9x^2e^4+6\,d^{10}xe^3+d^{11}e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] 1/360*(12*b*d*n*x^5*e^5 + 66*b*d^2*n*x^4*e^4 + 148*b*d^3*n*x^3*e^3 + 171*b*
d^4*n*x^2*e^2 + 13*b*d^6*n - 12*a*d^6 + 18*(5*b*d^5*n - 4*a*d^5)*x*e - 12*(
```

```
b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3*e^3 + 1
5*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x*e + b*d^6*n)*log(x*e + d) - 12*(6*b*d^5*x*e
 + b*d^6)*log(c) + 12*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 +
 20*b*d^3*n*x^3*e^3 + 15*b*d^4*n*x^2*e^2)*log(x))/(d^5*x^6*e^8 + 6*d^6*x^5*
e^7 + 15*d^7*x^4*e^6 + 20*d^8*x^3*e^5 + 15*d^9*x^2*e^4 + 6*d^10*x*e^3 + d^1
1*e^2)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1992 vs. $2(168) = 336$.
time = 84.57, size = 1992, normalized size = 11.45

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] Piecewise((zoo*(-a/(5*x**5) - b*n/(25*x**5) - b*log(c*x**n)/(5*x**5)), Eq(d
, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**7, Eq(
e, 0)), ((-a/(5*x**5) - b*n/(25*x**5) - b*log(c*x**n)/(5*x**5))/e**7, Eq(d,
 0)), (-12*a*d**6/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2
 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d*
*5*e**8*x**6) - 72*a*d**5*e*x/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d*
*9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x
**5 + 360*d**5*e**8*x**6) - 12*b*d**6*n*log(d/e + x)/(360*d**11*e**2 + 2160
*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*
x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) + 13*b*d**6*n/(360*d**11*e
**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*
d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 72*b*d**5*e*n*
x*log(d/e + x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 +
7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*
e**8*x**6) + 90*b*d**5*e*n*x/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**
9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x*
*5 + 360*d**5*e**8*x**6) - 180*b*d**4*e**2*n*x**2*log(d/e + x)/(360*d**11*e
**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*
d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) + 171*b*d**4*e**
2*n*x**2/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d
**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x
**6) + 180*b*d**4*e**2*x**2*log(c*x**n)/(360*d**11*e**2 + 2160*d**10*e**3*x
 + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d
**6*e**7*x**5 + 360*d**5*e**8*x**6) - 240*b*d**3*e**3*n*x**3*log(d/e + x)/(
360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x
**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) + 148
*b*d**3*e**3*n*x**3/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x*
*2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*
d**5*e**8*x**6) + 240*b*d**3*e**3*x**3*log(c*x**n)/(360*d**11*e**2 + 2160*d
```

```
**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x*
*4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 180*b*d**2*e**4*n*x**4*log
(d/e + x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*
d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*
x**6) + 66*b*d**2*e**4*n*x**4/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d*
*9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x
**5 + 360*d**5*e**8*x**6) + 180*b*d**2*e**4*x**4*log(c*x**n)/(360*d**11*e**
2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d*
*7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 72*b*d*e**5*n*x*
*5*log(d/e + x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 +
 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5
*e**8*x**6) + 12*b*d*e**5*n*x**5/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400
*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**
7*x**5 + 360*d**5*e**8*x**6) + 72*b*d*e**5*x**5*log(c*x**n)/(360*d**11*e**2
 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**
7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 12*b*e**6*n*x**6*
log(d/e + x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 72
00*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e*
*8*x**6) + 12*b*e**6*x**6*log(c*x**n)/(360*d**11*e**2 + 2160*d**10*e**3*x +
 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**
6*e**7*x**5 + 360*d**5*e**8*x**6), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 352 vs. $2(155) = 310$.
time = 4.31, size = 352, normalized size = 2.02

$$-\frac{12\,bnx^6e^6\log(xe+d)+72\,bdnx^5e^5\log(xe+d)+180\,bd^2nx^4e^4\log(xe+d)+240\,bd^3nx^3e^3\log(xe+d)+180\,bd^4nx^2e^2\log(xe+d)+72\,bd^5nxe\log(xe+d)-12\,bnx^6e^6\log(x)-72\,bdnx^5e^5\log(x)-180\,bd^2nx^4e^4\log(x)-240\,bd^3nx^3e^3\log(x)-180\,bd^4nx^2e^2\log(x)-12\,bdnx^5e^5-66\,bd^2nx^4e^4-148\,bd^3nx^3e^3-171\,bd^4nx^2e^2-90\,bd^5nxe+12\,bd^6n\log(xe+d)+72\,bd^5xe\log(c)-13\,bd^6n+72\,ad^5xe+12\,bd^6\log(c)+12\,ad^6}{360\,(d^5x^6e^8+6\,d^6x^5e^7+15\,d^7x^4e^6+20\,d^8x^3e^5+15\,d^9x^2e^4+6\,d^{10}xe^3+d^{11}e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] -1/360*(12*b*n*x^6*e^6*log(x*e + d) + 72*b*d*n*x^5*e^5*log(x*e + d) + 180*b
*d^2*n*x^4*e^4*log(x*e + d) + 240*b*d^3*n*x^3*e^3*log(x*e + d) + 180*b*d^4*
n*x^2*e^2*log(x*e + d) + 72*b*d^5*n*x*e*log(x*e + d) - 12*b*n*x^6*e^6*log(x
) - 72*b*d*n*x^5*e^5*log(x) - 180*b*d^2*n*x^4*e^4*log(x) - 240*b*d^3*n*x^3*
e^3*log(x) - 180*b*d^4*n*x^2*e^2*log(x) - 12*b*d*n*x^5*e^5 - 66*b*d^2*n*x^4
*e^4 - 148*b*d^3*n*x^3*e^3 - 171*b*d^4*n*x^2*e^2 - 90*b*d^5*n*x*e + 12*b*d^
6*n*log(x*e + d) + 72*b*d^5*x*e*log(c) - 13*b*d^6*n + 72*a*d^5*x*e + 12*b*d
^6*log(c) + 12*a*d^6)/(d^5*x^6*e^8 + 6*d^6*x^5*e^7 + 15*d^7*x^4*e^6 + 20*d^
8*x^3*e^5 + 15*d^9*x^2*e^4 + 6*d^10*x*e^3 + d^11*e^2)
```

Mupad [**B**]
time = 4.04, size = 251, normalized size = 1.44

$$\frac{\frac{13\,b\,d\,n}{12}-x\,\left(6\,a\,e-\frac{15\,b\,e\,n}{2}\right)-a\,d+\frac{57\,b\,e^2\,n\,x^2}{4\,d}+\frac{37\,b\,e^3\,n\,x^3}{3\,d^2}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^3}+\frac{b\,e^5\,n\,x^5}{d^4}}{30\,d^6\,e^2+180\,d^5\,e^3\,x+450\,d^4\,e^4\,x^2+600\,d^3\,e^5\,x^3+450\,d^2\,e^6\,x^4+180\,d\,e^7\,x^5+30\,e^8\,x^6}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{30\,e^2}+\frac{b\,x}{5\,e}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{15\,d^5\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

```
[Out] ((13*b*d*n)/12 - x*(6*a*e - (15*b*e*n)/2) - a*d + (57*b*e^2*n*x^2)/(4*d) +
(37*b*e^3*n*x^3)/(3*d^2) + (11*b*e^4*n*x^4)/(2*d^3) + (b*e^5*n*x^5)/d^4)/(3
0*d^6*e^2 + 30*e^8*x^6 + 180*d^5*e^3*x + 180*d*e^7*x^5 + 450*d^4*e^4*x^2 +
600*d^3*e^5*x^3 + 450*d^2*e^6*x^4) - (log(c*x^n)*((b*d)/(30*e^2) + (b*x)/(5
*e)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d
^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(15*d^5*e^2)
```

3.70 $\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$

Optimal. Leaf size=152

$$\frac{bn}{30de(d+ex)^5}+\frac{bn}{24d^2e(d+ex)^4}+\frac{bn}{18d^3e(d+ex)^3}+\frac{bn}{12d^4e(d+ex)^2}+\frac{bn}{6d^5e(d+ex)}+\frac{bn\log(x)}{6d^6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

```
[Out] 1/30*b*n/d/e/(e*x+d)^5+1/24*b*n/d^2/e/(e*x+d)^4+1/18*b*n/d^3/e/(e*x+d)^3+1/
12*b*n/d^4/e/(e*x+d)^2+1/6*b*n/d^5/e/(e*x+d)+1/6*b*n*ln(x)/d^6/e+1/6*(-a-b*
ln(c*x^n))/e/(e*x+d)^6-1/6*b*n*ln(e*x+d)/d^6/e
```

Rubi [A]

time = 0.05, antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2356, 46}

$$-\frac{a+b\log(cx^n)}{6e(d+ex)^6}+\frac{bn\log(x)}{6d^6e}-\frac{bn\log(d+ex)}{6d^6e}+\frac{bn}{6d^5e(d+ex)}+\frac{bn}{12d^4e(d+ex)^2}+\frac{bn}{18d^3e(d+ex)^3}+\frac{bn}{24d^2e(d+ex)^4}+\frac{bn}{30de(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x)^7,x]
```

```
[Out] (b*n)/(30*d*e*(d + e*x)^5) + (b*n)/(24*d^2*e*(d + e*x)^4) + (b*n)/(18*d^3*e
*(d + e*x)^3) + (b*n)/(12*d^4*e*(d + e*x)^2) + (b*n)/(6*d^5*e*(d + e*x)) +
(b*n*Log[x])/(6*d^6*e) - (a + b*Log[c*x^n])/(6*e*(d + e*x)^6) - (b*n*Log[d
+ e*x])/(6*d^6*e)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = -\frac{a+b\log(cx^n)}{6e(d+ex)^6} + \frac{(bn)\int \frac{1}{x(d+ex)^6}\,dx}{6e}$$
$$= -\frac{a+b\log(cx^n)}{6e(d+ex)^6} + \frac{(bn)\int \left(\frac{1}{d^6x} - \frac{e}{d(d+ex)^6} - \frac{e}{d^2(d+ex)^5} - \frac{e}{d^3(d+ex)^4} - \frac{e}{d^4(d+ex)^3} - \frac{e}{d^5(d+e}\right.}{6e}$$
$$= \frac{bn}{30de(d+ex)^5} + \frac{bn}{24d^2e(d+ex)^4} + \frac{bn}{18d^3e(d+ex)^3} + \frac{bn}{12d^4e(d+ex)^2} + \frac{bn}{6d^5e(d+e}$$

Mathematica [A]
time = 0.10, size = 99, normalized size = 0.65

$$\frac{-\frac{a+b\log(cx^n)}{(d+ex)^6} + \frac{bn\left(\frac{d\left(137d^4+385d^3ex+470d^2e^2x^2+270de^3x^3+60e^4x^4\right)}{(d+ex)^5}+60\log(x)-60\log(d+ex)\right)}{60d^6}}{6e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x)^7,x]
```

```
[Out] (-((a + b*Log[c*x^n])/(d + e*x)^6) + (b*n*((d*(137*d^4 + 385*d^3*e*x + 470*
d^2*e^2*x^2 + 270*d*e^3*x^3 + 60*e^4*x^4))/(d + e*x)^5 + 60*Log[x] - 60*Log
[d + e*x]))/(60*d^6))/(6*e)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 431, normalized size = 2.84

method	result
risch	$-\frac{b\ln(x^n)}{6e(ex+d)^6} - \frac{60\ln(c)b\,d^6+360\ln(ex+d)bd\,e^5n\,x^5+900\ln(ex+d)b\,d^2e^4n\,x^4+1200\ln(ex+d)b\,d^3e^3n\,x^3+900\ln(ex+d)b\,d^4e^2n\,x^2+}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*b/e/(e*x+d)^6*ln(x^n)-1/360*(60*ln(c)*b*d^6-30*I*Pi*b*d^6*csgn(I*c*x^n
)^3+360*ln(e*x+d)*b*d*e^5*n*x^5+900*ln(e*x+d)*b*d^2*e^4*n*x^4+1200*ln(e*x+d
)*b*d^3*e^3*n*x^3+900*ln(e*x+d)*b*d^4*e^2*n*x^2+360*ln(e*x+d)*b*d^5*e*n*x-3
60*ln(-x)*b*d*e^5*n*x^5-900*ln(-x)*b*d^2*e^4*n*x^4-1200*ln(-x)*b*d^3*e^3*n*
x^3-137*b*d^6*n-900*ln(-x)*b*d^4*e^2*n*x^2-360*ln(-x)*b*d^5*e*n*x+60*a*d^6+
30*I*Pi*b*d^6*csgn(I*x^n)*csgn(I*c*x^n)^2+30*I*Pi*b*d^6*csgn(I*c)*csgn(I*c*
x^n)^2+60*ln(e*x+d)*b*d^6*n-60*ln(-x)*b*d^6*n-855*b*d^4*e^2*n*x^2-522*b*d^5
*e*n*x-60*b*d*e^5*n*x^5-330*b*d^2*e^4*n*x^4-740*b*d^3*e^3*n*x^3-30*I*Pi*b*d
^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+60*ln(e*x+d)*b*e^6*n*x^6-60*ln(-x)*b
*e^6*n*x^6)/d^6/e/(e*x+d)^6
```

Maxima [A]
time = 0.35, size = 259, normalized size = 1.70

$$\frac{1}{360}\,bn\left(\frac{60\,x^4e^4 + 270\,dx^3e^3 + 470\,d^2x^2e^2 + 385\,d^3xe + 137\,d^4}{d^5x^5e^6 + 5\,d^6x^4e^5 + 10\,d^7x^3e^4 + 10\,d^8x^2e^3 + 5\,d^9xe^2 + d^{10}e} - \frac{60\,e^{(-1)}\log\left(xe+d\right)}{d^6} + \frac{60\,e^{(-1)}\log\left(x\right)}{d^6}\right) - \frac{b\log\left(cx^n\right)}{6\left(x^6e^7 + 6\,dx^5e^6 + 15\,d^2x^4e^5 + 20\,d^3x^3e^4 + 15\,d^4x^2e^3 + 6\,d^5xe^2 + d^6e\right)} - \frac{a}{6\left(x^6e^7 + 6\,dx^5e^6 + 15\,d^2x^4e^5 + 20\,d^3x^3e^4 + 15\,d^4x^2e^3 + 6\,d^5xe^2 + d^6e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/360*b*n*((60*x^4*e^4 + 270*d*x^3*e^3 + 470*d^2*x^2*e^2 + 385*d^3*x*e + 13
7*d^4)/(d^5*x^5*e^6 + 5*d^6*x^4*e^5 + 10*d^7*x^3*e^4 + 10*d^8*x^2*e^3 + 5*d
^9*x*e^2 + d^10*e) - 60*e^(-1)*log(x*e + d)/d^6 + 60*e^(-1)*log(x)/d^6) - 1
/6*b*log(c*x^n)/(x^6*e^7 + 6*d*x^5*e^6 + 15*d^2*x^4*e^5 + 20*d^3*x^3*e^4 +
15*d^4*x^2*e^3 + 6*d^5*x*e^2 + d^6*e) - 1/6*a/(x^6*e^7 + 6*d*x^5*e^6 + 15*d
^2*x^4*e^5 + 20*d^3*x^3*e^4 + 15*d^4*x^2*e^3 + 6*d^5*x*e^2 + d^6*e)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 295 vs. $2(135) = 270$.
time = 0.36, size = 295, normalized size = 1.94

$$\frac{60\,bdnx^5e^5 + 330\,bd^2nx^4e^4 + 740\,bd^3nx^3e^3 + 855\,bd^4nx^2e^2 + 522\,bd^5nxe + 137\,bd^6n - 60\,bd^6\log\left(c\right) - 60\,ad^6 - 60\left(bnx^6e^6 + 6\,bdnx^5e^5 + 15\,bd^2nx^4e^4 + 20\,bd^3nx^3e^3 + 15\,bd^4nx^2e^2 + 6\,bd^5nxe + bd^6n\right)\log\left(xe+d\right) + 60\left(bnx^6e^6 + 6\,bdnx^5e^5 + 15\,bd^2nx^4e^4 + 20\,bd^3nx^3e^3 + 15\,bd^4nx^2e^2 + 6\,bd^5nxe\right)\log\left(x\right)}{360\left(d^6x^6e^7 + 6\,d^7x^5e^6 + 15\,d^8x^4e^5 + 20\,d^9x^3e^4 + 15\,d^{10}x^2e^3 + 6\,d^{11}xe^2 + d^{12}e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] 1/360*(60*b*d*n*x^5*e^5 + 330*b*d^2*n*x^4*e^4 + 740*b*d^3*n*x^3*e^3 + 855*b
*d^4*n*x^2*e^2 + 522*b*d^5*n*x*e + 137*b*d^6*n - 60*b*d^6*log(c) - 60*a*d^6
 - 60*(b*n*x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3*
e^3 + 15*b*d^4*n*x^2*e^2 + 6*b*d^5*n*x*e + b*d^6*n)*log(x*e + d) + 60*(b*n*
x^6*e^6 + 6*b*d*n*x^5*e^5 + 15*b*d^2*n*x^4*e^4 + 20*b*d^3*n*x^3*e^3 + 15*b*
d^4*n*x^2*e^2 + 6*b*d^5*n*x*e)*log(x))/(d^6*x^6*e^7 + 6*d^7*x^5*e^6 + 15*d^
8*x^4*e^5 + 20*d^9*x^3*e^4 + 15*d^10*x^2*e^3 + 6*d^11*x*e^2 + d^12*e)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1955 vs. $2(134) = 268$.
time = 84.98, size = 1955, normalized size = 12.86

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d)**7,x)
```

```
[Out] Piecewise((zoo*(-a/(6*x**6) - b*n/(36*x**6) - b*log(c*x**n)/(6*x**6)), Eq(d
, 0) & Eq(e, 0)), ((-a/(6*x**6) - b*n/(36*x**6) - b*log(c*x**n)/(6*x**6))/e
**7, Eq(d, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**7, Eq(e, 0)), (-60*a*d*
*6/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4
```

```
*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) - 6
0*b*d**6*n*log(d/e + x)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*
x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 36
0*d**6*e**7*x**6) + 137*b*d**6*n/(360*d**12*e + 2160*d**11*e**2*x + 5400*d*
*10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*
x**5 + 360*d**6*e**7*x**6) - 360*b*d**5*e*n*x*log(d/e + x)/(360*d**12*e + 2
160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e
**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 522*b*d**5*e*n*x/(36
0*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3
+ 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 360*b*d
**5*e*x*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2
 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d*
*6*e**7*x**6) - 900*b*d**4*e**2*n*x**2*log(d/e + x)/(360*d**12*e + 2160*d**
11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**
4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 855*b*d**4*e**2*n*x**2/(360
*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 +
 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 900*b*d*
*4*e**2*x**2*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3
*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 3
60*d**6*e**7*x**6) - 1200*b*d**3*e**3*n*x**3*log(d/e + x)/(360*d**12*e + 21
60*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e*
*5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 740*b*d**3*e**3*n*x**
3/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*
x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 12
00*b*d**3*e**3*x**3*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**
10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x
**5 + 360*d**6*e**7*x**6) - 900*b*d**2*e**4*n*x**4*log(d/e + x)/(360*d**12*
e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d
**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 330*b*d**2*e**4
*n*x**4/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9
*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6
) + 900*b*d**2*e**4*x**4*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 540
0*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e
**6*x**5 + 360*d**6*e**7*x**6) - 360*b*d*e**5*n*x**5*log(d/e + x)/(360*d**1
2*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400
*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 60*b*d*e**5*n
*x**5/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e
**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6)
+ 360*b*d*e**5*x**5*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**
10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x
**5 + 360*d**6*e**7*x**6) - 60*b*e**6*n*x**6*log(d/e + x)/(360*d**12*e + 21
60*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e*
*5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 60*b*e**6*x**6*log(c*
x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e
**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6),
```

```
True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 344 vs. 2(135) = 270.
time = 5.03, size = 344, normalized size = 2.26

$$-\frac{60\,bnx^6e^6\log\left(xe+d\right)+360\,bdnx^5e^5\log\left(xe+d\right)+900\,bd^2nx^4e^4\log\left(xe+d\right)+1200\,bd^3nx^3e^3\log\left(xe+d\right)+900\,bd^4nx^2e^2\log\left(xe+d\right)+360\,bd^5nxe\log\left(xe+d\right)-60\,bnx^6e^6\log\left(x\right)-360\,bdnx^5e^5\log\left(x\right)-900\,bd^2nx^4e^4\log\left(x\right)-1200\,bd^3nx^3e^3\log\left(x\right)-900\,bd^4nx^2e^2\log\left(x\right)-360\,bd^5nxe\log\left(x\right)-60\,bdnx^5e^5-330\,bd^2nx^4e^4-740\,bd^3nx^3e^3-855\,bd^4nx^2e^2-522\,bd^5nxe+60\,bd^6n\log\left(xe+d\right)-137\,bd^6n+60\,bd^6\log\left(c\right)+60\,ad^6}{360\,\left(d^6x^6e^7+6\,d^7x^5e^6+15\,d^8x^4e^5+20\,d^9x^3e^4+15\,d^{10}x^2e^3+6\,d^{11}xe^2+d^{12}e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] -1/360*(60*b*n*x^6*e^6*log(x*e + d) + 360*b*d*n*x^5*e^5*log(x*e + d) + 900*
b*d^2*n*x^4*e^4*log(x*e + d) + 1200*b*d^3*n*x^3*e^3*log(x*e + d) + 900*b*d^
4*n*x^2*e^2*log(x*e + d) + 360*b*d^5*n*x*e*log(x*e + d) - 60*b*n*x^6*e^6*lo
g(x) - 360*b*d*n*x^5*e^5*log(x) - 900*b*d^2*n*x^4*e^4*log(x) - 1200*b*d^3*n
*x^3*e^3*log(x) - 900*b*d^4*n*x^2*e^2*log(x) - 360*b*d^5*n*x*e*log(x) - 60*
b*d*n*x^5*e^5 - 330*b*d^2*n*x^4*e^4 - 740*b*d^3*n*x^3*e^3 - 855*b*d^4*n*x^2
*e^2 - 522*b*d^5*n*x*e + 60*b*d^6*n*log(x*e + d) - 137*b*d^6*n + 60*b*d^6*l
og(c) + 60*a*d^6)/(d^6*x^6*e^7 + 6*d^7*x^5*e^6 + 15*d^8*x^4*e^5 + 20*d^9*x^
3*e^4 + 15*d^10*x^2*e^3 + 6*d^11*x*e^2 + d^12*e)
```

Mupad [B]
time = 3.93, size = 232, normalized size = 1.53

$$\frac{\frac{137\,b\,n}{60}-a+\frac{57\,b\,e^2\,n\,x^2}{4\,d^2}+\frac{37\,b\,e^3\,n\,x^3}{3\,d^3}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^4}+\frac{b\,e^5\,n\,x^5}{d^5}+\frac{87\,b\,e\,n\,x}{10\,d}}{6\,d^6\,e+36\,d^5\,e^2\,x+90\,d^4\,e^3\,x^2+120\,d^3\,e^4\,x^3+90\,d^2\,e^5\,x^4+36\,d\,e^6\,x^5+6\,e^7\,x^6}-\frac{b\,\ln\left(c\,x^n\right)}{6\,e\,\left(d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6\right)}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^6\,e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x)^7,x)
```

```
[Out] ((137*b*n)/60 - a + (57*b*e^2*n*x^2)/(4*d^2) + (37*b*e^3*n*x^3)/(3*d^3) + (
11*b*e^4*n*x^4)/(2*d^4) + (b*e^5*n*x^5)/d^5 + (87*b*e*n*x)/(10*d))/(6*d^6*e
 + 6*e^7*x^6 + 36*d^5*e^2*x + 36*d*e^6*x^5 + 90*d^4*e^3*x^2 + 120*d^3*e^4*x
^3 + 90*d^2*e^5*x^4) - (b*log(c*x^n))/(6*e*(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 1
5*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x)) - (b*n*atanh(
(2*e*x)/d + 1))/(3*d^6*e)
```

3.71 $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

Optimal. Leaf size=294

$$-\frac{bn}{30d^2(d+ex)^5}-\frac{11bn}{120d^3(d+ex)^4}-\frac{37bn}{180d^4(d+ex)^3}-\frac{19bn}{40d^5(d+ex)^2}-\frac{29bn}{20d^6(d+ex)}-\frac{29bn\log(x)}{20d^7}+\frac{a+b\log}{6d(d+}$$

```
[Out] -1/30*b*n/d^2/(e*x+d)^5-11/120*b*n/d^3/(e*x+d)^4-37/180*b*n/d^4/(e*x+d)^3-1
9/40*b*n/d^5/(e*x+d)^2-29/20*b*n/d^6/(e*x+d)-29/20*b*n*ln(x)/d^7+1/6*(a+b*l
n(c*x^n))/d/(e*x+d)^6+1/5*(a+b*ln(c*x^n))/d^2/(e*x+d)^5+1/4*(a+b*ln(c*x^n))
/d^3/(e*x+d)^4+1/3*(a+b*ln(c*x^n))/d^4/(e*x+d)^3+1/2*(a+b*ln(c*x^n))/d^5/(e
*x+d)^2-e*x*(a+b*ln(c*x^n))/d^7/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^7+49/
20*b*n*ln(e*x+d)/d^7+b*n*polylog(2,-d/e/x)/d^7
```

Rubi [A]
time = 0.48, antiderivative size = 294, normalized size of antiderivative = 1.00, number of steps used = 25, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2389, 2379, 2438, 2351, 31, 2356, 46}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^7}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^7}-\frac{ex(a+b\log(cx^n))}{d^7(d+ex)}+\frac{a+b\log(cx^n)}{2d^5(d+ex)^2}+\frac{a+b\log(cx^n)}{3d^4(d+ex)^3}+\frac{a+b\log(cx^n)}{4d^3(d+ex)^4}+\frac{a+b\log(cx^n)}{5d^2(d+ex)^5}+\frac{a+b\log(cx^n)}{6d(d+ex)^6}+\frac{49bn\log(d+ex)}{20d^7}-\frac{29bn\log(x)}{20d^7}-\frac{29bn}{20d^6(d+ex)}-\frac{19bn}{40d^5(d+ex)^2}-\frac{37bn}{180d^4(d+ex)^3}-\frac{11bn}{120d^3(d+ex)^4}-\frac{bn}{30d^2(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x)^7),x]
```

```
[Out] -1/30*(b*n)/(d^2*(d + e*x)^5) - (11*b*n)/(120*d^3*(d + e*x)^4) - (37*b*n)/(
180*d^4*(d + e*x)^3) - (19*b*n)/(40*d^5*(d + e*x)^2) - (29*b*n)/(20*d^6*(d
+ e*x)) - (29*b*n*Log[x])/(20*d^7) + (a + b*Log[c*x^n])/(6*d*(d + e*x)^6) +
 (a + b*Log[c*x^n])/(5*d^2*(d + e*x)^5) + (a + b*Log[c*x^n])/(4*d^3*(d + e*
x)^4) + (a + b*Log[c*x^n])/(3*d^4*(d + e*x)^3) + (a + b*Log[c*x^n])/(2*d^5*
(d + e*x)^2) - (e*x*(a + b*Log[c*x^n]))/(d^7*(d + e*x)) - (Log[1 + d/(e*x)]
*(a + b*Log[c*x^n]))/d^7 + (49*b*n*Log[d + e*x])/(20*d^7) + (b*n*PolyLog[2,
 -(d/(e*x))])/d^7
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx}{d}$$

$$= \frac{a+b\log(cx^n)}{6d(d+ex)^6} + \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}\,dx}{d^2} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^6}\,dx}{d^2} - \frac{(bn)\int \frac{1}{x(d+ex)^6}\,dx}{6d}$$

$$= \frac{a+b\log(cx^n)}{6d(d+ex)^6} + \frac{a+b\log(cx^n)}{5d^2(d+ex)^5} + \frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx}{d^3} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^5}\,dx}{d^3} - \frac{(bn)\int \frac{1}{x(d\cdots}}{5d^2\cdots}$$

$$= -\frac{bn}{30d^2(d+ex)^5} - \frac{bn}{24d^3(d+ex)^4} - \frac{bn}{18d^4(d+ex)^3} - \frac{bn}{12d^5(d+ex)^2} - \frac{bn}{6d^6(d+ex)}\cdots$$

$$= -\frac{bn}{30d^2(d+ex)^5} - \frac{11bn}{120d^3(d+ex)^4} - \frac{11bn}{90d^4(d+ex)^3} - \frac{11bn}{60d^5(d+ex)^2} - \frac{11bn}{30d^6(d+e\cdots}$$

$$= -\frac{bn}{30d^2(d+ex)^5} - \frac{11bn}{120d^3(d+ex)^4} - \frac{37bn}{180d^4(d+ex)^3} - \frac{37bn}{120d^5(d+ex)^2} - \frac{37bn}{60d^6(d+\cdots}$$

$$= -\frac{bn}{30d^2(d+ex)^5} - \frac{11bn}{120d^3(d+ex)^4} - \frac{37bn}{180d^4(d+ex)^3} - \frac{19bn}{40d^5(d+ex)^2} - \frac{19bn}{20d^6(d+\cdots}$$

$$= -\frac{bn}{30d^2(d+ex)^5} - \frac{11bn}{120d^3(d+ex)^4} - \frac{37bn}{180d^4(d+ex)^3} - \frac{19bn}{40d^5(d+ex)^2} - \frac{29bn}{20d^6(d+\cdots}$$

$$= -\frac{bn}{30d^2(d+ex)^5} - \frac{11bn}{120d^3(d+ex)^4} - \frac{37bn}{180d^4(d+ex)^3} - \frac{19bn}{40d^5(d+ex)^2} - \frac{29bn}{20d^6(d+\cdots}$$

Mathematica [A]
time = 0.24, size = 349, normalized size = 1.19

$$\frac{\frac{60ad^6}{(d+ex)^6} + \frac{72ad^5}{(d+ex)^5} - \frac{12bd^5n}{(d+ex)^5} + \frac{90ad^4}{(d+ex)^4} - \frac{33bd^4n}{(d+ex)^4} + \frac{120ad^3}{(d+ex)^3} - \frac{74bd^3n}{(d+ex)^3} + \frac{180ad^2}{(d+ex)^2} - \frac{171bd^2n}{(d+ex)^2} + \frac{360ad}{d+ex} - \frac{522bdn}{d+ex} - 882bn\log(x) + \frac{360a\log(cx^n)}{n} + \frac{60bd^6\log(cx^n)}{(d+ex)^6} + \frac{72bd^5\log(cx^n)}{(d+ex)^5} + \frac{90bd^4\log(cx^n)}{(d+ex)^4} + \frac{120bd^3\log(cx^n)}{(d+ex)^3} + \frac{180bd^2\log(cx^n)}{(d+ex)^2} + \frac{360bd\log(cx^n)}{d+ex} + \frac{180b\log^2(cx^n)}{n} + 882bn\log(d+ex) - 360a\log\left(1+\frac{ex}{d}\right) - 360b\log(cx^n)\log\left(1+\frac{ex}{d}\right) - 360bn\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{360d^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^7),x]
```

```
[Out] ((60*a*d^6)/(d + e*x)^6 + (72*a*d^5)/(d + e*x)^5 - (12*b*d^5*n)/(d + e*x)^5
 + (90*a*d^4)/(d + e*x)^4 - (33*b*d^4*n)/(d + e*x)^4 + (120*a*d^3)/(d + e*x
)^3 - (74*b*d^3*n)/(d + e*x)^3 + (180*a*d^2)/(d + e*x)^2 - (171*b*d^2*n)/(d
 + e*x)^2 + (360*a*d)/(d + e*x) - (522*b*d*n)/(d + e*x) - 882*b*n*Log[x] +
(360*a*Log[c*x^n])/n + (60*b*d^6*Log[c*x^n])/(d + e*x)^6 + (72*b*d^5*Log[c*
x^n])/(d + e*x)^5 + (90*b*d^4*Log[c*x^n])/(d + e*x)^4 + (120*b*d^3*Log[c*x^
n])/(d + e*x)^3 + (180*b*d^2*Log[c*x^n])/(d + e*x)^2 + (360*b*d*Log[c*x^n])
/(d + e*x) + (180*b*Log[c*x^n]^2)/n + 882*b*n*Log[d + e*x] - 360*a*Log[1 +
```

```
(e*x)/d] - 360*b*Log[c*x^n]*Log[1 + (e*x)/d] - 360*b*n*PolyLog[2, -((e*x)/d
)])/(360*d^7)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 1427, normalized size = 4.85

method	result	size
risch	Expression too large to display	1427

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] b*n/d^7*ln(e*x+d)*ln(-e*x/d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/d^5/(e*x+d)^2-1/2*I
*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^7*ln(e*x+d)+1/2*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2/d^6/(e*x+d)-1/12*I*b*Pi*csgn(I*c*x^n)^3/d/(e*x+d)^6-1/2*I*b*Pi*
csgn(I*c*x^n)^3/d^7*ln(x)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^7*ln(e*x+d)+1/2*I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^7*ln(x)+1/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)
^2/d^3/(e*x+d)^4+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^5/(e*x+d)^2+1/6*I*b
*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4/(e*x+d)^3-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x
^n)^2/d^7*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^7*ln(x)-1/2*I*b*
Pi*csgn(I*c*x^n)^3/d^6/(e*x+d)-1/6*I*b*Pi*csgn(I*c*x^n)^3/d^4/(e*x+d)^3-1/8
*I*b*Pi*csgn(I*c*x^n)^3/d^3/(e*x+d)^4-1/10*I*b*Pi*csgn(I*c*x^n)^3/d^2/(e*x+
d)^5+a/d^7*ln(x)-a/d^7*ln(e*x+d)+a/d^6/(e*x+d)+1/2*a/d^5/(e*x+d)^2+1/3*a/d^
4/(e*x+d)^3+1/4*a/d^3/(e*x+d)^4+1/5*a/d^2/(e*x+d)^5+1/6*a/d/(e*x+d)^6+1/10*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/(e*x+d)^5-1/2*b*n/d^7*ln(x)^2+b*n/d^7*
dilog(-e*x/d)+b*ln(c)/d^6/(e*x+d)+1/2*b*ln(c)/d^5/(e*x+d)^2+1/3*b*ln(c)/d^4
/(e*x+d)^3+1/4*b*ln(c)/d^3/(e*x+d)^4+1/5*b*ln(c)/d^2/(e*x+d)^5+1/6*b*ln(c)/
d/(e*x+d)^6-b*ln(c)/d^7*ln(e*x+d)+b*ln(c)/d^7*ln(x)-1/12*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)/d/(e*x+d)^6-1/8*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)/d^3/(e*x+d)^4-1/10*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/
(e*x+d)^5-b*ln(x^n)/d^7*ln(e*x+d)+b*ln(x^n)/d^6/(e*x+d)+1/2*b*ln(x^n)/d^5/(
e*x+d)^2+1/3*b*ln(x^n)/d^4/(e*x+d)^3+1/4*b*ln(x^n)/d^3/(e*x+d)^4+1/5*b*ln(x
^n)/d^2/(e*x+d)^5+1/6*b*ln(x^n)/d/(e*x+d)^6+b*ln(x^n)/d^7*ln(x)-1/4*I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^5/(e*x+d)^2-1/2*I*b*Pi*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)/d^6/(e*x+d)-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)/d^4/(e*x+d)^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^7*ln(e
*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^7*ln(x)+1/12*I*b*Pi*
csgn(I*x^n)*csgn(I*c*x^n)^2/d/(e*x+d)^6+1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n
)^2/d^3/(e*x+d)^4+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^5/(e*x+d)^2+1/6*
I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4/(e*x+d)^3+1/10*I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2/d^2/(e*x+d)^5+1/12*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(e*x+d)
^6+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^6/(e*x+d)-49/20*b*n*ln(x)/d^7+49/
20*b*n*ln(e*x+d)/d^7-1/30*b*n/d^2/(e*x+d)^5-11/120*b*n/d^3/(e*x+d)^4-37/180
*b*n/d^4/(e*x+d)^3-19/40*b*n/d^5/(e*x+d)^2-29/20*b*n/d^6/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/60*a*((60*x^5*e^5 + 330*d*x^4*e^4 + 740*d^2*x^3*e^3 + 855*d^3*x^2*e^2 + 5
22*d^4*x*e + 147*d^5)/(d^6*x^6*e^6 + 6*d^7*x^5*e^5 + 15*d^8*x^4*e^4 + 20*d^
9*x^3*e^3 + 15*d^10*x^2*e^2 + 6*d^11*x*e + d^12) - 60*log(x*e + d)/d^7 + 60
*log(x)/d^7) + b*integrate((log(c) + log(x^n))/(x^8*e^7 + 7*d*x^7*e^6 + 21*
d^2*x^6*e^5 + 35*d^3*x^5*e^4 + 35*d^4*x^4*e^3 + 21*d^5*x^3*e^2 + 7*d^6*x^2*
e + d^7*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^8*e^7 + 7*d*x^7*e^6 + 21*d^2*x^6*e^5 + 35*d^
3*x^5*e^4 + 35*d^4*x^4*e^3 + 21*d^5*x^3*e^2 + 7*d^6*x^2*e + d^7*x), x)
```

Sympy [A]
time = 159.26, size = 1518, normalized size = 5.16

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d)**7,x)
```

```
[Out] -a*e*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d - a*e*P
iecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**2 - a*e*Piec
ewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/d**3 - a*e*Piecewi
se((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**4 - a*e*Piecewise(
(x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**5 - a*e*Piecewise((x/
d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**6 - a*e*Piecewise((x/d, Eq(e
, 0)), (log(d + e*x)/e, True))/d**7 + a*log(x)/d**7 + b*e**6*n*Piecewise((-
1/(e**7*x), Eq(d, 0)), (-137*d**4/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*
d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5)
- 625*d**3*e*x/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 36
00*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 1100*d**2*e**2*x*
```

```
*2/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9
*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 900*d*e**3*x**3/(360*d**5*e**
6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e
**10*x**4 + 360*e**11*x**5) - 300*e**4*x**4/(360*d**5*e**6 + 1800*d**4*e**7
*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e*
*11*x**5) - log(d + e*x)/(6*d*e**6), True))/d**6 - b*e**6*Piecewise((1/(e**
7*x), Eq(d, 0)), (-1/(6*d*(d/x + e)**6), True))*log(c*x**n)/d**6 - 6*b*e**5
*n*Piecewise((-1/(e**6*x), Eq(d, 0)), (-25*d**3/(60*d**4*e**5 + 240*d**3*e*
*6*x + 360*d**2*e**7*x**2 + 240*d*e**8*x**3 + 60*e**9*x**4) - 88*d**2*e*x/(
60*d**4*e**5 + 240*d**3*e**6*x + 360*d**2*e**7*x**2 + 240*d*e**8*x**3 + 60*
e**9*x**4) - 108*d*e**2*x**2/(60*d**4*e**5 + 240*d**3*e**6*x + 360*d**2*e**
7*x**2 + 240*d*e**8*x**3 + 60*e**9*x**4) - 48*e**3*x**3/(60*d**4*e**5 + 240
*d**3*e**6*x + 360*d**2*e**7*x**2 + 240*d*e**8*x**3 + 60*e**9*x**4) - log(d
 + e*x)/(5*d*e**5), True))/d**6 + 6*b*e**5*Piecewise((1/(e**6*x), Eq(d, 0))
, (-1/(5*d*(d/x + e)**5), True))*log(c*x**n)/d**6 + 15*b*e**4*n*Piecewise((
-1/(e**5*x), Eq(d, 0)), (-11*d**2/(24*d**3*e**4 + 72*d**2*e**5*x + 72*d*e**
6*x**2 + 24*e**7*x**3) - 27*d*e*x/(24*d**3*e**4 + 72*d**2*e**5*x + 72*d*e**
6*x**2 + 24*e**7*x**3) - 18*e**2*x**2/(24*d**3*e**4 + 72*d**2*e**5*x + 72*d
*e**6*x**2 + 24*e**7*x**3) - log(d + e*x)/(4*d*e**4), True))/d**6 - 15*b*e*
*4*Piecewise((1/(e**5*x), Eq(d, 0)), (-1/(4*d*(d/x + e)**4), True))*log(c*x
**n)/d**6 - 20*b*e**3*n*Piecewise((-1/(e**4*x), Eq(d, 0)), (-3*d/(6*d**2*e*
*3 + 12*d*e**4*x + 6*e**5*x**2) - 4*e*x/(6*d**2*e**3 + 12*d*e**4*x + 6*e**5
*x**2) - log(d + e*x)/(3*d*e**3), True))/d**6 + 20*b*e**3*Piecewise((1/(e**
4*x), Eq(d, 0)), (-1/(3*d*(d/x + e)**3), True))*log(c*x**n)/d**6 + 15*b*e**
2*n*Piecewise((-1/(e**3*x), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d +
e*x)/(2*d*e**2), True))/d**6 - 15*b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)),
(-1/(2*d*(d/x + e)**2), True))*log(c*x**n)/d**6 - 6*b*e*n*Piecewise((-1/(e*
*2*x), Eq(d, 0)), (-log(d**2 + d*e*x)/(d*e), True))/d**6 + 6*b*e*Piecewise(
(1/(e**2*x), Eq(d, 0)), (-1/(d**2/x + d*e), True))*log(c*x**n)/d**6 + b*n*P
iecewise((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar(I*pi)/(e*
x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2, d*exp_pola
r(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp_polar(I*p
i)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) +
 meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp_polar(I*p
i)/(e*x)), True))/d, True))/d**6 - b*Piecewise((1/(e*x), Eq(d, 0)), (log(d/
x + e)/d, True))*log(c*x**n)/d**6
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^7*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^7} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^7),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^7), x)
```

3.72 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx$

Optimal. Leaf size=339

$$-\frac{bn}{d^7x}+\frac{ben}{30d^3(d+ex)^5}+\frac{17ben}{120d^4(d+ex)^4}+\frac{79ben}{180d^5(d+ex)^3}+\frac{53ben}{40d^6(d+ex)^2}+\frac{103ben}{20d^7(d+ex)}+\frac{103ben\log(x)}{20d^8}-\frac{a+}{}$$

```
[Out] -b*n/d^7/x+1/30*b*e*n/d^3/(e*x+d)^5+17/120*b*e*n/d^4/(e*x+d)^4+79/180*b*e*n
/d^5/(e*x+d)^3+53/40*b*e*n/d^6/(e*x+d)^2+103/20*b*e*n/d^7/(e*x+d)+103/20*b*
e*n*ln(x)/d^8+(-a-b*ln(c*x^n))/d^7/x-1/6*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^6-2/
5*e*(a+b*ln(c*x^n))/d^3/(e*x+d)^5-3/4*e*(a+b*ln(c*x^n))/d^4/(e*x+d)^4-4/3*e
*(a+b*ln(c*x^n))/d^5/(e*x+d)^3-5/2*e*(a+b*ln(c*x^n))/d^6/(e*x+d)^2+6*e^2*x*
(a+b*ln(c*x^n))/d^8/(e*x+d)+7*e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^8-223/20*b*e*
n*ln(e*x+d)/d^8-7*b*e*n*polylog(2,-d/e/x)/d^8
```

Rubi [A]
time = 0.41, antiderivative size = 339, normalized size of antiderivative = 1.00, number of steps used = 22, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {46, 2393, 2341, 2356, 2351, 31, 2379, 2438}

$$-\frac{7ben\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^8}+\frac{6e^2x(a+b\log(cx^n))}{d^8(d+ex)}+\frac{7e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^8}-\frac{a+b\log(cx^n)}{d^7x}-\frac{5e(a+b\log(cx^n))}{2d^6(d+ex)^2}-\frac{4e(a+b\log(cx^n))}{3d^5(d+ex)^3}-\frac{3e(a+b\log(cx^n))}{4d^4(d+ex)^4}-\frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5}-\frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6}+\frac{103ben\log(x)}{20d^8}-\frac{223ben\log(d+ex)}{20d^8}+\frac{103ben}{20d^7(d+ex)}-\frac{bn}{d^7x}+\frac{53ben}{40d^6(d+ex)^2}+\frac{79ben}{180d^5(d+ex)^3}+\frac{17ben}{120d^4(d+ex)^4}+\frac{ben}{30d^3(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^7),x]
```

```
[Out] -((b*n)/(d^7*x)) + (b*e*n)/(30*d^3*(d + e*x)^5) + (17*b*e*n)/(120*d^4*(d +
e*x)^4) + (79*b*e*n)/(180*d^5*(d + e*x)^3) + (53*b*e*n)/(40*d^6*(d + e*x)^2
) + (103*b*e*n)/(20*d^7*(d + e*x)) + (103*b*e*n*Log[x])/(20*d^8) - (a + b*L
og[c*x^n])/(d^7*x) - (e*(a + b*Log[c*x^n]))/(6*d^2*(d + e*x)^6) - (2*e*(a +
 b*Log[c*x^n]))/(5*d^3*(d + e*x)^5) - (3*e*(a + b*Log[c*x^n]))/(4*d^4*(d +
e*x)^4) - (4*e*(a + b*Log[c*x^n]))/(3*d^5*(d + e*x)^3) - (5*e*(a + b*Log[c*
x^n]))/(2*d^6*(d + e*x)^2) + (6*e^2*x*(a + b*Log[c*x^n]))/(d^8*(d + e*x)) +
 (7*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^8 - (223*b*e*n*Log[d + e*x])/(
20*d^8) - (7*b*e*n*PolyLog[2, -(d/(e*x))])/d^8
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
```

```
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = \int \left(\frac{a+b\log(cx^n)}{d^7x^2} - \frac{7e(a+b\log(cx^n))}{d^8x} + \frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^7} + \frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)^6}\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^7} - \frac{(7e)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^8} + \frac{(7e^2)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^8} + \frac{(6e^2)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d^7}$$

$$= -\frac{bn}{d^7x} - \frac{a+b\log(cx^n)}{d^7x} - \frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6} - \frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5} - \frac{3e(a+b\log(cx}{4d^4(d+ex)^4}$$

$$= -\frac{bn}{d^7x} - \frac{a+b\log(cx^n)}{d^7x} - \frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6} - \frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5} - \frac{3e(a+b\log(cx}{4d^4(d+ex)^4}$$

$$= -\frac{bn}{d^7x} + \frac{ben}{30d^3(d+ex)^5} + \frac{17ben}{120d^4(d+ex)^4} + \frac{79ben}{180d^5(d+ex)^3} + \frac{53ben}{40d^6(d+ex)^2} + \frac{1}{20d^7}$$

Mathematica [A]
time = 0.40, size = 401, normalized size = 1.18

$$-\frac{\frac{360ad}{x} + \frac{360bdn}{x} + \frac{60ad^6e}{(d+ex)^6} + \frac{144ad^5e}{(d+ex)^5} - \frac{12bd^5en}{(d+ex)^5} + \frac{270ad^4e}{(d+ex)^4} - \frac{51bd^4en}{(d+ex)^4} + \frac{480ad^3e}{(d+ex)^3} - \frac{158bd^3en}{(d+ex)^3} + \frac{900ad^2e}{(d+ex)^2} - \frac{477bd^2en}{(d+ex)^2} + \frac{2160ade}{d+ex} - \frac{1854bden}{d+ex} - 4014ben\log(x) + \frac{2520ae\log(cx^n)}{n} + \frac{360bd\log(cx^n)}{x} + \frac{60bd^6e\log(cx^n)}{(d+ex)^6} + \frac{144bd^5e\log(cx^n)}{(d+ex)^5} + \frac{270bd^4e\log(cx^n)}{(d+ex)^4} + \frac{480bd^3e\log(cx^n)}{(d+ex)^3} + \frac{900bd^2e\log(cx^n)}{(d+ex)^2} + \frac{2160bde\log(cx^n)}{d+ex} + \frac{1260be\log^2(cx^n)}{n} + 4014ben\log(d+ex) - 2520ae\log\left(1+\frac{ex}{d}\right) - 2520be\log(cx^n)\log\left(1+\frac{ex}{d}\right) - 2520ben\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{360d^8}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^7),x]
```

```
[Out] -1/360*((360*a*d)/x + (360*b*d*n)/x + (60*a*d^6*e)/(d + e*x)^6 + (144*a*d^5
*e)/(d + e*x)^5 - (12*b*d^5*e*n)/(d + e*x)^5 + (270*a*d^4*e)/(d + e*x)^4 -
(51*b*d^4*e*n)/(d + e*x)^4 + (480*a*d^3*e)/(d + e*x)^3 - (158*b*d^3*e*n)/(d
 + e*x)^3 + (900*a*d^2*e)/(d + e*x)^2 - (477*b*d^2*e*n)/(d + e*x)^2 + (2160
*a*d*e)/(d + e*x) - (1854*b*d*e*n)/(d + e*x) - 4014*b*e*n*Log[x] + (2520*a*
e*Log[c*x^n])/n + (360*b*d*Log[c*x^n])/x + (60*b*d^6*e*Log[c*x^n])/(d + e*x
)^6 + (144*b*d^5*e*Log[c*x^n])/(d + e*x)^5 + (270*b*d^4*e*Log[c*x^n])/(d +
e*x)^4 + (480*b*d^3*e*Log[c*x^n])/(d + e*x)^3 + (900*b*d^2*e*Log[c*x^n])/(d
 + e*x)^2 + (2160*b*d*e*Log[c*x^n])/(d + e*x) + (1260*b*e*Log[c*x^n]^2)/n +
 4014*b*e*n*Log[d + e*x] - 2520*a*e*Log[1 + (e*x)/d] - 2520*b*e*Log[c*x^n]*
Log[1 + (e*x)/d] - 2520*b*e*n*PolyLog[2, -((e*x)/d)])/d^8
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 1650, normalized size = 4.87

method	result	size
risch	Expression too large to display	1650

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

```
[Out] 7*b*ln(x^n)/d^8*e*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^7/x-1/12*I*b*Pi*cs
gn(I*x^n)*csgn(I*c*x^n)^2*e/d^2/(e*x+d)^6+7/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2/d^8*e*ln(e*x+d)-5/2*b*ln(c)*e/d^6/(e*x+d)^2-4/3*b*ln(c)*e/d^5/(e*x+d)
^3-3/4*b*ln(c)/d^4*e/(e*x+d)^4-2/5*b*ln(c)/d^3*e/(e*x+d)^5+7*b*ln(c)/d^8*e*
ln(e*x+d)-7*b*ln(c)/d^8*e*ln(x)-1/6*b*ln(c)*e/d^2/(e*x+d)^6-6*b*ln(c)/d^7*e
/(e*x+d)+1/12*I*b*Pi*csgn(I*c*x^n)^3*e/d^2/(e*x+d)^6-1/6*b*ln(x^n)*e/d^2/(e
*x+d)^6-7/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^8*e*ln(e*x+d)-3/8*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e/(e*x+d)^4-3*I*b*Pi*csgn(I*c)*csgn(I*
c*x^n)^2/d^7*e/(e*x+d)-7/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^8*e*ln(x)-7
*b*n/d^8*e*ln(e*x+d)*ln(-e*x/d)-1/12*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2
/(e*x+d)^6-b*ln(c)/d^7/x+3/8*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4
*e/(e*x+d)^4+223/20*b*e*n*ln(x)/d^8-223/20*b*e*n*ln(e*x+d)/d^8-1/6*a*e/d^2/
(e*x+d)^6+7*a/d^8*e*ln(e*x+d)-6*a/d^7*e/(e*x+d)-5/2*a*e/d^6/(e*x+d)^2-4/3*a
*e/d^5/(e*x+d)^3-3/4*a/d^4*e/(e*x+d)^4-2/5*a/d^3*e/(e*x+d)^5-7*a/d^8*e*ln(x
)-a/d^7/x-6*b*ln(x^n)/d^7*e/(e*x+d)-5/2*b*ln(x^n)*e/d^6/(e*x+d)^2+2/3*I*b*P
i*csgn(I*c*x^n)^3*e/d^5/(e*x+d)^3+3/8*I*b*Pi*csgn(I*c*x^n)^3/d^4*e/(e*x+d)^
4+1/5*I*b*Pi*csgn(I*c*x^n)^3/d^3*e/(e*x+d)^5-7*b*n/d^8*e*dilog(-e*x/d)+5/4*
I*b*Pi*csgn(I*c*x^n)^3*e/d^6/(e*x+d)^2-7/2*I*b*Pi*csgn(I*c*x^n)^3/d^8*e*ln(
e*x+d)-b*ln(x^n)/d^7/x+5/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^6
/(e*x+d)^2+7/2*b*n/d^8*e*ln(x)^2+3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)/d^7*e/(e*x+d)+1/12*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/(e*x
+d)^6+2/3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^5/(e*x+d)^3+3*I*b*
Pi*csgn(I*c*x^n)^3/d^7*e/(e*x+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^7/x
-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^7/x+1/5*I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)/d^3*e/(e*x+d)^5+7/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)/d^8*e*ln(x)-4/3*b*ln(x^n)*e/d^5/(e*x+d)^3-3/4*b*ln(x^n)/d^4*e/(e*x+d)
^4-2/5*b*ln(x^n)/d^3*e/(e*x+d)^5-7*b*ln(x^n)/d^8*e*ln(x)-3/8*I*b*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2/d^4*e/(e*x+d)^4-1/5*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
/d^3*e/(e*x+d)^5-2/3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^5/(e*x+d)^3-2/3
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^5/(e*x+d)^3-5/4*I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2*e/d^6/(e*x+d)^2+7/2*I*b*Pi*csgn(I*c*x^n)^3/d^8*e*ln(x)+7/2*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^8*e*ln(e*x+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)/d^7/x-7/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^8*e*ln(x)-1
/5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e/(e*x+d)^5-3*I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2/d^7*e/(e*x+d)-5/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^6/(e*x
+d)^2-b*n/d^7/x+1/30*b*e*n/d^3/(e*x+d)^5+17/120*b*e*n/d^4/(e*x+d)^4+79/180*
b*e*n/d^5/(e*x+d)^3+53/40*b*e*n/d^6/(e*x+d)^2+103/20*b*e*n/d^7/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] -1/60*a*((420*x^6*e^6 + 2310*d*x^5*e^5 + 5180*d^2*x^4*e^4 + 5985*d^3*x^3*e^
3 + 3654*d^4*x^2*e^2 + 1029*d^5*x*e + 60*d^6)/(d^7*x^7*e^6 + 6*d^8*x^6*e^5
+ 15*d^9*x^5*e^4 + 20*d^10*x^4*e^3 + 15*d^11*x^3*e^2 + 6*d^12*x^2*e + d^13*
x) - 420*e*log(x*e + d)/d^8 + 420*e*log(x)/d^8) + b*integrate((log(c) + log
(x^n))/(x^9*e^7 + 7*d*x^8*e^6 + 21*d^2*x^7*e^5 + 35*d^3*x^6*e^4 + 35*d^4*x^
5*e^3 + 21*d^5*x^4*e^2 + 7*d^6*x^3*e + d^7*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^9*e^7 + 7*d*x^8*e^6 + 21*d^2*x^7*e^5 + 35*d^
3*x^6*e^4 + 35*d^4*x^5*e^3 + 21*d^5*x^4*e^2 + 7*d^6*x^3*e + d^7*x^2), x)
```

Sympy [A]
time = 155.85, size = 1685, normalized size = 4.97

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**7,x)
```

```
[Out] a*e**2*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d**2 +
2*a*e**2*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**3
+ 3*a*e**2*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/d**
4 + 4*a*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d
**5 + 5*a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))
/d**6 + 6*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d
**7 - a/(d**7*x) + 7*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, Tru
e))/d**8 - 7*a*e*log(x)/d**8 - b*e**2*n*Piecewise((x/d**7, Eq(e, 0)), (-137
*d**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**
4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**1
0*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d
**6*e**5*x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d**10*e + 180
0*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*
x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*
x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d
**5*e**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e
**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5)
- log(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True))/d**2 + b*e**2*Piecewi
se((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/d**2 - 2*
b*e**2*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7*e**2
```

```
*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 52*d**2
*e*x/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3
 + 60*d**4*e**5*x**4) - 42*d*e**2*x**2/(60*d**8*e + 240*d**7*e**2*x + 360*d
**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 12*e**3*x**3/(60*
d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**
4*e**5*x**4) - log(x)/(5*d**5*e) + log(d/e + x)/(5*d**5*e), True))/d**3 + 2
*b*e**2*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))*log(c*
x**n)/d**3 - 3*b*e**2*n*Piecewise((x/d**5, Eq(e, 0)), (-11*d**2/(24*d**6*e
+ 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - 15*d*e*x/(24*d*
*6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - 6*e**2*x**
2/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d**3*e**4*x**3) - lo
g(x)/(4*d**4*e) + log(d/e + x)/(4*d**4*e), True))/d**4 + 3*b*e**2*Piecewise
((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))*log(c*x**n)/d**4 - 4*b*
e**2*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d
**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log
(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), True))/d**5 + 4*b*e**2*Piecewise(
(x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/d**5 - 5*b*e
**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2
*d**2*e) + log(d/e + x)/(2*d**2*e), True))/d**6 + 5*b*e**2*Piecewise((x/d**
3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/d**6 - 6*b*e**2*n*
Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/d
**7 + 6*b*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log
(c*x**n)/d**7 - b*n/(d**7*x) - b*log(c*x**n)/(d**7*x) - 7*b*e**2*n*Piecewis
e((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x)
< 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d),
 Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(
x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1),
 ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e
, True))/d**8 + 7*b*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))
*log(c*x**n)/d**8 + 7*b*e*n*log(x)**2/(2*d**8) - 7*b*e*log(x)*log(c*x**n)/d
**8
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^7*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x\right)}^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^7),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^7), x)
```

3.73 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx$

Optimal. Leaf size=401

$$-\frac{bn}{4d^7x^2}+\frac{7ben}{d^8x}-\frac{be^2n}{30d^4(d+ex)^5}-\frac{23be^2n}{120d^5(d+ex)^4}-\frac{34be^2n}{45d^6(d+ex)^3}-\frac{14be^2n}{5d^7(d+ex)^2}-\frac{131be^2n}{10d^8(d+ex)}-\frac{131be^2n\,\mathrm{lo}}{10d^9}$$

```
[Out] -1/4*b*n/d^7/x^2+7*b*e*n/d^8/x-1/30*b*e^2*n/d^4/(e*x+d)^5-23/120*b*e^2*n/d^
5/(e*x+d)^4-34/45*b*e^2*n/d^6/(e*x+d)^3-14/5*b*e^2*n/d^7/(e*x+d)^2-131/10*b
*e^2*n/d^8/(e*x+d)-131/10*b*e^2*n*ln(x)/d^9+1/2*(-a-b*ln(c*x^n))/d^7/x^2+7*
e*(a+b*ln(c*x^n))/d^8/x+1/6*e^2*(a+b*ln(c*x^n))/d^3/(e*x+d)^6+3/5*e^2*(a+b*
ln(c*x^n))/d^4/(e*x+d)^5+3/2*e^2*(a+b*ln(c*x^n))/d^5/(e*x+d)^4+10/3*e^2*(a+
b*ln(c*x^n))/d^6/(e*x+d)^3+15/2*e^2*(a+b*ln(c*x^n))/d^7/(e*x+d)^2-21*e^3*x*
(a+b*ln(c*x^n))/d^9/(e*x+d)-28*e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^9+341/10*b
*e^2*n*ln(e*x+d)/d^9+28*b*e^2*n*polylog(2,-d/e/x)/d^9
```

Rubi [A]
time = 0.46, antiderivative size = 401, normalized size of antiderivative = 1.00, number of steps used = 23, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$,
Rules used = {46, 2393, 2341, 2356, 2351, 31, 2379, 2438}

$$\frac{28be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^9}-\frac{21e^3x(a+b\log(cx^n))}{d^9(d+ex)}-\frac{28e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^9}+\frac{7e(a+b\log(cx^n))}{d^8x}+\frac{15e^2(a+b\log(cx^n))}{2d^7(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^7x^2}+\frac{10e^2(a+b\log(cx^n))}{3d^6(d+ex)^3}+\frac{3e^2(a+b\log(cx^n))}{2d^5(d+ex)^4}+\frac{3e^2(a+b\log(cx^n))}{5d^4(d+ex)^5}+\frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6}-\frac{131be^2n\log(x)}{10d^9}+\frac{341be^2n\log(d+ex)}{10d^9}-\frac{131be^2n}{10d^8(d+ex)}+\frac{7ben}{d^8x}-\frac{14be^2n}{5d^7(d+ex)^2}-\frac{bn}{4d^7x^2}-\frac{34be^2n}{45d^6(d+ex)^3}-\frac{23be^2n}{120d^5(d+ex)^4}-\frac{be^2n}{30d^4(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^7),x]
```

```
[Out] -1/4*(b*n)/(d^7*x^2) + (7*b*e*n)/(d^8*x) - (b*e^2*n)/(30*d^4*(d + e*x)^5) -
 (23*b*e^2*n)/(120*d^5*(d + e*x)^4) - (34*b*e^2*n)/(45*d^6*(d + e*x)^3) - (
14*b*e^2*n)/(5*d^7*(d + e*x)^2) - (131*b*e^2*n)/(10*d^8*(d + e*x)) - (131*b
*e^2*n*Log[x])/(10*d^9) - (a + b*Log[c*x^n])/(2*d^7*x^2) + (7*e*(a + b*Log[
c*x^n]))/(d^8*x) + (e^2*(a + b*Log[c*x^n]))/(6*d^3*(d + e*x)^6) + (3*e^2*(a
 + b*Log[c*x^n]))/(5*d^4*(d + e*x)^5) + (3*e^2*(a + b*Log[c*x^n]))/(2*d^5*(
d + e*x)^4) + (10*e^2*(a + b*Log[c*x^n]))/(3*d^6*(d + e*x)^3) + (15*e^2*(a
+ b*Log[c*x^n]))/(2*d^7*(d + e*x)^2) - (21*e^3*x*(a + b*Log[c*x^n]))/(d^9*(
d + e*x)) - (28*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^9 + (341*b*e^2*n
*Log[d + e*x])/(10*d^9) + (28*b*e^2*n*PolyLog[2, -(d/(e*x))])/d^9
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
```

```
NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \int \left(\frac{a+b\log(cx^n)}{d^7x^3} - \frac{7e(a+b\log(cx^n))}{d^8x^2} + \frac{28e^2(a+b\log(cx^n))}{d^9x} - \frac{e^3(a+b\log(cx\right.$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d^7} - \frac{(7e)\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^8} + \frac{(28e^2)\int \frac{a+b\log(cx^n)}{x}\,dx}{d^9} - \frac{(28e^3)\int \frac{a+b\log(cx}{d+ex}}{d^9}$$

$$= -\frac{bn}{4d^7x^2} + \frac{7ben}{d^8x} - \frac{a+b\log(cx^n)}{2d^7x^2} + \frac{7e(a+b\log(cx^n))}{d^8x} + \frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6} + \frac{3e^2}{}$$

$$= -\frac{bn}{4d^7x^2} + \frac{7ben}{d^8x} - \frac{a+b\log(cx^n)}{2d^7x^2} + \frac{7e(a+b\log(cx^n))}{d^8x} + \frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6} + \frac{3e^2}{}$$

$$= -\frac{bn}{4d^7x^2} + \frac{7ben}{d^8x} - \frac{be^2n}{30d^4(d+ex)^5} - \frac{23be^2n}{120d^5(d+ex)^4} - \frac{34be^2n}{45d^6(d+ex)^3} - \frac{14be^2n}{5d^7(d+ex)}$$

Mathematica [A]
time = 0.34, size = 486, normalized size = 1.21

$$\frac{-\frac{180ad^2}{x^2} - \frac{90bd^2n}{x^2} + \frac{2520ade}{x} + \frac{2520bden}{x} + \frac{60ad^6e^2}{(d+ex)^6} + \frac{216ad^5e^2}{(d+ex)^5} - \frac{12bd^5e^2n}{(d+ex)^5} + \frac{540ad^4e^2}{(d+ex)^4} - \frac{69bd^4e^2n}{(d+ex)^4} + \frac{1200ad^3e^2}{(d+ex)^3} - \frac{272bd^3e^2n}{(d+ex)^3} + \frac{2700ad^2e^2}{(d+ex)^2} - \frac{1008bd^2e^2n}{(d+ex)^2} + \frac{7560ade^2}{d+ex} - \frac{4716bde^2n}{d+ex} - 12276be^2n\log(x) + \frac{10080ae^2\log(cx^n)}{n} - \frac{180bd^2\log(cx^n)}{x^2} + \frac{2520bde\log(cx^n)}{x} + \frac{60bd^6e^2\log(cx^n)}{(d+ex)^6} + \frac{216bd^5e^2\log(cx^n)}{(d+ex)^5} + \frac{540bd^4e^2\log(cx^n)}{(d+ex)^4} + \frac{1200bd^3e^2\log(cx^n)}{(d+ex)^3} + \frac{2700bd^2e^2\log(cx^n)}{(d+ex)^2} + \frac{7560bde^2\log(cx^n)}{d+ex} + \frac{5040be^2\log^2(cx^n)}{n} + 12276be^2n\log(d+ex) - 10080ae^2\log\left(1+\frac{ex}{d}\right) - 10080be^2\log(cx^n)\log\left(1+\frac{ex}{d}\right) - 10080be^2n\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{360d^9}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^7),x]
```

```
[Out] ((-180*a*d^2)/x^2 - (90*b*d^2*n)/x^2 + (2520*a*d*e)/x + (2520*b*d*e*n)/x +
(60*a*d^6*e^2)/(d + e*x)^6 + (216*a*d^5*e^2)/(d + e*x)^5 - (12*b*d^5*e^2*n)
/(d + e*x)^5 + (540*a*d^4*e^2)/(d + e*x)^4 - (69*b*d^4*e^2*n)/(d + e*x)^4 +
 (1200*a*d^3*e^2)/(d + e*x)^3 - (272*b*d^3*e^2*n)/(d + e*x)^3 + (2700*a*d^2
*e^2)/(d + e*x)^2 - (1008*b*d^2*e^2*n)/(d + e*x)^2 + (7560*a*d*e^2)/(d + e*
x) - (4716*b*d*e^2*n)/(d + e*x) - 12276*b*e^2*n*Log[x] + (10080*a*e^2*Log[c
*x^n])/n - (180*b*d^2*Log[c*x^n])/x^2 + (2520*b*d*e*Log[c*x^n])/x + (60*b*d
^6*e^2*Log[c*x^n])/(d + e*x)^6 + (216*b*d^5*e^2*Log[c*x^n])/(d + e*x)^5 + (
540*b*d^4*e^2*Log[c*x^n])/(d + e*x)^4 + (1200*b*d^3*e^2*Log[c*x^n])/(d + e*
x)^3 + (2700*b*d^2*e^2*Log[c*x^n])/(d + e*x)^2 + (7560*b*d*e^2*Log[c*x^n])/
(d + e*x) + (5040*b*e^2*Log[c*x^n]^2)/n + 12276*b*e^2*n*Log[d + e*x] - 1008
0*a*e^2*Log[1 + (e*x)/d] - 10080*b*e^2*Log[c*x^n]*Log[1 + (e*x)/d] - 10080*
b*e^2*n*PolyLog[2, -((e*x)/d)])/(360*d^9)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 1939, normalized size = 4.84

method	result	size
risch	Expression too large to display	1939

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x+d)^7,x,method=_RETURNVERBOSE)

[Out] 1/6*b*ln(c)*e^2/d^3/(e*x+d)^6+7*b*ln(c)/d^8*e/x-21/2*I*b*Pi*csgn(I*c*x^n)^3
/d^8*e^2/(e*x+d)-21/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^8*e^2/(e
*x+d)-15/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^7/(e*x+d)^2-1/1
2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3/(e*x+d)^6-7/2*I*b*Pi*csgn(I*c*x^n)^3/d^8*e
/x-3/4*I*b*Pi*csgn(I*c*x^n)^3/d^5*e^2/(e*x+d)^4-28*a/d^9*e^2*ln(e*x+d)+21*a
/d^8*e^2/(e*x+d)+15/2*a*e^2/d^7/(e*x+d)^2+10/3*a*e^2/d^6/(e*x+d)^3+3/2*a/d^
5*e^2/(e*x+d)^4+3/5*a/d^4*e^2/(e*x+d)^5+1/6*a*e^2/d^3/(e*x+d)^6+28*a/d^9*e^
2*ln(x)+7*a/d^8*e/x-5/3*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^6/(e*x+d)^3+1/4*I*b*Pi
*csgn(I*c*x^n)^3/d^7/x^2+14*I*b*Pi*csgn(I*c*x^n)^3/d^9*e^2*ln(e*x+d)+1/12*I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3/(e*x+d)^6-1/4*I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2/d^7/x^2-3/10*I*b*Pi*csgn(I*c*x^n)^3/d^4*e^2/(e*x+d)^5-28*b*ln
(c)/d^9*e^2*ln(e*x+d)+28*b*ln(c)/d^9*e^2*ln(x)+21*b*ln(c)/d^8*e^2/(e*x+d)+1
5/2*b*ln(c)*e^2/d^7/(e*x+d)^2+10/3*b*ln(c)*e^2/d^6/(e*x+d)^3+3/2*b*ln(c)/d^
5*e^2/(e*x+d)^4+3/5*b*ln(c)/d^4*e^2/(e*x+d)^5-7/2*I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)/d^8*e/x+28*b*n/d^9*e^2*ln(e*x+d)*ln(-e*x/d)-28*b*ln(x^n)/
d^9*e^2*ln(e*x+d)-15/4*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^7/(e*x+d)^2-14*b*n/d^9*
e^2*ln(x)^2+28*b*n/d^9*e^2*dilog(-e*x/d)-3/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)/d^5*e^2/(e*x+d)^4-3/10*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)/d^4*e^2/(e*x+d)^5-341/10*b*e^2*n*ln(x)/d^9+341/10*b*e^2*n*ln(e*x+d)/d^9
-1/2*a/d^7/x^2-1/2*b*ln(c)/d^7/x^2-14*I*b*Pi*csgn(I*c*x^n)^3/d^9*e^2*ln(x)-
1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^7/x^2+1/12*I*b*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2*e^2/d^3/(e*x+d)^6+14*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^9*e^2*l
n(x)+3/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^5*e^2/(e*x+d)^4-1/12*I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3/(e*x+d)^6-14*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)/d^9*e^2*ln(x)-1/2*b*ln(x^n)/d^7/x^2+3/10*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2/d^4*e^2/(e*x+d)^5+15/4*I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2*e^2/d^7/(e*x+d)^2+14*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^9*e^2*ln(x)
+21/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^8*e^2/(e*x+d)+15/4*I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2*e^2/d^7/(e*x+d)^2+7/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/
d^8*e/x-14*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^9*e^2*ln(e*x+d)+1/4*I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^7/x^2-14*I*b*Pi*csgn(I*c)*csgn(I*c*x^
n)^2/d^9*e^2*ln(e*x+d)+5/3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^6/(e*x+d)
^3+7/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^8*e/x+21/2*I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2/d^8*e^2/(e*x+d)+5/3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^6
/(e*x+d)^3+3/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^5*e^2/(e*x+d)^4+3/10*I*b*
Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e^2/(e*x+d)^5+1/6*b*ln(x^n)*e^2/d^3/(e*x+d
)^6+28*b*ln(x^n)/d^9*e^2*ln(x)+7*b*ln(x^n)/d^8*e/x+21*b*ln(x^n)/d^8*e^2/(e*
x+d)+15/2*b*ln(x^n)*e^2/d^7/(e*x+d)^2+10/3*b*ln(x^n)*e^2/d^6/(e*x+d)^3+3/2*
b*ln(x^n)/d^5*e^2/(e*x+d)^4+3/5*b*ln(x^n)/d^4*e^2/(e*x+d)^5+14*I*b*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^9*e^2*ln(e*x+d)-5/3*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*e^2/d^6/(e*x+d)^3-1/4*b*n/d^7/x^2+7*b*e*n/d^8/x-1/30*b
*e^2*n/d^4/(e*x+d)^5-23/120*b*e^2*n/d^5/(e*x+d)^4-34/45*b*e^2*n/d^6/(e*x+d)
^3-14/5*b*e^2*n/d^7/(e*x+d)^2-131/10*b*e^2*n/d^8/(e*x+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="maxima")
```

```
[Out] 1/30*a*((840*x^7*e^7 + 4620*d*x^6*e^6 + 10360*d^2*x^5*e^5 + 11970*d^3*x^4*e
^4 + 7308*d^4*x^3*e^3 + 2058*d^5*x^2*e^2 + 120*d^6*x*e - 15*d^7)/(d^8*x^8*e
^6 + 6*d^9*x^7*e^5 + 15*d^10*x^6*e^4 + 20*d^11*x^5*e^3 + 15*d^12*x^4*e^2 +
6*d^13*x^3*e + d^14*x^2) - 840*e^2*log(x*e + d)/d^9 + 840*e^2*log(x)/d^9) +
 b*integrate((log(c) + log(x^n))/(x^10*e^7 + 7*d*x^9*e^6 + 21*d^2*x^8*e^5 +
 35*d^3*x^7*e^4 + 35*d^4*x^6*e^3 + 21*d^5*x^5*e^2 + 7*d^6*x^4*e + d^7*x^3),
 x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^10*e^7 + 7*d*x^9*e^6 + 21*d^2*x^8*e^5 + 35*d
^3*x^7*e^4 + 35*d^4*x^6*e^3 + 21*d^5*x^5*e^2 + 7*d^6*x^4*e + d^7*x^3), x)
```

Sympy [A]
time = 161.24, size = 1737, normalized size = 4.33

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**7,x)
```

```
[Out] -a*e**3*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d**3 -
 3*a*e**3*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**4
 - 6*a*e**3*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/d*
*5 - 10*a*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))
/d**6 - 15*a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), Tru
e))/d**7 - a/(2*d**7*x**2) - 21*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d
*e + e**2*x), True))/d**8 + 7*a*e/(d**8*x) - 28*a*e**3*Piecewise((x/d, Eq(e
, 0)), (log(d + e*x)/e, True))/d**9 + 28*a*e**2*log(x)/d**9 + b*e**3*n*Piec
ewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e**2*x + 3600
*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6
```

```
*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2
 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 470*d*
*2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d
**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*x**3
/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**
3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**4/(360*d**10*e +
 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e
**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e
), True))/d**3 - b*e**3*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6
), True))*log(c*x**n)/d**3 + 3*b*e**3*n*Piecewise((x/d**6, Eq(e, 0)), (-25*
d**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3
 + 60*d**4*e**5*x**4) - 52*d**2*e*x/(60*d**8*e + 240*d**7*e**2*x + 360*d**6
*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - 42*d*e**2*x**2/(60*d
**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**2 + 240*d**5*e**4*x**3 + 60*d**4
*e**5*x**4) - 12*e**3*x**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**3*x**
2 + 240*d**5*e**4*x**3 + 60*d**4*e**5*x**4) - log(x)/(5*d**5*e) + log(d/e +
 x)/(5*d**5*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**6, Eq(e, 0)), (-1/(5
*e*(d + e*x)**5), True))*log(c*x**n)/d**4 + 6*b*e**3*n*Piecewise((x/d**5, E
q(e, 0)), (-11*d**2/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 + 24*d*
*3*e**4*x**3) - 15*d*e*x/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3*x**2 +
24*d**3*e**4*x**3) - 6*e**2*x**2/(24*d**6*e + 72*d**5*e**2*x + 72*d**4*e**3
*x**2 + 24*d**3*e**4*x**3) - log(x)/(4*d**4*e) + log(d/e + x)/(4*d**4*e), T
rue))/d**5 - 6*b*e**3*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4),
 True))*log(c*x**n)/d**5 + 10*b*e**3*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/
(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*
e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), T
rue))/d**6 - 10*b*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3)
, True))*log(c*x**n)/d**6 + 15*b*e**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(
2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True)
)/d**7 - 15*b*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), Tr
ue))*log(c*x**n)/d**7 - b*n/(4*d**7*x**2) - b*log(c*x**n)/(2*d**7*x**2) + 2
1*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e
), True))/d**8 - 21*b*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x)
, True))*log(c*x**n)/d**8 + 7*b*e*n/(d**8*x) + 7*b*e*log(c*x**n)/(d**8*x) +
 28*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_pol
ar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*
x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_p
olar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(
d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_pol
ar(I*pi)/d), True))/e, True))/d**9 - 28*b*e**3*Piecewise((x/d, Eq(e, 0)), (
log(d + e*x)/e, True))*log(c*x**n)/d**9 - 14*b*e**2*n*log(x)**2/d**9 + 28*b
*e**2*log(x)*log(c*x**n)/d**9
```

Giac [F]

time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^7*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,{\left(d+e\,x\right)}^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)^7),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)^7), x)
```

3.74 $\int \frac{\log(cx)}{1-cx}\,dx$

Optimal. Leaf size=12

$$\frac{\text{Li}_2(1-cx)}{c}$$

```
[Out] polylog(2,-c*x+1)/c
```

Rubi [A]
time = 0.01, antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {2352}

$$\frac{\text{PolyLog}(2,1-cx)}{c}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]/(1 - c*x),x]
```

```
[Out] PolyLog[2, 1 - c*x]/c
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rubi steps

$$\int \frac{\log(cx)}{1-cx}\,dx = \frac{\text{Li}_2(1-cx)}{c}$$

Mathematica [A]
time = 0.00, size = 12, normalized size = 1.00

$$\frac{\text{Li}_2(1-cx)}{c}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]/(1 - c*x),x]
```

```
[Out] PolyLog[2, 1 - c*x]/c
```

Maple [A]
time = 0.11, size = 9, normalized size = 0.75

method	result	size
derivativedivides	$\frac{\operatorname{dilog}(cx)}{c}$	9
default	$\frac{\operatorname{dilog}(cx)}{c}$	9
risch	$\frac{\operatorname{dilog}(cx)}{c}$	9

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)/(-c*x+1),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c*dilog(c*x)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(11) = 22$.
time = 0.27, size = 48, normalized size = 4.00

$$-\frac{\log\left(cx-1\right)\log\left(cx\right)}{c}+\frac{\log\left(cx-1\right)\log\left(x\right)}{c}-\frac{\log\left(-cx+1\right)\log\left(x\right)+\mathrm{Li}_2(cx)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/(-c*x+1),x, algorithm="maxima")
```

```
[Out] -log(c*x - 1)*log(c*x)/c + log(c*x - 1)*log(x)/c - (log(-c*x + 1)*log(x) +
dilog(c*x))/c
```

Fricas [A]
time = 0.34, size = 11, normalized size = 0.92

$$\frac{\mathrm{Li}_2(-cx+1)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/(-c*x+1),x, algorithm="fricas")
```

```
[Out] dilog(-c*x + 1)/c
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\int\frac{\log\left(cx\right)}{cx-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)/(-c*x+1),x)
```

```
[Out] -Integral(log(c*x)/(c*x - 1), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/(-c*x+1),x, algorithm="giac")
[Out] integrate(-log(c*x)/(c*x - 1), x)
```

Mupad [B]
time = 3.46, size = 8, normalized size = 0.67

$$\frac{\mathrm{Li}_2(c\,x)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-log(c*x)/(c*x - 1),x)
[Out] dilog(c*x)/c
```

3.75 $\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx$

Optimal. Leaf size=10

$$\text{Li}_2\left(1-\frac{x}{c}\right)$$

```
[Out] polylog(2,1-x/c)
```

Rubi [A]
time = 0.01, antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2352}

$$\text{PolyLog}\left(2,1-\frac{x}{c}\right)$$

Antiderivative was successfully verified.

```
[In] Int[Log[x/c]/(c - x),x]
```

```
[Out] PolyLog[2, 1 - x/c]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rubi steps

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \text{Li}_2\left(1-\frac{x}{c}\right)$$

Mathematica [A]
time = 0.00, size = 11, normalized size = 1.10

$$\text{Li}_2\left(\frac{c-x}{c}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[x/c]/(c - x),x]
```

```
[Out] PolyLog[2, (c - x)/c]
```

Maple [A]
time = 0.08, size = 7, normalized size = 0.70

method	result	size
derivativedivides	$\text{dilog}\left(\frac{x}{c}\right)$	7
default	$\text{dilog}\left(\frac{x}{c}\right)$	7
risch	$\text{dilog}\left(\frac{x}{c}\right)$	7

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(x/c)/(c-x),x,method=_RETURNVERBOSE)
```

```
[Out] dilog(x/c)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(9) = 18$.
time = 0.26, size = 45, normalized size = 4.50

$$\log\left(c-x\right)\log\left(x\right)-\log\left(c-x\right)\log\left(\frac{x}{c}\right)-\log\left(x\right)\log\left(-\frac{x}{c}+1\right)-\text{Li}_2\left(\frac{x}{c}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x/c)/(c-x),x, algorithm="maxima")
```

```
[Out] log(c - x)*log(x) - log(c - x)*log(x/c) - log(x)*log(-x/c + 1) - dilog(x/c)
```

Fricas [A]
time = 0.35, size = 9, normalized size = 0.90

$$\text{Li}_2\left(-\frac{x}{c}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x/c)/(c-x),x, algorithm="fricas")
```

```
[Out] dilog(-x/c + 1)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\int\frac{\log\left(\frac{x}{c}\right)}{-c+x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(x/c)/(c-x),x)
```

```
[Out] -Integral(log(x/c)/(-c + x), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x/c)/(c-x),x, algorithm="giac")
[Out] integrate(log(x/c)/(c - x), x)
```

Mupad [B]
time = 3.50, size = 6, normalized size = 0.60

$$\mathrm{Li}_2\left(\frac{x}{c}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(x/c)/(c - x),x)
[Out] dilog(x/c)
```

3.76 $\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$

Optimal. Leaf size=109

$$\frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4-\frac{2}{9}bdnx^3\left(a+b\log\left(cx^n\right)\right)-\frac{1}{8}benx^4\left(a+b\log\left(cx^n\right)\right)+\frac{1}{3}dx^3\left(a+b\log\left(cx^n\right)\right)^2+\frac{1}{4}ex^4(a+$$

```
[Out] 2/27*b^2*d*n^2*x^3+1/32*b^2*e*n^2*x^4-2/9*b*d*n*x^3*(a+b*ln(c*x^n))-1/8*b*e
*n*x^4*(a+b*ln(c*x^n))+1/3*d*x^3*(a+b*ln(c*x^n))^2+1/4*e*x^4*(a+b*ln(c*x^n)
)^2
```

Rubi [A]
time = 0.11, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2395, 2342, 2341}

$$\frac{1}{3}dx^3\left(a+b\log\left(cx^n\right)\right)^2-\frac{2}{9}bdnx^3\left(a+b\log\left(cx^n\right)\right)+\frac{1}{4}ex^4\left(a+b\log\left(cx^n\right)\right)^2-\frac{1}{8}benx^4\left(a+b\log\left(cx^n\right)\right)+\frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b^2*d*n^2*x^3)/27 + (b^2*e*n^2*x^4)/32 - (2*b*d*n*x^3*(a + b*Log[c*x^n])
)/9 - (b*e*n*x^4*(a + b*Log[c*x^n]))/8 + (d*x^3*(a + b*Log[c*x^n])^2)/3 + (
e*x^4*(a + b*Log[c*x^n])^2)/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \int \left(dx^2\left(a+b\log\left(cx^n\right)\right)^2+ex^3\left(a+b\log\left(cx^n\right)\right)^2\right)\,dx$$
$$= d\int x^2\left(a+b\log\left(cx^n\right)\right)^2\,dx+e\int x^3\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$= \frac{1}{3}dx^3\left(a+b\log\left(cx^n\right)\right)^2+\frac{1}{4}ex^4\left(a+b\log\left(cx^n\right)\right)^2-\frac{1}{3}(2bdn)\int x^2(a+b$$
$$= \frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4-\frac{2}{9}bdnx^3\left(a+b\log\left(cx^n\right)\right)-\frac{1}{8}benx^4(a+b\log$$

Mathematica [**A**]
time = 0.04, size = 82, normalized size = 0.75

$$\frac{1}{864}x^3\left(27benx\left(-4a+bn-4b\log\left(cx^n\right)\right)+64bdn\left(-3a+bn-3b\log\left(cx^n\right)\right)+288d\left(a+b\log\left(cx^n\right)\right)^2+216ex\left(a+b\log\left(cx^n\right)\right)^2\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x^3*(27*b*e*n*x*(-4*a + b*n - 4*b*Log[c*x^n]) + 64*b*d*n*(-3*a + b*n - 3*b
*Log[c*x^n]) + 288*d*(a + b*Log[c*x^n])^2 + 216*e*x*(a + b*Log[c*x^n])^2))/
864
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 1622, normalized size = 14.88

method	result	size
risch	Expression too large to display	1622

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*a^2*e+1/3*x^3*a^2*d+1/72*b*(-18*I*Pi*b*e*x^4*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+18*I*Pi*b*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+18*I*Pi*b*e*x^4*csg
n(I*x^n)*csgn(I*c*x^n)^2-18*I*Pi*b*e*x^4*csgn(I*c*x^n)^3+36*ln(c)*b*e*x^4-9
*b*e*n*x^4+36*x^4*a*e-24*I*Pi*b*d*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2
4*I*Pi*b*d*x^3*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*b*d*x^3*csgn(I*x^n)*csgn(I
*c*x^n)^2-24*I*Pi*b*d*x^3*csgn(I*c*x^n)^3+48*ln(c)*b*d*x^3-16*b*d*n*x^3+48*
x^3*a*d)*ln(x^n)-1/16*Pi^2*b^2*e*x^4*csgn(I*c)^2*csgn(I*c*x^n)^4+1/8*Pi^2*b
^2*e*x^4*csgn(I*c)*csgn(I*c*x^n)^5-1/16*Pi^2*b^2*e*x^4*csgn(I*x^n)^2*csgn(I
*c*x^n)^4+1/8*Pi^2*b^2*e*x^4*csgn(I*x^n)*csgn(I*c*x^n)^5+1/6*Pi^2*b^2*d*x^3
*csgn(I*x^n)*csgn(I*c*x^n)^5-1/12*Pi^2*b^2*d*x^3*csgn(I*c)^2*csgn(I*c*x^n)^
4+1/6*Pi^2*b^2*d*x^3*csgn(I*c)*csgn(I*c*x^n)^5-1/4*I*Pi*ln(c)*b^2*e*x^4*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/16*I*Pi*b^2*e*n*x^4*csgn(I*c)*csgn(I*x^n
```

```
)*csgn(I*c*x^n)-1/4*I*Pi*a*b*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/3*
I*Pi*ln(c)*b^2*d*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*Pi*ln(c)*b^2*d*x^3*csg
n(I*x^n)*csgn(I*c*x^n)^2-1/9*I*Pi*b^2*d*n*x^3*csgn(I*c)*csgn(I*c*x^n)^2-1/9
*I*Pi*b^2*d*n*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8*a*b*e*n*x^4+2/3*ln(c)*a*b
*d*x^3-1/16*Pi^2*b^2*e*x^4*csgn(I*c*x^n)^6-1/12*Pi^2*b^2*d*x^3*csgn(I*c*x^n
)^6-1/8*ln(c)*b^2*e*n*x^4+1/2*ln(c)*a*b*e*x^4-2/9*ln(c)*b^2*d*n*x^3-1/12*Pi
^2*b^2*d*x^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4-2/9*a*b*d*n*x^3-1/16*I*Pi*b^2*e*
n*x^4*csgn(I*c)*csgn(I*c*x^n)^2-1/16*I*Pi*b^2*e*n*x^4*csgn(I*x^n)*csgn(I*c*
x^n)^2+1/4*I*Pi*a*b*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/4*I*Pi*a*b*e*x^4*csgn
(I*x^n)*csgn(I*c*x^n)^2+1/4*I*Pi*ln(c)*b^2*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+
1/4*I*Pi*ln(c)*b^2*e*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+1/12*b^2*x^3*(3*e*x+4*
d)*ln(x^n)^2+1/3*ln(c)^2*b^2*d*x^3+1/4*ln(c)^2*b^2*e*x^4+1/3*I*Pi*a*b*d*x^3
*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*Pi*a*b*d*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+2
/27*b^2*d*n^2*x^3+1/32*b^2*e*n^2*x^4-1/3*I*Pi*a*b*d*x^3*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+1/9*I*Pi*b^2*d*n*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1
/3*I*Pi*ln(c)*b^2*d*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*Pi^2*b^2*e*
x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/12*Pi^2*b^2*d*x^3*csgn(I*c)^2*c
sgn(I*x^n)^2*csgn(I*c*x^n)^2-1/16*Pi^2*b^2*e*x^4*csgn(I*c)^2*csgn(I*x^n)^2*
csgn(I*c*x^n)^2+1/8*Pi^2*b^2*e*x^4*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+
1/8*Pi^2*b^2*e*x^4*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/3*I*Pi*a*b*d*x
^3*csgn(I*c*x^n)^3-1/3*I*Pi*ln(c)*b^2*d*x^3*csgn(I*c*x^n)^3+1/9*I*Pi*b^2*d*
n*x^3*csgn(I*c*x^n)^3+1/6*Pi^2*b^2*d*x^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^3+1/16*I*Pi*b^2*e*n*x^4*csgn(I*c*x^n)^3-1/4*I*Pi*a*b*e*x^4*csgn(I*c*x^n
)^3-1/4*I*Pi*ln(c)*b^2*e*x^4*csgn(I*c*x^n)^3+1/6*Pi^2*b^2*d*x^3*csgn(I*c)*c
sgn(I*x^n)^2*csgn(I*c*x^n)^3-1/3*Pi^2*b^2*d*x^3*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)^4
```

Maxima [**A**]
time = 0.27, size = 156, normalized size = 1.43

$$\frac{1}{4}\,b^{2}x^{4}e\log\left(cx^{n}\right)^{2}-\frac{1}{8}\,abnx^{4}e+\frac{1}{2}\,abx^{4}e\log\left(cx^{n}\right)+\frac{1}{3}\,b^{2}dx^{3}\log\left(cx^{n}\right)^{2}-\frac{2}{9}\,abdnx^{3}+\frac{1}{4}\,a^{2}x^{4}e+\frac{2}{3}\,abdx^{3}\log\left(cx^{n}\right)+\frac{1}{3}\,a^{2}dx^{3}+\frac{2}{27}\,\left(n^{2}x^{3}-3\,nx^{3}\log\left(cx^{n}\right)\right)b^{2}d+\frac{1}{32}\,\left(n^{2}x^{4}-4\,nx^{4}\log\left(cx^{n}\right)\right)b^{2}e$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/4*b^2*x^4*e*log(c*x^n)^2 - 1/8*a*b*n*x^4*e + 1/2*a*b*x^4*e*log(c*x^n) + 1
/3*b^2*d*x^3*log(c*x^n)^2 - 2/9*a*b*d*n*x^3 + 1/4*a^2*x^4*e + 2/3*a*b*d*x^3
*log(c*x^n) + 1/3*a^2*d*x^3 + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*d + 1
/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2*e
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 221 vs. $2(100) = 200$.
time = 0.35, size = 221, normalized size = 2.03

$$\frac{1}{32}\,\left(b^{2}n^{2}-4\,abn+8\,a^{2}\right)x^{4}e+\frac{1}{27}\,\left(2\,b^{2}dn^{2}-6\,abdn+9\,a^{2}d\right)x^{3}+\frac{1}{12}\,\left(3\,b^{2}x^{4}e+4\,b^{2}dx^{3}\right)\log\left(c\right)^{2}+\frac{1}{12}\,\left(3\,b^{2}n^{2}x^{4}e+4\,b^{2}dn^{2}x^{3}\right)\log\left(x\right)^{2}-\frac{1}{72}\,\left(9\,\left(b^{2}n-4\,ab\right)x^{4}e+16\,\left(b^{2}dn-3\,abd\right)x^{3}\right)\log\left(c\right)-\frac{1}{72}\,\left(9\,\left(b^{2}n^{2}-4\,abn\right)x^{4}e+16\,\left(b^{2}dn^{2}-3\,abdn\right)x^{3}-12\,\left(3\,b^{2}nx^{4}e+4\,b^{2}dnx^{3}\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/32*(b^2*n^2 - 4*a*b*n + 8*a^2)*x^4*e + 1/27*(2*b^2*d*n^2 - 6*a*b*d*n + 9*
a^2*d)*x^3 + 1/12*(3*b^2*x^4*e + 4*b^2*d*x^3)*log(c)^2 + 1/12*(3*b^2*n^2*x^
4*e + 4*b^2*d*n^2*x^3)*log(x)^2 - 1/72*(9*(b^2*n - 4*a*b)*x^4*e + 16*(b^2*d
*n - 3*a*b*d)*x^3)*log(c) - 1/72*(9*(b^2*n^2 - 4*a*b*n)*x^4*e + 16*(b^2*d*n
^2 - 3*a*b*d*n)*x^3 - 12*(3*b^2*n*x^4*e + 4*b^2*d*n*x^3)*log(c))*log(x)
```

Sympy [A]
time = 0.42, size = 185, normalized size = 1.70

$$\frac{a^2dx^3}{3} + \frac{a^2ex^4}{4} - \frac{2abdnx^3}{9} + \frac{2abdx^3\log\left(cx^n\right)}{3} - \frac{abenx^4}{8} + \frac{abex^4\log\left(cx^n\right)}{2} + \frac{2b^2dn^2x^3}{27} - \frac{2b^2dnx^3\log\left(cx^n\right)}{9} + \frac{b^2dx^3\log\left(cx^n\right)^2}{3} + \frac{b^2en^2x^4}{32} - \frac{b^2enx^4\log\left(cx^n\right)}{8} + \frac{b^2ex^4\log\left(cx^n\right)^2}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x+d)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*d*x**3/3 + a**2*e*x**4/4 - 2*a*b*d*n*x**3/9 + 2*a*b*d*x**3*log(c*x**n)
/3 - a*b*e*n*x**4/8 + a*b*e*x**4*log(c*x**n)/2 + 2*b**2*d*n**2*x**3/27 - 2*
b**2*d*n*x**3*log(c*x**n)/9 + b**2*d*x**3*log(c*x**n)**2/3 + b**2*e*n**2*x*
*4/32 - b**2*e*n*x**4*log(c*x**n)/8 + b**2*e*x**4*log(c*x**n)**2/4
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 251 vs. 2(100) = 200.
time = 4.62, size = 251, normalized size = 2.30

$$\frac{1}{4}b^2n^2x^4e\log\left(x\right)^2 - \frac{1}{8}b^2n^2x^4e\log\left(x\right) + \frac{1}{2}b^2nx^4e\log\left(c\right)\log\left(x\right) + \frac{1}{3}b^2dn^2x^3\log\left(x\right)^2 + \frac{1}{32}b^2n^2x^4e - \frac{1}{8}b^2nx^4e\log\left(c\right) + \frac{1}{4}b^2x^4e\log\left(c\right)^2 - \frac{2}{9}b^2dn^2x^3\log\left(x\right) + \frac{1}{2}abnx^4e\log\left(x\right) + \frac{2}{3}b^2dnx^3\log\left(c\right)\log\left(x\right) + \frac{2}{27}b^2dn^2x^3 - \frac{1}{8}abnx^4e - \frac{2}{9}b^2dnx^3\log\left(c\right) + \frac{1}{2}abx^4e\log\left(c\right) + \frac{1}{3}b^2dx^3\log\left(c\right)^2 + \frac{2}{3}abdnx^3\log\left(x\right) - \frac{2}{9}abdnx^3 + \frac{1}{4}a^2x^4e + \frac{2}{3}abdx^3\log\left(c\right) + \frac{1}{3}a^2dx^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/4*b^2*n^2*x^4*e*log(x)^2 - 1/8*b^2*n^2*x^4*e*log(x) + 1/2*b^2*n*x^4*e*log
(c)*log(x) + 1/3*b^2*d*n^2*x^3*log(x)^2 + 1/32*b^2*n^2*x^4*e - 1/8*b^2*n*x^
4*e*log(c) + 1/4*b^2*x^4*e*log(c)^2 - 2/9*b^2*d*n^2*x^3*log(x) + 1/2*a*b*n*
x^4*e*log(x) + 2/3*b^2*d*n*x^3*log(c)*log(x) + 2/27*b^2*d*n^2*x^3 - 1/8*a*b
*n*x^4*e - 2/9*b^2*d*n*x^3*log(c) + 1/2*a*b*x^4*e*log(c) + 1/3*b^2*d*x^3*lo
g(c)^2 + 2/3*a*b*d*n*x^3*log(x) - 2/9*a*b*d*n*x^3 + 1/4*a^2*x^4*e + 2/3*a*b
*d*x^3*log(c) + 1/3*a^2*d*x^3
```

Mupad [B]
time = 3.58, size = 116, normalized size = 1.06

$$\ln\left(c\,x^n\right)^2\,\left(\frac{e\,b^2\,x^4}{4}+\frac{d\,b^2\,x^3}{3}\right)+\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,\left(4\,a-b\,n\right)\,x^4}{8}+\frac{2\,b\,d\,\left(3\,a-b\,n\right)\,x^3}{9}\right)+\frac{d\,x^3\,\left(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2\right)}{27}+\frac{e\,x^4\,\left(8\,a^2-4\,a\,b\,n+b^2\,n^2\right)}{32}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))^2*(d + e*x),x)
```

```
[Out] log(c*x^n)^2*((b^2*d*x^3)/3 + (b^2*e*x^4)/4) + log(c*x^n)*((2*b*d*x^3*(3*a
- b*n))/9 + (b*e*x^4*(4*a - b*n))/8) + (d*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n)
)/27 + (e*x^4*(8*a^2 + b^2*n^2 - 4*a*b*n))/32
```

3.77 $\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$

Optimal. Leaf size=109

$$\frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3-\frac{1}{2}bdnx^2(a+b\log\left(cx^n\right))-\frac{2}{9}benx^3(a+b\log\left(cx^n\right))+\frac{1}{2}dx^2(a+b\log\left(cx^n\right))^2+\frac{1}{3}ex^3(a+$$

```
[Out] 1/4*b^2*d*n^2*x^2+2/27*b^2*e*n^2*x^3-1/2*b*d*n*x^2*(a+b*ln(c*x^n))-2/9*b*e*
n*x^3*(a+b*ln(c*x^n))+1/2*d*x^2*(a+b*ln(c*x^n))^2+1/3*e*x^3*(a+b*ln(c*x^n))
^2
```

Rubi [A]
time = 0.08, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2395, 2342, 2341}

$$\frac{1}{2}dx^2(a+b\log\left(cx^n\right))^2-\frac{1}{2}bdnx^2(a+b\log\left(cx^n\right))+\frac{1}{3}ex^3(a+b\log\left(cx^n\right))^2-\frac{2}{9}benx^3(a+b\log\left(cx^n\right))+\frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (b^2*d*n^2*x^2)/4 + (2*b^2*e*n^2*x^3)/27 - (b*d*n*x^2*(a + b*Log[c*x^n]))/2
 - (2*b*e*n*x^3*(a + b*Log[c*x^n]))/9 + (d*x^2*(a + b*Log[c*x^n])^2)/2 + (e
*x^3*(a + b*Log[c*x^n])^2)/3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \int \left(dx(a+b\log\left(cx^n\right))^2+ex^2(a+b\log\left(cx^n\right))^2\right)\,dx$$
$$= d\int x(a+b\log\left(cx^n\right))^2\,dx + e\int x^2(a+b\log\left(cx^n\right))^2\,dx$$
$$= \frac{1}{2}dx^2(a+b\log\left(cx^n\right))^2+\frac{1}{3}ex^3(a+b\log\left(cx^n\right))^2-(bdn)\int x(a+b\log($$
$$= \frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3-\frac{1}{2}bdnx^2(a+b\log\left(cx^n\right))-\frac{2}{9}benx^3(a+b\log($$

Mathematica [A]
time = 0.04, size = 82, normalized size = 0.75

$$\frac{1}{108}x^2\left(8benx(-3a+bn-3b\log\left(cx^n\right))+27bdn(-2a+bn-2b\log\left(cx^n\right))+54d(a+b\log\left(cx^n\right))^2+36ex(a+b\log\left(cx^n\right))^2\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x^2*(8*b*e*n*x*(-3*a + b*n - 3*b*Log[c*x^n]) + 27*b*d*n*(-2*a + b*n - 2*b*
Log[c*x^n]) + 54*d*(a + b*Log[c*x^n])^2 + 36*e*x*(a + b*Log[c*x^n])^2))/108
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 1621, normalized size = 14.87

method	result	size
risch	Expression too large to display	1621

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*x^3*a^2*e+1/2*x^2*a^2*d-1/2*I*Pi*ln(c)*b^2*d*x^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+1/4*I*Pi*b^2*d*n*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*
I*Pi*b^2*d*n*x^2*csgn(I*c)*csgn(I*c*x^n)^2-1/4*I*Pi*b^2*d*n*x^2*csgn(I*x^n)
*csgn(I*c*x^n)^2+1/2*I*Pi*a*b*d*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*Pi*ln(c
)*b^2*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*Pi*ln(c)*b^2*e*x^3*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/9*I*Pi*b^2*e*n*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/18*b*(-6*I
*Pi*b*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*I*Pi*b*e*x^3*csgn(I*c)*cs
gn(I*c*x^n)^2+6*I*Pi*b*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-6*I*Pi*b*e*x^3*csg
n(I*c*x^n)^3+12*ln(c)*b*e*x^3-4*b*e*n*x^3+12*x^3*a*e-9*I*Pi*b*d*x^2*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi*b*d*x^2*csgn(I*c)*csgn(I*c*x^n)^2+9*I*P
i*b*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*d*x^2*csgn(I*c*x^n)^3+18*ln(
c)*b*d*x^2-9*b*d*n*x^2+18*x^2*a*d)*ln(x^n)+1/4*Pi^2*b^2*d*x^2*csgn(I*x^n)*c
sgn(I*c*x^n)^5-1/12*Pi^2*b^2*e*x^3*csgn(I*c)^2*csgn(I*c*x^n)^4+1/6*Pi^2*b^2
```

```
*e*x^3*csgn(I*c)*csgn(I*c*x^n)^5-1/12*Pi^2*b^2*e*x^3*csgn(I*x^n)^2*csgn(I*c
*x^n)^4+1/6*Pi^2*b^2*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^5-1/12*Pi^2*b^2*e*x^3*
csgn(I*c*x^n)^6-1/8*Pi^2*b^2*d*x^2*csgn(I*c*x^n)^6-1/8*Pi^2*b^2*d*x^2*csgn(
I*c)^2*csgn(I*c*x^n)^4+1/4*Pi^2*b^2*d*x^2*csgn(I*c)*csgn(I*c*x^n)^5-1/8*Pi^
2*b^2*d*x^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-2/9*ln(c)*b^2*e*n*x^3+1/2*I*Pi*a*
b*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/6*b^2*x^2*(2*e*x+3*d)*ln(x^n)^2+1/2*l
n(c)^2*b^2*d*x^2+1/3*ln(c)^2*b^2*e*x^3-1/2*ln(c)*b^2*d*n*x^2+ln(c)*a*b*d*x^
2+2/3*ln(c)*a*b*e*x^3+1/2*I*Pi*ln(c)*b^2*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+
1/3*I*Pi*a*b*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*Pi*ln(c)*b^2*d*x^2*csg
n(I*c)*csgn(I*c*x^n)^2-1/9*I*Pi*b^2*e*n*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3
*I*Pi*a*b*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/4*b^2*d*n^2*x^2+2/27*b^2*e*n^2*
x^3-1/2*b*n*x^2*a*d-2/9*b*n*x^3*a*e-1/8*Pi^2*b^2*d*x^2*csgn(I*c)^2*csgn(I*x
^n)^2*csgn(I*c*x^n)^2+1/4*Pi^2*b^2*d*x^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^3+1/4*Pi^2*b^2*d*x^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/2*Pi^2*b
^2*d*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/2*I*Pi*ln(c)*b^2*d*x^2*csg
n(I*c*x^n)^3+1/4*I*Pi*b^2*d*n*x^2*csgn(I*c*x^n)^3-1/2*I*Pi*a*b*d*x^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*I*Pi*ln(c)*b^2*e*x^3*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+1/9*I*Pi*b^2*e*n*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/
3*I*Pi*a*b*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*Pi*a*b*d*x^2*csg
n(I*c*x^n)^3-1/3*I*Pi*ln(c)*b^2*e*x^3*csgn(I*c*x^n)^3+1/9*I*Pi*b^2*e*n*x^3*
csgn(I*c*x^n)^3-1/3*I*Pi*a*b*e*x^3*csgn(I*c*x^n)^3-1/12*Pi^2*b^2*e*x^3*csgn
(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/6*Pi^2*b^2*e*x^3*csgn(I*c)^2*csgn(I
*x^n)*csgn(I*c*x^n)^3+1/6*Pi^2*b^2*e*x^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x
^n)^3-1/3*Pi^2*b^2*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4
```

Maxima [A]
time = 0.27, size = 155, normalized size = 1.42

$$\frac{1}{3}\,b^2x^3e\log\left(cx^n\right)^2-\frac{2}{9}\,abnx^3e+\frac{2}{3}\,abx^3e\log\left(cx^n\right)+\frac{1}{2}\,b^2dx^2\log\left(cx^n\right)^2-\frac{1}{2}\,abdnx^2+\frac{1}{3}\,a^2x^3e+abdx^2\log\left(cx^n\right)+\frac{1}{2}\,a^2dx^2+\frac{1}{4}\,\left(n^2x^2-2\,nx^2\log\left(cx^n\right)\right)b^2d+\frac{2}{27}\,\left(n^2x^3-3\,nx^3\log\left(cx^n\right)\right)b^2e$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/3*b^2*x^3*e*log(c*x^n)^2 - 2/9*a*b*n*x^3*e + 2/3*a*b*x^3*e*log(c*x^n) + 1
/2*b^2*d*x^2*log(c*x^n)^2 - 1/2*a*b*d*n*x^2 + 1/3*a^2*x^3*e + a*b*d*x^2*log
(c*x^n) + 1/2*a^2*d*x^2 + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*d + 2/27*(
n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*e
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 221 vs. $2(100) = 200$.
time = 0.42, size = 221, normalized size = 2.03

$$\frac{1}{27}\,\left(2\,b^2n^2-6\,abn+9\,a^2\right)x^3e+\frac{1}{4}\,\left(b^2dn^2-2\,abdn+2\,a^2d\right)x^2+\frac{1}{6}\,\left(2\,b^2x^3e+3\,b^2dx^2\right)\log\left(c\right)^2+\frac{1}{6}\,\left(2\,b^2n^2x^3e+3\,b^2dn^2x^2\right)\log\left(x\right)^2-\frac{1}{18}\,\left(4\,\left(b^2n-3\,ab\right)x^3e+9\,\left(b^2dn-2\,abd\right)x^2\right)\log\left(c\right)-\frac{1}{18}\,\left(4\,\left(b^2n^2-3\,abn\right)x^3e+9\,\left(b^2dn^2-2\,abdn\right)x^2-6\,\left(2\,b^2nx^3e+3\,b^2dnx^2\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/27*(2*b^2*n^2 - 6*a*b*n + 9*a^2)*x^3*e + 1/4*(b^2*d*n^2 - 2*a*b*d*n + 2*a
^2*d)*x^2 + 1/6*(2*b^2*x^3*e + 3*b^2*d*x^2)*log(c)^2 + 1/6*(2*b^2*n^2*x^3*e
 + 3*b^2*d*n^2*x^2)*log(x)^2 - 1/18*(4*(b^2*n - 3*a*b)*x^3*e + 9*(b^2*d*n -
 2*a*b*d)*x^2)*log(c) - 1/18*(4*(b^2*n^2 - 3*a*b*n)*x^3*e + 9*(b^2*d*n^2 -
2*a*b*d*n)*x^2 - 6*(2*b^2*n*x^3*e + 3*b^2*d*n*x^2)*log(c))*log(x)
```

Sympy [A]
time = 0.30, size = 184, normalized size = 1.69

$$\frac{a^2dx^2}{2}+\frac{a^2ex^3}{3}-\frac{abdnx^2}{2}+abdx^2\log\left(cx^n\right)-\frac{2abenx^3}{9}+\frac{2abex^3\log\left(cx^n\right)}{3}+\frac{b^2dn^2x^2}{4}-\frac{b^2dnx^2\log\left(cx^n\right)}{2}+\frac{b^2dx^2\log\left(cx^n\right)^2}{2}+\frac{2b^2en^2x^3}{27}-\frac{2b^2enx^3\log\left(cx^n\right)}{9}+\frac{b^2ex^3\log\left(cx^n\right)^2}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*d*x**2/2 + a**2*e*x**3/3 - a*b*d*n*x**2/2 + a*b*d*x**2*log(c*x**n) - 2
*a*b*e*n*x**3/9 + 2*a*b*e*x**3*log(c*x**n)/3 + b**2*d*n**2*x**2/4 - b**2*d*
n*x**2*log(c*x**n)/2 + b**2*d*x**2*log(c*x**n)**2/2 + 2*b**2*e*n**2*x**3/27
 - 2*b**2*e*n*x**3*log(c*x**n)/9 + b**2*e*x**3*log(c*x**n)**2/3
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 248 vs. 2(100) = 200.
time = 3.91, size = 248, normalized size = 2.28

$$\frac{1}{3}b^2n^2x^3e\log\left(x\right)^2-\frac{2}{9}b^2n^2x^3e\log\left(x\right)+\frac{2}{3}b^2nx^3e\log\left(c\right)\log\left(x\right)+\frac{1}{2}b^2dn^2x^2\log\left(x\right)^2+\frac{2}{27}b^2n^2x^3e-\frac{2}{9}b^2nx^3e\log\left(c\right)+\frac{1}{3}b^2x^3e\log\left(c\right)^2-\frac{1}{2}b^2dn^2x^2\log\left(x\right)+\frac{2}{3}abnx^3e\log\left(x\right)+b^2dnx^2\log\left(c\right)\log\left(x\right)+\frac{1}{4}b^2dn^2x^2-\frac{2}{9}abnx^3e-\frac{1}{2}b^2dnx^2\log\left(c\right)+\frac{2}{3}abx^3e\log\left(c\right)+\frac{1}{2}b^2dx^2\log\left(c\right)^2+abdnx^2\log\left(x\right)-\frac{1}{2}abdnx^2+\frac{1}{3}a^2x^3e+abdx^2\log\left(c\right)+\frac{1}{2}a^2dx^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/3*b^2*n^2*x^3*e*log(x)^2 - 2/9*b^2*n^2*x^3*e*log(x) + 2/3*b^2*n*x^3*e*log
(c)*log(x) + 1/2*b^2*d*n^2*x^2*log(x)^2 + 2/27*b^2*n^2*x^3*e - 2/9*b^2*n*x^
3*e*log(c) + 1/3*b^2*x^3*e*log(c)^2 - 1/2*b^2*d*n^2*x^2*log(x) + 2/3*a*b*n*
x^3*e*log(x) + b^2*d*n*x^2*log(c)*log(x) + 1/4*b^2*d*n^2*x^2 - 2/9*a*b*n*x^
3*e - 1/2*b^2*d*n*x^2*log(c) + 2/3*a*b*x^3*e*log(c) + 1/2*b^2*d*x^2*log(c)^
2 + a*b*d*n*x^2*log(x) - 1/2*a*b*d*n*x^2 + 1/3*a^2*x^3*e + a*b*d*x^2*log(c)
 + 1/2*a^2*d*x^2
```

Mupad [B]
time = 3.53, size = 116, normalized size = 1.06

$$\ln\left(c\,x^n\right)^2\,\left(\frac{e\,b^2\,x^3}{3}+\frac{d\,b^2\,x^2}{2}\right)+\ln\left(c\,x^n\right)\,\left(\frac{2\,b\,e\,\left(3\,a-b\,n\right)\,x^3}{9}+\frac{b\,d\,\left(2\,a-b\,n\right)\,x^2}{2}\right)+\frac{d\,x^2\,\left(2\,a^2-2\,a\,b\,n+b^2\,n^2\right)}{4}+\frac{e\,x^3\,\left(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))^2*(d + e*x),x)
```

```
[Out] log(c*x^n)^2*((b^2*d*x^2)/2 + (b^2*e*x^3)/3) + log(c*x^n)*((b*d*x^2*(2*a -
b*n))/2 + (2*b*e*x^3*(3*a - b*n))/9) + (d*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/
4 + (e*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27
```

3.78 $\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$

Optimal. Leaf size=101

$$-2abdnx+2b^2dn^2x+\frac{1}{4}b^2en^2x^2-2b^2dnx\log\left(cx^n\right)-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+dx(a+b\log\left(cx^n\right))^2+\frac{1}{2}ex^2(a+b$$

```
[Out] -2*a*b*d*n*x+2*b^2*d*n^2*x+1/4*b^2*e*n^2*x^2-2*b^2*d*n*x*ln(c*x^n)-1/2*b*e*
n*x^2*(a+b*ln(c*x^n))+d*x*(a+b*ln(c*x^n))^2+1/2*e*x^2*(a+b*ln(c*x^n))^2
```

Rubi [A]
time = 0.05, antiderivative size = 101, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.278$, Rules used = {2367, 2333, 2332, 2342, 2341}

$$dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn^2x+\frac{1}{4}b^2en^2x^2$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] -2*a*b*d*n*x + 2*b^2*d*n^2*x + (b^2*e*n^2*x^2)/4 - 2*b^2*d*n*x*Log[c*x^n] -
 (b*e*n*x^2*(a + b*Log[c*x^n]))/2 + d*x*(a + b*Log[c*x^n])^2 + (e*x^2*(a +
b*Log[c*x^n])^2)/2
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
```

```
c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}
\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \int \left(d(a+b\log\left(cx^n\right))^2+ex(a+b\log\left(cx^n\right))^2\right)\,dx \\
&= d\int \left(a+b\log\left(cx^n\right)\right)^2\,dx+e\int x(a+b\log\left(cx^n\right))^2\,dx \\
&= dx(a+b\log\left(cx^n\right))^2+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-(2bdn)\int \left(a+b\log\left(cx^n\right.\right. \\
&= -2abdnx+\frac{1}{4}b^2en^2x^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+dx(a+b\log\left(cx^n\right))^2+ \\
&= -2abdnx+2b^2dn^2x+\frac{1}{4}b^2en^2x^2-2b^2dnx\log\left(cx^n\right)-\frac{1}{2}benx^2(a+b\log\left(\right.
\end{aligned}$$

Mathematica [A]
time = 0.03, size = 77, normalized size = 0.76

$$\frac{1}{4}x\left(benx(-2a+bn-2b\log\left(cx^n\right))+4d(a+b\log\left(cx^n\right))^2+2ex(a+b\log\left(cx^n\right))^2-8bdn(a-bn+b\log\left(cx^n\right))\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x*(b*e*n*x*(-2*a + b*n - 2*b*Log[c*x^n]) + 4*d*(a + b*Log[c*x^n])^2 + 2*e*
x*(a + b*Log[c*x^n])^2 - 8*b*d*n*(a - b*n + b*Log[c*x^n])))/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 1545, normalized size = 15.30

method	result	size
risch	Expression too large to display	1545

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*a^2*e*x^2+x*a^2*d+1/2*I*Pi*a*b*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*l
n(c)*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x+I*Pi*ln(c)*b^2*d*csgn(I*x^
n)*csgn(I*c*x^n)^2*x+I*Pi*a*b*d*csgn(I*c)*csgn(I*c*x^n)^2*x+I*Pi*a*b*d*csgn
(I*x^n)*csgn(I*c*x^n)^2*x+I*Pi*ln(c)*b^2*d*csgn(I*c)*csgn(I*c*x^n)^2*x-I*b^
2*n*Pi*d*csgn(I*c)*csgn(I*c*x^n)^2*x-1/8*Pi^2*b^2*e*x^2*csgn(I*c*x^n)^6-1/4
*Pi^2*b^2*d*csgn(I*c*x^n)^6*x+1/2*b^2*x*(e*x+2*d)*ln(x^n)^2-1/2*I*b*(Pi*b*e
*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)
^2-Pi*b*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+Pi*b*e*x^2*csgn(I*c*x^n)^3+2*Pi*b
*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-2*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2
*x-2*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*x+2*Pi*b*d*csgn(I*c*x^n)^3*x+2*I*ln
(c)*b*e*x^2-I*b*e*n*x^2+4*I*ln(c)*b*d*x+2*I*a*e*x^2-4*I*b*d*n*x+4*I*a*d*x)*
ln(x^n)-1/2*I*Pi*a*b*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*I*b^2*n*
Pi*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-1/4*I*b^2*n*Pi*e*x^2*csgn(I*x^n)*csgn(I*
c*x^n)^2+1/2*I*Pi*ln(c)*b^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*Pi*ln(c)*
b^2*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*Pi*a*b*e*x^2*csgn(I*c)*csgn(I*c
*x^n)^2-I*b^2*n*Pi*d*csgn(I*x^n)*csgn(I*c*x^n)^2*x+ln(c)^2*b^2*d*x+1/2*ln(c
)^2*b^2*e*x^2-1/8*Pi^2*b^2*e*x^2*csgn(I*c)^2*csgn(I*c*x^n)^4-1/2*Pi^2*b^2*e
*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+I*b^2*n*Pi*d*csgn(I*c*x^n)^3*x+2
*b^2*d*n^2*x+1/4*b^2*e*n^2*x^2-1/2*b*n*a*e*x^2+1/2*Pi^2*b^2*d*csgn(I*c)^2*c
sgn(I*x^n)*csgn(I*c*x^n)^3*x+1/2*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)^2*csgn(I*
c*x^n)^3*x-Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x-1/8*Pi^2*b^2*
e*x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/4*I*b^2*n*Pi*e*x^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*Pi^2*b^2*e*x^2*csgn(I*c)*csgn(I*x^n)^2*cs
gn(I*c*x^n)^3-1/4*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x+2*
ln(c)*a*b*d*x-1/2*b^2*n*ln(c)*e*x^2-2*b^2*n*ln(c)*d*x-1/2*I*Pi*ln(c)*b^2*e*
x^2*csgn(I*c*x^n)^3+1/4*I*b^2*n*Pi*e*x^2*csgn(I*c*x^n)^3+1/4*Pi^2*b^2*e*x^2
*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/2*I*Pi*a*b*e*x^2*csgn(I*c*x^n)^3
-I*Pi*ln(c)*b^2*d*csgn(I*c*x^n)^3*x-I*Pi*a*b*d*csgn(I*c*x^n)^3*x-2*a*b*d*n*
x+I*b^2*n*Pi*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-I*Pi*a*b*d*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*x+ln(c)*a*b*e*x^2+1/4*Pi^2*b^2*e*x^2*csgn(I*c)*csg
n(I*c*x^n)^5-1/8*Pi^2*b^2*e*x^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/4*Pi^2*b^2*
d*csgn(I*c)^2*csgn(I*c*x^n)^4*x+1/2*Pi^2*b^2*d*csgn(I*c)*csgn(I*c*x^n)^5*x-
1/4*Pi^2*b^2*d*csgn(I*x^n)^2*csgn(I*c*x^n)^4*x+1/2*Pi^2*b^2*d*csgn(I*x^n)*c
sgn(I*c*x^n)^5*x+1/4*Pi^2*b^2*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/2*I*Pi*ln
(c)*b^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
```

Maxima [A]
time = 0.27, size = 141, normalized size = 1.40

$$\frac{1}{2}b^2x^2e\log\left(cx^n\right)^2-\frac{1}{2}abnx^2e+abx^2e\log\left(cx^n\right)+b^2dx\log\left(cx^n\right)^2-2\,abdnx+\frac{1}{2}a^2x^2e+2\,abdx\log\left(cx^n\right)+2\left(n^2x-nx\log\left(cx^n\right)\right)b^2d+a^2dx+\frac{1}{4}\left(n^2x^2-2\,nx^2\log\left(cx^n\right)\right)b^2e$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/2*b^2*x^2*e*log(c*x^n)^2 - 1/2*a*b*n*x^2*e + a*b*x^2*e*log(c*x^n) + b^2*d
*x*log(c*x^n)^2 - 2*a*b*d*n*x + 1/2*a^2*x^2*e + 2*a*b*d*x*log(c*x^n) + 2*(n
```

```
^2*x - n*x*log(c*x^n))*b^2*d + a^2*d*x + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))
*b^2*e
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 202 vs. 2(98) = 196.
time = 0.35, size = 202, normalized size = 2.00

$$\frac{1}{4}\left(b^2n^2 - 2\,abn + 2\,a^2\right)x^2e + \frac{1}{2}\left(b^2x^2e + 2\,b^2dx\right)\log\left(c\right)^2 + \frac{1}{2}\left(b^2n^2x^2e + 2\,b^2dn^2x\right)\log\left(x\right)^2 + \left(2\,b^2dn^2 - 2\,abdn + a^2d\right)x - \frac{1}{2}\left(\left(b^2n - 2\,ab\right)x^2e + 4\left(b^2dn - abd\right)x\right)\log\left(c\right) - \frac{1}{2}\left(\left(b^2n^2 - 2\,abn\right)x^2e + 4\left(b^2dn^2 - abdn\right)x - 2\left(b^2nx^2e + 2\,b^2dnx\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/4*(b^2*n^2 - 2*a*b*n + 2*a^2)*x^2*e + 1/2*(b^2*x^2*e + 2*b^2*d*x)*log(c)^
2 + 1/2*(b^2*n^2*x^2*e + 2*b^2*d*n^2*x)*log(x)^2 + (2*b^2*d*n^2 - 2*a*b*d*n
 + a^2*d)*x - 1/2*((b^2*n - 2*a*b)*x^2*e + 4*(b^2*d*n - a*b*d)*x)*log(c) -
1/2*((b^2*n^2 - 2*a*b*n)*x^2*e + 4*(b^2*d*n^2 - a*b*d*n)*x - 2*(b^2*n*x^2*e
 + 2*b^2*d*n*x)*log(c))*log(x)
```

Sympy [A]
time = 0.21, size = 163, normalized size = 1.61

$$a^2dx + \frac{a^2ex^2}{2} - 2abdnx + 2abdx\log\left(cx^n\right) - \frac{abenx^2}{2} + abex^2\log\left(cx^n\right) + 2b^2dn^2x - 2b^2dnx\log\left(cx^n\right) + b^2dx\log\left(cx^n\right)^2 + \frac{b^2en^2x^2}{4} - \frac{b^2enx^2\log\left(cx^n\right)}{2} + \frac{b^2ex^2\log\left(cx^n\right)^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*d*x + a**2*e*x**2/2 - 2*a*b*d*n*x + 2*a*b*d*x*log(c*x**n) - a*b*e*n*x*
*2/2 + a*b*e*x**2*log(c*x**n) + 2*b**2*d*n**2*x - 2*b**2*d*n*x*log(c*x**n)
+ b**2*d*x*log(c*x**n)**2 + b**2*e*n**2*x**2/4 - b**2*e*n*x**2*log(c*x**n)/
2 + b**2*e*x**2*log(c*x**n)**2/2
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 225 vs. 2(98) = 196.
time = 4.09, size = 225, normalized size = 2.23

$$\frac{1}{2}\,b^2n^2x^2e\log\left(x\right)^2 - \frac{1}{2}\,b^2n^2x^2e\log\left(x\right) + b^2nx^2e\log\left(c\right)\log\left(x\right) + b^2dn^2x\log\left(x\right)^2 + \frac{1}{4}\,b^2n^2x^2e - \frac{1}{2}\,b^2nx^2e\log\left(c\right) + \frac{1}{2}\,b^2x^2e\log\left(c\right)^2 - 2\,b^2dn^2x\log\left(x\right) + abnx^2e\log\left(x\right) + 2\,b^2dnx\log\left(c\right)\log\left(x\right) + 2\,b^2dn^2x - \frac{1}{2}\,abnx^2e - 2\,b^2dnx\log\left(c\right) + abx^2e\log\left(c\right) + b^2dx\log\left(c\right)^2 + 2\,abdnx\log\left(x\right) - 2\,abdnx + \frac{1}{2}\,a^2x^2e + 2\,abdx\log\left(c\right) + a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/2*b^2*n^2*x^2*e*log(x)^2 - 1/2*b^2*n^2*x^2*e*log(x) + b^2*n*x^2*e*log(c)*
log(x) + b^2*d*n^2*x*log(x)^2 + 1/4*b^2*n^2*x^2*e - 1/2*b^2*n*x^2*e*log(c)
+ 1/2*b^2*x^2*e*log(c)^2 - 2*b^2*d*n^2*x*log(x) + a*b*n*x^2*e*log(x) + 2*b^
2*d*n*x*log(c)*log(x) + 2*b^2*d*n^2*x - 1/2*a*b*n*x^2*e - 2*b^2*d*n*x*log(c
) + a*b*x^2*e*log(c) + b^2*d*x*log(c)^2 + 2*a*b*d*n*x*log(x) - 2*a*b*d*n*x
+ 1/2*a^2*x^2*e + 2*a*b*d*x*log(c) + a^2*d*x
```

Mupad [B]
time = 3.68, size = 104, normalized size = 1.03

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,\left(2\,a-b\,n\right)\,x^2}{2}+2\,b\,d\,\left(a-b\,n\right)\,x\right)+\ln\left(c\,x^n\right)^2\,\left(\frac{e\,b^2\,x^2}{2}+d\,b^2\,x\right)+\frac{e\,x^2\,\left(2\,a^2-2\,a\,b\,n+b^2\,n^2\right)}{4}+d\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2*(d + e*x),x)
```

```
[Out] log(c*x^n)*((b*e*x^2*(2*a - b*n))/2 + 2*b*d*x*(a - b*n)) + log(c*x^n)^2*((b
^2*e*x^2)/2 + b^2*d*x) + (e*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + d*x*(a^2 +
 2*b^2*n^2 - 2*a*b*n)
```

3.79 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x} dx$

Optimal. Leaf size=70

$$-2abenx + 2b^2en^2x - 2b^2enx\log(cx^n) + ex(a + b\log(cx^n))^2 + \frac{d(a + b\log(cx^n))^3}{3bn}$$

```
[Out] -2*a*b*e*n*x+2*b^2*e*n^2*x-2*b^2*e*n*x*ln(c*x^n)+e*x*(a+b*ln(c*x^n))^2+1/3*
d*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.06, antiderivative size = 70, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2388, 2339, 30, 2333, 2332}

$$\frac{d(a + b\log(cx^n))^3}{3bn} + ex(a + b\log(cx^n))^2 - 2abenx - 2b^2enx\log(cx^n) + 2b^2en^2x$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] -2*a*b*e*n*x + 2*b^2*e*n^2*x - 2*b^2*e*n*x*Log[c*x^n] + e*x*(a + b*Log[c*x^
n])^2 + (d*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2388

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Dist[d, Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x),
 x], x] + Dist[e, Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Rubi steps

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = d\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx + e\int \left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$= ex(a+b\log\left(cx^n\right))^2 + \frac{d\text{Subst}\left(\int x^2\,dx, x, a+b\log\left(cx^n\right)\right)}{bn} - (2ben)\int (a+$$
$$= -2abenx + ex(a+b\log\left(cx^n\right))^2 + \frac{d(a+b\log\left(cx^n\right))^3}{3bn} - \left(2b^2en\right)\int \log\left(cx\right.$$
$$= -2abenx + 2b^2en^2x - 2b^2enx\log\left(cx^n\right) + ex(a+b\log\left(cx^n\right))^2 + \frac{d(a+b\,\mathrm{lo}}{3\ldots}$$

Mathematica [**A**]
time = 0.02, size = 59, normalized size = 0.84

$$ex(a+b\log\left(cx^n\right))^2 + \frac{d(a+b\log\left(cx^n\right))^3}{3bn} - 2benx(a-bn+b\log\left(cx^n\right))$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] e*x*(a + b*Log[c*x^n])^2 + (d*(a + b*Log[c*x^n])^3)/(3*b*n) - 2*b*e*n*x*(a
- b*n + b*Log[c*x^n])
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 1555, normalized size = 22.21

method	result	size
risch	Expression too large to display	1555

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

```
[Out] a^2*e*x-I*Pi*a*b*e*x*csgn(I*c*x^n)^3+ln(x)*a^2*d+I*Pi*a*b*e*x*csgn(I*c)*csg
n(I*c*x^n)^2+I*Pi*a*b*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*Pi^2*b^2*e*x*csgn
(I*c*x^n)^6+I*Pi*b^2*e*n*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*ln(x)*Pi*a
```

```
*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b^2*e*n*x*csgn(I*c)*csgn(I*c*x^n)^2-I
*Pi*b^2*e*n*x*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(x)^2*Pi*b^2*d*n*csgn(I*c
)*csgn(I*c*x^n)^2-I*ln(c)*Pi*b^2*e*x*csgn(I*c*x^n)^3+ln(c)^2*b^2*e*x+ln(x)*
ln(c)^2*b^2*d+1/3*b^2*d*n^2*ln(x)^3+I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x
^n)^2+I*ln(c)*Pi*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(x)^2*Pi*b^2*d
*n*csgn(I*x^n)*csgn(I*c*x^n)^2+(b^2*e*x+b^2*d*ln(x))*ln(x^n)^2+(-b^2*d*n*ln
(x)^2-I*ln(x)*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*ln(x)*Pi*b^2*d
*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x)*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*l
n(x)*Pi*b^2*d*csgn(I*c*x^n)^3-I*Pi*b^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+I*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b^2*e*x*csgn(I*x^n)*csgn(I*
c*x^n)^2-I*Pi*b^2*e*x*csgn(I*c*x^n)^3+2*ln(x)*ln(c)*b^2*d+2*ln(c)*b^2*e*x-2
*b^2*n*e*x+2*ln(x)*a*b*d+2*a*b*e*x)*ln(x^n)+I*ln(x)*ln(c)*Pi*b^2*d*csgn(I*c
)*csgn(I*c*x^n)^2+I*ln(x)*ln(c)*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b^2*
e*n^2*x+I*ln(x)*Pi*a*b*d*csgn(I*c)*csgn(I*c*x^n)^2-I*ln(x)*Pi*a*b*d*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*a*b*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+1/2*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/4*ln(x)*Pi^2*
b^2*d*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*ln(x)*Pi^2*b^2*d*csgn(I*c)*csgn(I*c*x
^n)^5-1/4*ln(x)*Pi^2*b^2*d*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/2*ln(x)*Pi^2*b^2
*d*csgn(I*x^n)*csgn(I*c*x^n)^5+I*Pi*b^2*e*n*x*csgn(I*c*x^n)^3+1/2*Pi^2*b^2*
e*x*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-Pi^2*b^2*e*x*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)^4-1/4*ln(x)*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^2+1/2*ln(x)*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2*ln
(x)*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-ln(x)*Pi^2*b^2*d*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*x^n)
^2*csgn(I*c*x^n)^2+2*ln(c)*a*b*e*x-2*ln(c)*b^2*e*n*x-1/4*ln(x)*Pi^2*b^2*d*c
sgn(I*c*x^n)^6+1/2*I*ln(x)^2*Pi*b^2*d*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-I*ln(x)*ln(c)*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*ln(x)*ln(c)*a
*b*d-ln(x)^2*ln(c)*b^2*d*n-ln(x)^2*a*d*b*n-I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)-1/4*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*Pi^
2*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^5-1/4*Pi^2*b^2*e*x*csgn(I*x^n)^2*csgn(I*c
*x^n)^4+1/2*Pi^2*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^5-2*a*b*e*n*x-I*ln(x)*ln
(c)*Pi*b^2*d*csgn(I*c*x^n)^3-I*ln(x)*Pi*a*b*d*csgn(I*c*x^n)^3+1/2*I*ln(x)^2
*Pi*b^2*d*n*csgn(I*c*x^n)^3
```

Maxima [A]
time = 0.27, size = 106, normalized size = 1.51

$$b^2xe\log\left(cx^n\right)^2 - 2\,abnxe + 2\,abxe\log\left(cx^n\right) + \frac{b^2d\log\left(cx^n\right)^3}{3\,n} + 2\left(n^2x - nx\log\left(cx^n\right)\right)b^2e + a^2xe + \frac{abd\log\left(cx^n\right)^2}{n} + a^2d\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] b^2*x*e*log(c*x^n)^2 - 2*a*b*n*x*e + 2*a*b*x*e*log(c*x^n) + 1/3*b^2*d*log(c
*x^n)^3/n + 2*(n^2*x - n*x*log(c*x^n))*b^2*e + a^2*x*e + a*b*d*log(c*x^n)^2
/n + a^2*d*log(x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 145 vs. $2(72) = 144$.
time = 0.36, size = 145, normalized size = 2.07

$$\frac{1}{3}\,b^{2}dn^{2}\log\left(x\right)^{3}+b^{2}xe\log\left(c\right)^{2}-2\left(b^{2}n-ab\right)xe\log\left(c\right)+\left(2\,b^{2}n^{2}-2\,abn+a^{2}\right)xe+\left(b^{2}n^{2}xe+b^{2}dn\log\left(c\right)+abdn\right)\log\left(x\right)^{2}+\left(b^{2}d\log\left(c\right)^{2}+a^{2}d-2\left(b^{2}n^{2}-abn\right)xe+2\left(b^{2}nxe+abd\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

```
[Out] 1/3*b^2*d*n^2*log(x)^3 + b^2*x*e*log(c)^2 - 2*(b^2*n - a*b)*x*e*log(c) + (2
*b^2*n^2 - 2*a*b*n + a^2)*x*e + (b^2*n^2*x*e + b^2*d*n*log(c) + a*b*d*n)*lo
g(x)^2 + (b^2*d*log(c)^2 + a^2*d - 2*(b^2*n^2 - a*b*n)*x*e + 2*(b^2*n*x*e +
 a*b*d)*log(c))*log(x)
```

Sympy [A]
time = 0.31, size = 138, normalized size = 1.97

$$\begin{cases} \frac{a^{2}d\log\left(cx^{n}\right)}{n}+a^{2}ex+\frac{abd\log\left(cx^{n}\right)^{2}}{n}-2abenx+2abex\log\left(cx^{n}\right)+\frac{b^{2}d\log\left(cx^{n}\right)^{3}}{3n}+2b^{2}en^{2}x-2b^{2}enx\log\left(cx^{n}\right)+b^{2}ex\log\left(cx^{n}\right)^{2} & \text{for}\: n\neq 0\\ \left(a+b\log\left(c\right)\right)^{2}\left(d\log\left(x\right)+ex\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Piecewise((a**2*d*log(c*x**n)/n + a**2*e*x + a*b*d*log(c*x**n)**2/n - 2*a*b
*e*n*x + 2*a*b*e*x*log(c*x**n) + b**2*d*log(c*x**n)**3/(3*n) + 2*b**2*e*n**
2*x - 2*b**2*e*n*x*log(c*x**n) + b**2*e*x*log(c*x**n)**2, Ne(n, 0)), ((a +
b*log(c))**2*(d*log(x) + e*x), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 169 vs. $2(72) = 144$.
time = 2.94, size = 169, normalized size = 2.41

$$b^{2}n^{2}xe\log\left(x\right)^{2}+\frac{1}{3}\,b^{2}dn^{2}\log\left(x\right)^{3}-2\,b^{2}n^{2}xe\log\left(x\right)+2\,b^{2}nxe\log\left(c\right)\log\left(x\right)+b^{2}dn\log\left(c\right)\log\left(x\right)^{2}+2\,b^{2}n^{2}xe-2\,b^{2}nxe\log\left(c\right)+b^{2}xe\log\left(c\right)^{2}+2\,abnxe\log\left(x\right)+b^{2}d\log\left(c\right)^{2}\log\left(x\right)+abdn\log\left(x\right)^{2}-2\,abnxe+2\,abxe\log\left(c\right)+2\,abd\log\left(c\right)\log\left(x\right)+a^{2}xe+a^{2}d\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

```
[Out] b^2*n^2*x*e*log(x)^2 + 1/3*b^2*d*n^2*log(x)^3 - 2*b^2*n^2*x*e*log(x) + 2*b^
2*n*x*e*log(c)*log(x) + b^2*d*n*log(c)*log(x)^2 + 2*b^2*n^2*x*e - 2*b^2*n*x
*e*log(c) + b^2*x*e*log(c)^2 + 2*a*b*n*x*e*log(x) + b^2*d*log(c)^2*log(x) +
 a*b*d*n*log(x)^2 - 2*a*b*n*x*e + 2*a*b*x*e*log(c) + 2*a*b*d*log(c)*log(x)
+ a^2*x*e + a^2*d*log(x)
```

Mupad [B]
time = 3.43, size = 85, normalized size = 1.21

$$\ln\left(c\,x^n\right)^2\,\left(b^2\,e\,x+\frac{a\,b\,d}{n}\right)+a^2\,d\,\ln\left(x\right)+e\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right)+\frac{b^2\,d\,{\ln\left(c\,x^n\right)}^3}{3\,n}+2\,b\,e\,x\,\ln\left(c\,x^n\right)\,\left(a-b\,n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x))/x,x)
```

```
[Out] log(c*x^n)^2*(b^2*e*x + (a*b*d)/n) + a^2*d*log(x) + e*x*(a^2 + 2*b^2*n^2 -
2*a*b*n) + (b^2*d*log(c*x^n)^3)/(3*n) + 2*b*e*x*log(c*x^n)*(a - b*n)
```

3.80 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx$

Optimal. Leaf size=72

$$-\frac{2b^2dn^2}{x}-\frac{2bdn(a+b\log(cx^n))}{x}-\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}$$

```
[Out] -2*b^2*d*n^2/x-2*b*d*n*(a+b*ln(c*x^n))/x-d*(a+b*ln(c*x^n))^2/x+1/3*e*(a+b*l
n(c*x^n))^3/b/n
```

Rubi [A]
time = 0.09, antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2395, 2342, 2341, 2339, 30}

$$-\frac{d(a+b\log(cx^n))^2}{x}-\frac{2bdn(a+b\log(cx^n))}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}-\frac{2b^2dn^2}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^2,x]
```

```
[Out] (-2*b^2*d*n^2)/x - (2*b*d*n*(a + b*Log[c*x^n]))/x - (d*(a + b*Log[c*x^n])^2
)/x + (e*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
```

```
c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)\,(a+b\log(cx^n))^2}{x^2}\,dx &= \int \left(\frac{d(a+b\log(cx^n))^2}{x^2}+\frac{e(a+b\log(cx^n))^2}{x}\right)dx\\ &= d\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx+e\int \frac{(a+b\log(cx^n))^2}{x}\,dx\\ &= -\frac{d(a+b\log(cx^n))^2}{x}+\frac{e\text{Subst}\left(\int x^2\,dx,x,a+b\log(cx^n)\right)}{bn}+(2bdn)\int \frac{a}{}\\ &= -\frac{2b^2dn^2}{x}-\frac{2bdn(a+b\log(cx^n))}{x}-\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx}{3bn}\end{aligned}$$

Mathematica [A]
time = 0.03, size = 63, normalized size = 0.88

$$-\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}-\frac{2bdn(a+bn+b\log(cx^n))}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^2,x]
```

```
[Out] -((d*(a + b*Log[c*x^n])^2)/x) + (e*(a + b*Log[c*x^n])^3)/(3*b*n) - (2*b*d*n
*(a + b*n + b*Log[c*x^n]))/x
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 1544, normalized size = 21.44

method	result	size
risch	Expression too large to display	1544

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^2/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b^2*(-e*x*ln(x)+d)/x*ln(x^n)^2-b*(I*ln(x)*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)*x-I*ln(x)*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x-I*ln(x)*Pi*b*e*csgn
(I*x^n)*csgn(I*c*x^n)^2*x+I*ln(x)*Pi*b*e*csgn(I*c*x^n)^3*x-I*Pi*b*d*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*cs
gn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d*csgn(I*c*x^n)^3+b*e*n*ln(x)^2*x-2*ln(x)*
ln(c)*b*e*x-2*ln(x)*a*e*x+2*d*b*ln(c)+2*b*d*n+2*a*d)/x*ln(x^n)+1/12*(12*I*P
i*b^2*d*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*I*ln(x)^2*Pi*b^2*e*n*csgn(I
*c*x^n)^3*x+12*I*ln(x)*ln(c)*Pi*b^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x-24*d*a*b*
ln(c)-12*ln(x)*Pi^2*b^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x-12*d*b^2*
ln(c)^2+6*I*ln(x)^2*Pi*b^2*e*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-24*b^2
*d*n^2-3*ln(x)*Pi^2*b^2*e*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x+6*ln(
x)*Pi^2*b^2*e*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x+6*ln(x)*Pi^2*b^2*e*
csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*x-12*I*ln(x)*Pi*a*b*e*csgn(I*c*x^n)
^3*x+12*I*Pi*a*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12*a^2*d+12*ln(x)*e*
a^2*x+12*I*ln(c)*Pi*b^2*d*csgn(I*c*x^n)^3-24*b^2*d*ln(c)*n-24*a*d*b*n+3*Pi^
2*b^2*d*csgn(I*c*x^n)^6-12*I*ln(x)*ln(c)*Pi*b^2*e*csgn(I*c*x^n)^3*x+12*I*ln
(c)*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-6*Pi^2*b^2*d*csgn(I*x^n)*c
sgn(I*c*x^n)^5+3*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*c*x^n)^4+12*ln(x)*ln(c)^2*b^
2*e*x+4*e*b^2*n^2*ln(x)^3*x+12*I*Pi*b^2*d*n*csgn(I*c*x^n)^3-3*ln(x)*Pi^2*b^
2*e*csgn(I*c*x^n)^6*x+3*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^
2+24*ln(x)*ln(c)*a*b*e*x-12*ln(x)^2*b*a*e*n*x-12*ln(x)^2*ln(c)*b^2*e*n*x-12
*I*Pi*b^2*d*n*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b^2*d*n*csgn(I*x^n)*csgn(I*
c*x^n)^2-12*I*ln(c)*Pi*b^2*d*csgn(I*c)*csgn(I*c*x^n)^2-12*I*ln(c)*Pi*b^2*d*
csgn(I*x^n)*csgn(I*c*x^n)^2+12*I*ln(x)*Pi*a*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x
+12*I*ln(x)*Pi*a*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x-12*I*Pi*a*b*d*csgn(I*c)*
csgn(I*c*x^n)^2-12*I*Pi*a*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-6*I*ln(x)^2*Pi*b^
2*e*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x+12*I*Pi*a*b*d*csgn(I*c*x^n)^3-6*I*ln(x)
^2*Pi*b^2*e*n*csgn(I*c)*csgn(I*c*x^n)^2*x+12*I*ln(x)*ln(c)*Pi*b^2*e*csgn(I*
x^n)*csgn(I*c*x^n)^2*x+3*Pi^2*b^2*d*csgn(I*x^n)^2*csgn(I*c*x^n)^4-6*Pi^2*b^
2*d*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c
*x^n)^3-6*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+12*Pi^2*b^2*d*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-3*ln(x)*Pi^2*b^2*e*csgn(I*c)^2*csgn(I
*c*x^n)^4*x+6*ln(x)*Pi^2*b^2*e*csgn(I*c)*csgn(I*c*x^n)^5*x-3*ln(x)*Pi^2*b^2
*e*csgn(I*x^n)^2*csgn(I*c*x^n)^4*x+6*ln(x)*Pi^2*b^2*e*csgn(I*x^n)*csgn(I*c*
x^n)^5*x-12*I*ln(x)*ln(c)*Pi*b^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-12
*I*ln(x)*Pi*a*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x)/x
```

Maxima [A]
time = 0.27, size = 117, normalized size = 1.62

$$\frac{b^2e\log\left(cx^n\right)^3}{3\,n}-2\,b^2d\left(\frac{n^2}{x}+\frac{n\log\left(cx^n\right)}{x}\right)-\frac{b^2d\log\left(cx^n\right)^2}{x}+\frac{abe\log\left(cx^n\right)^2}{n}+a^2e\log\left(x\right)-\frac{2\,abdn}{x}-\frac{2\,abd\log\left(cx^n\right)}{x}-\frac{a^2d}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

```
[Out] 1/3*b^2*e*log(c*x^n)^3/n - 2*b^2*d*(n^2/x + n*log(c*x^n)/x) - b^2*d*log(c*x
^n)^2/x + a*b*e*log(c*x^n)^2/n + a^2*e*log(x) - 2*a*b*d*n/x - 2*a*b*d*log(c
*x^n)/x - a^2*d/x
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 155 vs. $2(71) = 142$.
time = 0.47, size = 155, normalized size = 2.15

$$\frac{b^{2}n^{2}xe\log\left(x\right)^{3}-6\,b^{2}dn^{2}-3\,b^{2}d\log\left(c\right)^{2}-6\,abdn-3\,a^{2}d+3\,\left(b^{2}nxe\log\left(c\right)-b^{2}dn^{2}+abnxe\right)\log\left(x\right)^{2}-6\,\left(b^{2}dn+abd\right)\log\left(c\right)+3\,\left(b^{2}xe\log\left(c\right)^{2}-2\,b^{2}dn^{2}-2\,abdn+a^{2}xe-2\,\left(b^{2}dn-abxe\right)\log\left(c\right)\right)\log\left(x\right)}{3\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

```
[Out] 1/3*(b^2*n^2*x*e*log(x)^3 - 6*b^2*d*n^2 - 3*b^2*d*log(c)^2 - 6*a*b*d*n - 3*
a^2*d + 3*(b^2*n*x*e*log(c) - b^2*d*n^2 + a*b*n*x*e)*log(x)^2 - 6*(b^2*d*n
+ a*b*d)*log(c) + 3*(b^2*x*e*log(c)^2 - 2*b^2*d*n^2 - 2*a*b*d*n + a^2*x*e -
 2*(b^2*d*n - a*b*x*e)*log(c))*log(x))/x
```

Sympy [A]
time = 3.22, size = 141, normalized size = 1.96

$$-\frac{a^{2}d}{x}+a^{2}e\log\left(x\right)-\frac{2abdn}{x}-\frac{2abd\log\left(cx^{n}\right)}{x}-2abe\left(\begin{cases}-\log\left(c\right)\log\left(x\right) & \text{for}\: n=0\\-\frac{\log\left(cx^{n}\right)^{2}}{2n} & \text{otherwise}\end{cases}\right)-\frac{2b^{2}dn^{2}}{x}-\frac{2b^{2}dn\log\left(cx^{n}\right)}{x}-\frac{b^{2}d\log\left(cx^{n}\right)^{2}}{x}-b^{2}e\left(\begin{cases}-\log\left(c\right)^{2}\log\left(x\right) & \text{for}\: n=0\\-\frac{\log\left(cx^{n}\right)^{3}}{3n} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**2,x)
```

```
[Out] -a**2*d/x + a**2*e*log(x) - 2*a*b*d*n/x - 2*a*b*d*log(c*x**n)/x - 2*a*b*e*P
iecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)) - 2*b**
2*d*n**2/x - 2*b**2*d*n*log(c*x**n)/x - b**2*d*log(c*x**n)**2/x - b**2*e*Pi
ecewise((-log(c)**2*log(x), Eq(n, 0)), (-log(c*x**n)**3/(3*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 172 vs. $2(71) = 142$.
time = 2.52, size = 172, normalized size = 2.39

$$\frac{b^{2}n^{2}xe\log\left(x\right)^{3}+3\,b^{2}nxe\log\left(c\right)\log\left(x\right)^{2}+3\,b^{2}xe\log\left(c\right)^{2}\log\left(x\right)-3\,b^{2}dn^{2}\log\left(x\right)^{2}+3\,abnxe\log\left(x\right)^{2}-6\,b^{2}dn^{2}\log\left(x\right)-6\,b^{2}dn\log\left(c\right)\log\left(x\right)+6\,abxe\log\left(c\right)\log\left(x\right)-6\,b^{2}dn^{2}-6\,b^{2}dn\log\left(c\right)-3\,b^{2}d\log\left(c\right)^{2}-6\,abdn\log\left(x\right)+3\,a^{2}xe\log\left(x\right)-6\,abdn-6\,abd\log\left(c\right)-3\,a^{2}d}{3\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

```
[Out] 1/3*(b^2*n^2*x*e*log(x)^3 + 3*b^2*n*x*e*log(c)*log(x)^2 + 3*b^2*x*e*log(c)^
2*log(x) - 3*b^2*d*n^2*log(x)^2 + 3*a*b*n*x*e*log(x)^2 - 6*b^2*d*n^2*log(x)
 - 6*b^2*d*n*log(c)*log(x) + 6*a*b*x*e*log(c)*log(x) - 6*b^2*d*n^2 - 6*b^2*
d*n*log(c) - 3*b^2*d*log(c)^2 - 6*a*b*d*n*log(x) + 3*a^2*x*e*log(x) - 6*a*b
*d*n - 6*a*b*d*log(c) - 3*a^2*d)/x
```

Mupad [B]
time = 3.73, size = 138, normalized size = 1.92

$$\ln(x)\left(e\,a^2+2\,e\,a\,b\,n+2\,e\,b^2\,n^2\right)-\frac{d\,a^2+2\,d\,a\,b\,n+2\,d\,b^2\,n^2}{x}-\ln\left(c\,x^n\right)^2\left(\frac{b^2\,d+b^2\,e\,x}{x}-\frac{b\,e\,(a+b\,n)}{n}\right)-\frac{\ln\left(c\,x^n\right)\,\left(2\,b\,d\,(a+b\,n)+2\,b\,e\,x\,(a+b\,n)\right)}{x}+\frac{b^2\,e\ln\left(c\,x^n\right)^3}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x))/x^2,x)
```

```
[Out] log(x)*(a^2*e + 2*b^2*e*n^2 + 2*a*b*e*n) - (a^2*d + 2*b^2*d*n^2 + 2*a*b*d*n
)/x - log(c*x^n)^2*((b^2*d + b^2*e*x)/x - (b*e*(a + b*n))/n) - (log(c*x^n)*
(2*b*d*(a + b*n) + 2*b*e*x*(a + b*n)))/x + (b^2*e*log(c*x^n)^3)/(3*n)
```

3.81 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3} dx$

Optimal. Leaf size=103

$$-\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}-\frac{bdn(a+b\log(cx^n))}{2x^2}-\frac{2ben(a+b\log(cx^n))}{x}-\frac{d(a+b\log(cx^n))^2}{2x^2}-\frac{e(a+b\log(cx^n))^2}{x}$$

```
[Out] -1/4*b^2*d*n^2/x^2-2*b^2*e*n^2/x-1/2*b*d*n*(a+b*ln(c*x^n))/x^2-2*b*e*n*(a+b
*ln(c*x^n))/x-1/2*d*(a+b*ln(c*x^n))^2/x^2-e*(a+b*ln(c*x^n))^2/x
```

Rubi [A]
time = 0.10, antiderivative size = 103, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2395, 2342, 2341}

$$-\frac{bdn(a+b\log(cx^n))}{2x^2}-\frac{d(a+b\log(cx^n))^2}{2x^2}-\frac{2ben(a+b\log(cx^n))}{x}-\frac{e(a+b\log(cx^n))^2}{x}-\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^3,x]
```

```
[Out] -1/4*(b^2*d*n^2)/x^2 - (2*b^2*e*n^2)/x - (b*d*n*(a + b*Log[c*x^n]))/(2*x^2)
 - (2*b*e*n*(a + b*Log[c*x^n]))/x - (d*(a + b*Log[c*x^n])^2)/(2*x^2) - (e*(
a + b*Log[c*x^n])^2)/x
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^3}\,dx &= \int \left(\frac{d(a+b\log{(cx^n)})^2}{x^3}+\frac{e(a+b\log{(cx^n)})^2}{x^2}\right)dx \\ &= d\int \frac{(a+b\log{(cx^n)})^2}{x^3}\,dx+e\int \frac{(a+b\log{(cx^n)})^2}{x^2}\,dx \\ &= -\frac{d(a+b\log{(cx^n)})^2}{2x^2}-\frac{e(a+b\log{(cx^n)})^2}{x}+(bdn)\int \frac{a+b\log{(cx^n)}}{x^3}\,dx + \\ &= -\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}-\frac{bdn(a+b\log{(cx^n)})}{2x^2}-\frac{2ben(a+b\log{(cx^n)})}{x}-\frac{d(a+\end{aligned}$$

Mathematica [A]
time = 0.03, size = 90, normalized size = 0.87

$$-\frac{2a^2(d+2ex)+2abn(d+4ex)+b^2n^2(d+8ex)+2b(2a(d+2ex)+bn(d+4ex))\log{(cx^n)}+2b^2(d+2ex)\log^2{(cx^n)}}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^3,x]
```

```
[Out] -1/4*(2*a^2*(d + 2*e*x) + 2*a*b*n*(d + 4*e*x) + b^2*n^2*(d + 8*e*x) + 2*b*(
2*a*(d + 2*e*x) + b*n*(d + 4*e*x))*Log[c*x^n] + 2*b^2*(d + 2*e*x)*Log[c*x^n
]^2)/x^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 1483, normalized size = 14.40

method	result	size
risch	Expression too large to display	1483

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b^2*(2*e*x+d)/x^2*ln(x^n)^2-1/2*(-2*I*Pi*b^2*e*x*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+2*I*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b^2*e*x*csgn
(I*x^n)*csgn(I*c*x^n)^2-2*I*Pi*b^2*e*x*csgn(I*c*x^n)^3+4*ln(c)*b^2*e*x+4*b^
2*n*e*x+4*a*b*e*x-I*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b^2*d
*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b^2*
d*csgn(I*c*x^n)^3+2*b^2*d*ln(c)+b^2*d*n+2*a*d*b)/x^2*ln(x^n)-1/8*(8*a^2*e*x
+8*d*a*b*ln(c)+8*I*n*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+8*I*n*Pi*b^2*e*x*
csgn(I*x^n)*csgn(I*c*x^n)^2+4*d*b^2*ln(c)^2-2*Pi^2*b^2*e*x*csgn(I*c*x^n)^6-
2*I*Pi*b^2*d*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*I*ln(c)*Pi*b^2*e*x*csg
n(I*c)*csgn(I*c*x^n)^2+8*I*Pi*a*b*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b^2*d*n
```

```
^2+4*a^2*d+8*ln(c)^2*b^2*e*x-4*I*ln(c)*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+4*b^2*d*ln(c)*n+4*a*d*b*n-4*I*Pi*a*b*d*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+8*I*ln(c)*Pi*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*a*b*e*x*cs
gn(I*c)*csgn(I*c*x^n)^2-Pi^2*b^2*d*csgn(I*c*x^n)^6+16*b^2*e*n^2*x+2*Pi^2*b^
2*d*csgn(I*x^n)*csgn(I*c*x^n)^5-Pi^2*b^2*d*csgn(I*c)^2*csgn(I*c*x^n)^4-8*I*
Pi*a*b*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-8*I*n*Pi*b^2*e*x*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)-Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)
^2+4*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*I*Pi*b^2*d*n*cs
gn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b^2*d*n*csgn(I*x^n)*csgn(I*c*x^n)^2+4*Pi^2*b
^2*e*x*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-8*Pi^2*b^2*e*x*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)^4-2*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*
x^n)^2-8*I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+16*ln(c)*a*
b*e*x+16*ln(c)*b^2*e*n*x+4*I*Pi*a*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-8*I*ln(c)
*Pi*b^2*e*x*csgn(I*c*x^n)^3-8*I*Pi*a*b*e*x*csgn(I*c*x^n)^3-8*I*n*Pi*b^2*e*x
*csgn(I*c*x^n)^3-2*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*c*x^n)^4+4*Pi^2*b^2*e*x*
csgn(I*c)*csgn(I*c*x^n)^5-2*Pi^2*b^2*e*x*csgn(I*x^n)^2*csgn(I*c*x^n)^4+4*Pi
^2*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^5+16*a*b*e*n*x+4*I*ln(c)*Pi*b^2*d*csgn
(I*c)*csgn(I*c*x^n)^2+4*I*ln(c)*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi
*a*b*d*csgn(I*c)*csgn(I*c*x^n)^2-Pi^2*b^2*d*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2
*Pi^2*b^2*d*csgn(I*c)*csgn(I*c*x^n)^5-4*I*ln(c)*Pi*b^2*d*csgn(I*c*x^n)^3-4*
I*Pi*a*b*d*csgn(I*c*x^n)^3-2*I*Pi*b^2*d*n*csgn(I*c*x^n)^3+2*Pi^2*b^2*d*csgn
(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)^2*cs
gn(I*c*x^n)^3-4*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4)/x^2
```

Maxima [A]
time = 0.28, size = 155, normalized size = 1.50

$$-\frac{1}{4}\,b^2d\left(\frac{n^2}{x^2}+\frac{2\,n\log\left(cx^n\right)}{x^2}\right)-2\,b^2\left(\frac{n^2}{x}+\frac{n\log\left(cx^n\right)}{x}\right)e-\frac{b^2e\log\left(cx^n\right)^2}{x}-\frac{2\,abne}{x}-\frac{2\,abe\log\left(cx^n\right)}{x}-\frac{b^2d\log\left(cx^n\right)^2}{2\,x^2}-\frac{abdn}{2\,x^2}-\frac{a^2e}{x}-\frac{abd\log\left(cx^n\right)}{x^2}-\frac{a^2d}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

```
[Out] -1/4*b^2*d*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 2*b^2*(n^2/x + n*log(c*x^n)/x)*
e - b^2*e*log(c*x^n)^2/x - 2*a*b*n*e/x - 2*a*b*e*log(c*x^n)/x - 1/2*b^2*d*l
og(c*x^n)^2/x^2 - 1/2*a*b*d*n/x^2 - a^2*e/x - a*b*d*log(c*x^n)/x^2 - 1/2*a^
2*d/x^2
```

Fricas [A]
time = 0.41, size = 180, normalized size = 1.75

$$-\frac{b^2dn^2+2\,abdn+2\,a^2d+4\,(2\,b^2n^2+2\,abn+a^2)xe+2\,(2\,b^2xe+b^2d)\log\left(c\right)^2+2\,(2\,b^2n^2xe+b^2dn^2)\log\left(x\right)^2+2\,(b^2dn+2\,abd+4\,(b^2n+ab)xe)\log\left(c\right)+2\,(b^2dn^2+2\,abdn+4\,(b^2n^2+abn)xe+2\,(2\,b^2nxe+b^2dn)\log\left(c\right))\log\left(x\right)}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(b^2*d*n^2 + 2*a*b*d*n + 2*a^2*d + 4*(2*b^2*n^2 + 2*a*b*n + a^2)*x*e +
 2*(2*b^2*x*e + b^2*d)*log(c)^2 + 2*(2*b^2*n^2*x*e + b^2*d*n^2)*log(x)^2 +
2*(b^2*d*n + 2*a*b*d + 4*(b^2*n + a*b)*x*e)*log(c) + 2*(b^2*d*n^2 + 2*a*b*d
*n + 4*(b^2*n^2 + a*b*n)*x*e + 2*(2*b^2*n*x*e + b^2*d*n)*log(c))*log(x))/x^
2
```

Sympy [A]
time = 0.29, size = 165, normalized size = 1.60

$$-\frac{a^2d}{2x^2}-\frac{a^2e}{x}-\frac{abdn}{2x^2}-\frac{abd\log(cx^n)}{x^2}-\frac{2aben}{x}-\frac{2abe\log(cx^n)}{x}-\frac{b^2dn^2}{4x^2}-\frac{b^2dn\log(cx^n)}{2x^2}-\frac{b^2d\log(cx^n)^2}{2x^2}-\frac{2b^2en^2}{x}-\frac{2b^2en\log(cx^n)}{x}-\frac{b^2e\log(cx^n)^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**3,x)
```

```
[Out] -a**2*d/(2*x**2) - a**2*e/x - a*b*d*n/(2*x**2) - a*b*d*log(c*x**n)/x**2 - 2
*a*b*e*n/x - 2*a*b*e*log(c*x**n)/x - b**2*d*n**2/(4*x**2) - b**2*d*n*log(c*
x**n)/(2*x**2) - b**2*d*log(c*x**n)**2/(2*x**2) - 2*b**2*e*n**2/x - 2*b**2*
e*n*log(c*x**n)/x - b**2*e*log(c*x**n)**2/x
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 205 vs. 2(100) = 200.
time = 2.49, size = 205, normalized size = 1.99

$$-\frac{4b^2n^2xe\log(x)^2+8b^2n^2xe\log(x)+8b^2nxe\log(c)\log(x)+2b^2dn^2\log(x)^2+8b^2n^2xe+8b^2nxe\log(c)+4b^2xe\log(c)^2+2b^2dn^2\log(x)+8abnxe\log(x)+4b^2dn\log(c)\log(x)+b^2dn^2+8abnxe+2b^2dn\log(c)+8abxe\log(c)+2b^2d\log(c)^2+4abdn\log(x)+2abdn+4a^2xe+4abd\log(c)+2a^2d}{4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

```
[Out] -1/4*(4*b^2*n^2*x*e*log(x)^2 + 8*b^2*n^2*x*e*log(x) + 8*b^2*n*x*e*log(c)*lo
g(x) + 2*b^2*d*n^2*log(x)^2 + 8*b^2*n^2*x*e + 8*b^2*n*x*e*log(c) + 4*b^2*x*
e*log(c)^2 + 2*b^2*d*n^2*log(x) + 8*a*b*n*x*e*log(x) + 4*b^2*d*n*log(c)*log
(x) + b^2*d*n^2 + 8*a*b*n*x*e + 2*b^2*d*n*log(c) + 8*a*b*x*e*log(c) + 2*b^2
*d*log(c)^2 + 4*a*b*d*n*log(x) + 2*a*b*d*n + 4*a^2*x*e + 4*a*b*d*log(c) + 2
*a^2*d)/x^2
```

Mupad [B]
time = 3.54, size = 109, normalized size = 1.06

$$-\frac{x\,\left(2\,e\,a^2+4\,e\,a\,b\,n+4\,e\,b^2\,n^2\right)+a^2\,d+\frac{b^2\,d\,n^2}{2}+a\,b\,d\,n}{2\,x^2}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d\,\left(2\,a+b\,n\right)}{2}+2\,b\,e\,x\,\left(a+b\,n\right)\right)}{x^2}-\frac{{\ln\left(c\,x^n\right)}^2\,\left(\frac{b^2\,d}{2}+b^2\,e\,x\right)}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x))/x^3,x)
```

```
[Out] - (x*(2*a^2*e + 4*b^2*e*n^2 + 4*a*b*e*n) + a^2*d + (b^2*d*n^2)/2 + a*b*d*n)
/(2*x^2) - (log(c*x^n)*((b*d*(2*a + b*n))/2 + 2*b*e*x*(a + b*n)))/x^2 - (lo
g(c*x^n)^2*((b^2*d)/2 + b^2*e*x))/x^2
```

3.82 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx$

Optimal. Leaf size=109

$$-\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}-\frac{2bdn(a+b\log(cx^n))}{9x^3}-\frac{ben(a+b\log(cx^n))}{2x^2}-\frac{d(a+b\log(cx^n))^2}{3x^3}-\frac{e(a+b\log(cx^n))^2}{2x^2}$$

```
[Out] -2/27*b^2*d*n^2/x^3-1/4*b^2*e*n^2/x^2-2/9*b*d*n*(a+b*ln(c*x^n))/x^3-1/2*b*e
*n*(a+b*ln(c*x^n))/x^2-1/3*d*(a+b*ln(c*x^n))^2/x^3-1/2*e*(a+b*ln(c*x^n))^2/
x^2
```

Rubi [A]
time = 0.09, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2395, 2342, 2341}

$$-\frac{2bdn(a+b\log(cx^n))}{9x^3}-\frac{d(a+b\log(cx^n))^2}{3x^3}-\frac{ben(a+b\log(cx^n))}{2x^2}-\frac{e(a+b\log(cx^n))^2}{2x^2}-\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^4,x]
```

```
[Out] (-2*b^2*d*n^2)/(27*x^3) - (b^2*e*n^2)/(4*x^2) - (2*b*d*n*(a + b*Log[c*x^n])
)/(9*x^3) - (b*e*n*(a + b*Log[c*x^n]))/(2*x^2) - (d*(a + b*Log[c*x^n])^2)/(
3*x^3) - (e*(a + b*Log[c*x^n])^2)/(2*x^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx &= \int \left(\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{x^4}+\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\right)dx\\ &= d\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx+e\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx\\ &= -\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{3x^3}-\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{2x^2}+\frac{1}{3}(2bdn)\int \frac{a+b\log\left(cx^n\right)}{x^4}\,dx\\ &= -\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}-\frac{2bdn\left(a+b\log\left(cx^n\right)\right)}{9x^3}-\frac{ben\left(a+b\log\left(cx^n\right)\right)}{2x^2}-\frac{d(a+\end{aligned}$$

Mathematica [A]
time = 0.04, size = 82, normalized size = 0.75

$$-\frac{36d\left(a+b\log\left(cx^n\right)\right)^2+54ex\left(a+b\log\left(cx^n\right)\right)^2+27benx\left(2a+bn+2b\log\left(cx^n\right)\right)+8bdn\left(3a+bn+3b\log\left(cx^n\right)\right)}{108x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^4,x]
```

```
[Out] -1/108*(36*d*(a + b*Log[c*x^n])^2 + 54*e*x*(a + b*Log[c*x^n])^2 + 27*b*e*n*
x*(2*a + b*n + 2*b*Log[c*x^n]) + 8*b*d*n*(3*a + b*n + 3*b*Log[c*x^n]))/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 1486, normalized size = 13.63

method	result	size
risch	Expression too large to display	1486

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^2/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*b^2*(3*e*x+2*d)/x^3*ln(x^n)^2-1/18*(-9*I*Pi*b^2*e*x*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)+9*I*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b^2*e*x*c
sgn(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b^2*e*x*csgn(I*c*x^n)^3+18*ln(c)*b^2*e*x+
9*b^2*n*e*x+18*a*b*e*x-6*I*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*I
*Pi*b^2*d*csgn(I*c)*csgn(I*c*x^n)^2+6*I*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^
2-6*I*Pi*b^2*d*csgn(I*c*x^n)^3+12*b^2*d*ln(c)+4*b^2*d*n+12*a*d*b)/x^3*ln(x^
n)-1/216*(108*a^2*e*x+144*d*a*b*ln(c)-24*I*Pi*b^2*d*n*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+54*I*n*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+54*I*n*Pi*b^2*e*
x*csgn(I*x^n)*csgn(I*c*x^n)^2+108*I*ln(c)*Pi*b^2*e*x*csgn(I*x^n)*csgn(I*c*x
```

```
^n)^2+72*d*b^2*ln(c)^2-27*Pi^2*b^2*e*x*csgn(I*c*x^n)^6+16*b^2*d*n^2+108*I*P
i*a*b*e*x*csgn(I*c)*csgn(I*c*x^n)^2-72*I*Pi*a*b*d*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)-72*I*ln(c)*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+72*a^2*d
+108*ln(c)^2*b^2*e*x+48*b^2*d*ln(c)*n+48*a*d*b*n-108*I*Pi*a*b*e*x*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)-54*I*n*Pi*b^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-18*Pi^2*b^2*d*csgn(I*c*x^n)^6+108*I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csgn(I
*c*x^n)^2+108*I*Pi*a*b*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*b^2*d*n*csgn
(I*c*x^n)^3+24*I*Pi*b^2*d*n*csgn(I*x^n)*csgn(I*c*x^n)^2+72*I*ln(c)*Pi*b^2*d
*csgn(I*c)*csgn(I*c*x^n)^2+72*I*ln(c)*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2+
72*I*Pi*a*b*d*csgn(I*c)*csgn(I*c*x^n)^2-72*I*ln(c)*Pi*b^2*d*csgn(I*c*x^n)^3
-72*I*Pi*a*b*d*csgn(I*c*x^n)^3+54*b^2*e*n^2*x+36*Pi^2*b^2*d*csgn(I*x^n)*csg
n(I*c*x^n)^5-18*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*c*x^n)^4+72*I*Pi*a*b*d*csgn(I
*x^n)*csgn(I*c*x^n)^2-108*I*ln(c)*Pi*b^2*e*x*csgn(I*c*x^n)^3-108*I*Pi*a*b*e
*x*csgn(I*c*x^n)^3-18*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+
54*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+54*Pi^2*b^2*e*x*csg
n(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-108*Pi^2*b^2*e*x*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)^4-108*I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-27*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+216*ln(c)*a*b*e*
x+108*ln(c)*b^2*e*n*x-27*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I*c*x^n)^4+54*Pi^2*b
^2*e*x*csgn(I*c)*csgn(I*c*x^n)^5-27*Pi^2*b^2*e*x*csgn(I*x^n)^2*csgn(I*c*x^n
)^4+54*Pi^2*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^5-54*I*n*Pi*b^2*e*x*csgn(I*c*
x^n)^3+108*a*b*e*n*x+24*I*Pi*b^2*d*n*csgn(I*c)*csgn(I*c*x^n)^2-18*Pi^2*b^2*
d*csgn(I*x^n)^2*csgn(I*c*x^n)^4+36*Pi^2*b^2*d*csgn(I*c)*csgn(I*c*x^n)^5+36*
Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+36*Pi^2*b^2*d*csgn(I*c)*
csgn(I*x^n)^2*csgn(I*c*x^n)^3-72*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)^4)/x^3
```

Maxima [A]
time = 0.27, size = 156, normalized size = 1.43

$$-\frac{2}{27}\,b^2d\left(\frac{n^2}{x^3}+\frac{3\,n\log\left(cx^n\right)}{x^3}\right)-\frac{1}{4}\,b^2\left(\frac{n^2}{x^2}+\frac{2\,n\log\left(cx^n\right)}{x^2}\right)e-\frac{b^2e\log\left(cx^n\right)^2}{2\,x^2}-\frac{abne}{2\,x^2}-\frac{abe\log\left(cx^n\right)}{x^2}-\frac{b^2d\log\left(cx^n\right)^2}{3\,x^3}-\frac{2\,abdn}{9\,x^3}-\frac{a^2e}{2\,x^2}-\frac{2\,abd\log\left(cx^n\right)}{3\,x^3}-\frac{a^2d}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="maxima")
```

```
[Out] -2/27*b^2*d*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - 1/4*b^2*(n^2/x^2 + 2*n*log(c*x
^n)/x^2)*e - 1/2*b^2*e*log(c*x^n)^2/x^2 - 1/2*a*b*n*e/x^2 - a*b*e*log(c*x^n
)/x^2 - 1/3*b^2*d*log(c*x^n)^2/x^3 - 2/9*a*b*d*n/x^3 - 1/2*a^2*e/x^2 - 2/3*
a*b*d*log(c*x^n)/x^3 - 1/3*a^2*d/x^3
```

Fricas [A]
time = 0.36, size = 189, normalized size = 1.73

$$-\frac{8\,b^2dn^2+24\,abdn+36\,a^2d+27\,(b^2n^2+2\,abn+2\,a^2)xe+18\,(3\,b^2xe+2\,b^2d)\log\left(c\right)^2+18\,(3\,b^2n^2xe+2\,b^2dn^2)\log\left(x\right)^2+6\,(4\,b^2dn+12\,abd+9\,(b^2n+2\,ab)xe)\log\left(c\right)+6\,(4\,b^2dn^2+12\,abdn+9\,(b^2n^2+2\,abn)xe+6\,(3\,b^2nxe+2\,b^2dn)\log\left(c\right))\log\left(x\right)}{108\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="fricas")
```

```
[Out] -1/108*(8*b^2*d*n^2 + 24*a*b*d*n + 36*a^2*d + 27*(b^2*n^2 + 2*a*b*n + 2*a^2
)*x*e + 18*(3*b^2*x*e + 2*b^2*d)*log(c)^2 + 18*(3*b^2*n^2*x*e + 2*b^2*d*n^2
)*log(x)^2 + 6*(4*b^2*d*n + 12*a*b*d + 9*(b^2*n + 2*a*b)*x*e)*log(c) + 6*(4
*b^2*d*n^2 + 12*a*b*d*n + 9*(b^2*n^2 + 2*a*b*n)*x*e + 6*(3*b^2*n*x*e + 2*b^
2*d*n)*log(c))*log(x))/x^3
```

Sympy [A]
time = 0.40, size = 185, normalized size = 1.70

$$-\frac{a^2d}{3x^3}-\frac{a^2e}{2x^2}-\frac{2abdn}{9x^3}-\frac{2abd\log\left(cx^n\right)}{3x^3}-\frac{aben}{2x^2}-\frac{abe\log\left(cx^n\right)}{x^2}-\frac{2b^2dn^2}{27x^3}-\frac{2b^2dn\log\left(cx^n\right)}{9x^3}-\frac{b^2d\log\left(cx^n\right)^2}{3x^3}-\frac{b^2en^2}{4x^2}-\frac{b^2en\log\left(cx^n\right)}{2x^2}-\frac{b^2e\log\left(cx^n\right)^2}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**4,x)
```

```
[Out] -a**2*d/(3*x**3) - a**2*e/(2*x**2) - 2*a*b*d*n/(9*x**3) - 2*a*b*d*log(c*x**
n)/(3*x**3) - a*b*e*n/(2*x**2) - a*b*e*log(c*x**n)/x**2 - 2*b**2*d*n**2/(27
*x**3) - 2*b**2*d*n*log(c*x**n)/(9*x**3) - b**2*d*log(c*x**n)**2/(3*x**3) -
 b**2*e*n**2/(4*x**2) - b**2*e*n*log(c*x**n)/(2*x**2) - b**2*e*log(c*x**n)*
*2/(2*x**2)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 206 vs. 2(100) = 200.
time = 2.93, size = 206, normalized size = 1.89

$$-\frac{54\,b^2n^2xe\log\left(x\right)^2+54\,b^2n^2xe\log\left(x\right)+108\,b^2nxe\log\left(c\right)\log\left(x\right)+36\,b^2dn^2\log\left(x\right)^2+27\,b^2n^2xe+54\,b^2nxe\log\left(c\right)+54\,b^2xe\log\left(c\right)^2+24\,b^2dn^2\log\left(x\right)+108\,abnxe\log\left(x\right)+72\,b^2dn\log\left(c\right)\log\left(x\right)+8\,b^2dn^2+54\,abnxe+24\,b^2dn\log\left(c\right)+108\,abxe\log\left(c\right)+36\,b^2d\log\left(c\right)^2+72\,abdn\log\left(x\right)+24\,abdn+54\,a^2xe+72\,abd\log\left(c\right)+36\,a^2d}{108\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="giac")
```

```
[Out] -1/108*(54*b^2*n^2*x*e*log(x)^2 + 54*b^2*n^2*x*e*log(x) + 108*b^2*n*x*e*log
(c)*log(x) + 36*b^2*d*n^2*log(x)^2 + 27*b^2*n^2*x*e + 54*b^2*n*x*e*log(c) +
 54*b^2*x*e*log(c)^2 + 24*b^2*d*n^2*log(x) + 108*a*b*n*x*e*log(x) + 72*b^2*
d*n*log(c)*log(x) + 8*b^2*d*n^2 + 54*a*b*n*x*e + 24*b^2*d*n*log(c) + 108*a*
b*x*e*log(c) + 36*b^2*d*log(c)^2 + 72*a*b*d*n*log(x) + 24*a*b*d*n + 54*a^2*
x*e + 72*a*b*d*log(c) + 36*a^2*d)/x^3
```

Mupad [B]
time = 3.79, size = 114, normalized size = 1.05

$$-\frac{x\,\left(9\,e\,a^2+9\,e\,a\,b\,n+\frac{9\,e\,b^2\,n^2}{2}\right)+6\,a^2\,d+\frac{4\,b^2\,d\,n^2}{3}+4\,a\,b\,d\,n}{18\,x^3}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{2\,b\,d\,\left(3\,a+b\,n\right)}{3}+\frac{3\,b\,e\,x\,\left(2\,a+b\,n\right)}{2}\right)}{3\,x^3}-\frac{{\ln\left(c\,x^n\right)}^2\,\left(\frac{b^2\,d}{3}+\frac{b^2\,e\,x}{2}\right)}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x))/x^4,x)
```

```
[Out] - (x*(9*a^2*e + (9*b^2*e*n^2)/2 + 9*a*b*e*n) + 6*a^2*d + (4*b^2*d*n^2)/3 +
4*a*b*d*n)/(18*x^3) - (log(c*x^n)*((2*b*d*(3*a + b*n))/3 + (3*b*e*x*(2*a +
b*n))/2))/(3*x^3) - (log(c*x^n)^2*((b^2*d)/3 + (b^2*e*x)/2))/x^3
```

3.83 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx$

Optimal. Leaf size=109

$$-\frac{b^2dn^2}{32x^4}-\frac{2b^2en^2}{27x^3}-\frac{bdn(a+b\log(cx^n))}{8x^4}-\frac{2ben(a+b\log(cx^n))}{9x^3}-\frac{d(a+b\log(cx^n))^2}{4x^4}-\frac{e(a+b\log(cx^n))^2}{3x^3}$$

```
[Out] -1/32*b^2*d*n^2/x^4-2/27*b^2*e*n^2/x^3-1/8*b*d*n*(a+b*ln(c*x^n))/x^4-2/9*b*
e*n*(a+b*ln(c*x^n))/x^3-1/4*d*(a+b*ln(c*x^n))^2/x^4-1/3*e*(a+b*ln(c*x^n))^2
/x^3
```

Rubi [A]
time = 0.10, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2395, 2342, 2341}

$$-\frac{bdn(a+b\log(cx^n))}{8x^4}-\frac{d(a+b\log(cx^n))^2}{4x^4}-\frac{2ben(a+b\log(cx^n))}{9x^3}-\frac{e(a+b\log(cx^n))^2}{3x^3}-\frac{b^2dn^2}{32x^4}-\frac{2b^2en^2}{27x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^5,x]
```

```
[Out] -1/32*(b^2*d*n^2)/x^4 - (2*b^2*e*n^2)/(27*x^3) - (b*d*n*(a + b*Log[c*x^n]))
/(8*x^4) - (2*b*e*n*(a + b*Log[c*x^n]))/(9*x^3) - (d*(a + b*Log[c*x^n])^2)/
(4*x^4) - (e*(a + b*Log[c*x^n])^2)/(3*x^3)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int \frac{(d+ex)\,(a+b\log(cx^n))^2}{x^5}\,dx = \int \left(\frac{d(a+b\log(cx^n))^2}{x^5} + \frac{e(a+b\log(cx^n))^2}{x^4}\right) dx$$
$$= d\int \frac{(a+b\log(cx^n))^2}{x^5}\,dx + e\int \frac{(a+b\log(cx^n))^2}{x^4}\,dx$$
$$= -\frac{d(a+b\log(cx^n))^2}{4x^4} - \frac{e(a+b\log(cx^n))^2}{3x^3} + \frac{1}{2}(bdn)\int \frac{a+b\log(cx^n)}{x^5}\,dx$$
$$= -\frac{b^2dn^2}{32x^4} - \frac{2b^2en^2}{27x^3} - \frac{bdn(a+b\log(cx^n))}{8x^4} - \frac{2ben(a+b\log(cx^n))}{9x^3} - \frac{d(a+$$

Mathematica [A]
time = 0.04, size = 82, normalized size = 0.75

$$-\frac{216d(a+b\log(cx^n))^2 + 288ex(a+b\log(cx^n))^2 + 64benx(3a+bn+3b\log(cx^n)) + 27bdn(4a+bn+4b\log(cx^n))}{864x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^5,x]
```

```
[Out] -1/864*(216*d*(a + b*Log[c*x^n])^2 + 288*e*x*(a + b*Log[c*x^n])^2 + 64*b*e*
n*x*(3*a + b*n + 3*b*Log[c*x^n]) + 27*b*d*n*(4*a + b*n + 4*b*Log[c*x^n]))/x
^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 1486, normalized size = 13.63

method	result	size
risch	Expression too large to display	1486

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^2/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/12*b^2*(4*e*x+3*d)/x^4*ln(x^n)^2-1/72*(-24*I*Pi*b^2*e*x*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+24*I*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*b^2*e
*x*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*b^2*e*x*csgn(I*c*x^n)^3+48*ln(c)*b^2
*e*x+16*b^2*n*e*x+48*a*b*e*x-18*I*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+18*I*Pi*b^2*d*csgn(I*c)*csgn(I*c*x^n)^2+18*I*Pi*b^2*d*csgn(I*x^n)*csgn(
I*c*x^n)^2-18*I*Pi*b^2*d*csgn(I*c*x^n)^3+36*b^2*d*ln(c)+9*b^2*d*n+36*a*d*b)
/x^4*ln(x^n)-1/864*(288*a^2*e*x+432*d*a*b*ln(c)-216*I*Pi*a*b*d*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)+288*I*Pi*a*b*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+216*d*
b^2*ln(c)^2-72*Pi^2*b^2*e*x*csgn(I*c*x^n)^6+27*b^2*d*n^2+216*a^2*d+288*ln(c
```

```
)^2*b^2*e*x+108*b^2*d*ln(c)*n-216*I*ln(c)*Pi*b^2*d*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)-54*I*Pi*b^2*d*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+108*a*d*b*n
-54*Pi^2*b^2*d*csgn(I*c*x^n)^6-54*I*Pi*b^2*d*n*csgn(I*c*x^n)^3+216*I*Pi*a*b
*d*csgn(I*c)*csgn(I*c*x^n)^2+216*I*Pi*a*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+54*
I*Pi*b^2*d*n*csgn(I*c)*csgn(I*c*x^n)^2+288*I*ln(c)*Pi*b^2*e*x*csgn(I*x^n)*c
sgn(I*c*x^n)^2+288*I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+96*I*n*Pi*b
^2*e*x*csgn(I*c)*csgn(I*c*x^n)^2+96*I*n*Pi*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n
)^2+64*b^2*e*n^2*x+288*I*Pi*a*b*e*x*csgn(I*c)*csgn(I*c*x^n)^2+108*Pi^2*b^2*
d*csgn(I*x^n)*csgn(I*c*x^n)^5-54*Pi^2*b^2*d*csgn(I*c)^2*csgn(I*c*x^n)^4-54*
Pi^2*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+144*Pi^2*b^2*e*x*csgn(
I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+54*I*Pi*b^2*d*n*csgn(I*x^n)*csgn(I*c*x^n
)^2+144*Pi^2*b^2*e*x*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-288*Pi^2*b^2*e
*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-72*Pi^2*b^2*e*x*csgn(I*c)^2*csgn(I
*x^n)^2*csgn(I*c*x^n)^2-288*I*ln(c)*Pi*b^2*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+576*ln(c)*a*b*e*x+192*ln(c)*b^2*e*n*x-288*I*ln(c)*Pi*b^2*e*x*csgn(I
*c*x^n)^3-288*I*Pi*a*b*e*x*csgn(I*c*x^n)^3-72*Pi^2*b^2*e*x*csgn(I*c)^2*csgn
(I*c*x^n)^4+144*Pi^2*b^2*e*x*csgn(I*c)*csgn(I*c*x^n)^5-72*Pi^2*b^2*e*x*csgn
(I*x^n)^2*csgn(I*c*x^n)^4+144*Pi^2*b^2*e*x*csgn(I*x^n)*csgn(I*c*x^n)^5-96*I
*n*Pi*b^2*e*x*csgn(I*c*x^n)^3+216*I*ln(c)*Pi*b^2*d*csgn(I*c)*csgn(I*c*x^n)^
2+192*a*b*e*n*x+216*I*ln(c)*Pi*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2-216*I*ln(c
)*Pi*b^2*d*csgn(I*c*x^n)^3-216*I*Pi*a*b*d*csgn(I*c*x^n)^3-54*Pi^2*b^2*d*csg
n(I*x^n)^2*csgn(I*c*x^n)^4+108*Pi^2*b^2*d*csgn(I*c)*csgn(I*c*x^n)^5+108*Pi^
2*b^2*d*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+108*Pi^2*b^2*d*csgn(I*c)*cs
gn(I*x^n)^2*csgn(I*c*x^n)^3-216*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)^4-288*I*Pi*a*b*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-96*I*n*Pi*b^2*e*
x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/x^4
```

Maxima [A]
time = 0.29, size = 156, normalized size = 1.43

$$-\frac{1}{32}\,b^2 d\left(\frac{n^2}{x^4}+\frac{4\,n\log\left(cx^n\right)}{x^4}\right)-\frac{2}{27}\,b^2\left(\frac{n^2}{x^3}+\frac{3\,n\log\left(cx^n\right)}{x^3}\right)e-\frac{b^2 e\log\left(cx^n\right)^2}{3\,x^3}-\frac{2\,abne}{9\,x^3}-\frac{2\,abe\log\left(cx^n\right)}{3\,x^3}-\frac{b^2 d\log\left(cx^n\right)^2}{4\,x^4}-\frac{abdn}{8\,x^4}-\frac{a^2 e}{3\,x^3}-\frac{abd\log\left(cx^n\right)}{2\,x^4}-\frac{a^2 d}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="maxima")
```

```
[Out] -1/32*b^2*d*(n^2/x^4 + 4*n*log(c*x^n)/x^4) - 2/27*b^2*(n^2/x^3 + 3*n*log(c*
x^n)/x^3)*e - 1/3*b^2*e*log(c*x^n)^2/x^3 - 2/9*a*b*n*e/x^3 - 2/3*a*b*e*log(
c*x^n)/x^3 - 1/4*b^2*d*log(c*x^n)^2/x^4 - 1/8*a*b*d*n/x^4 - 1/3*a^2*e/x^3 -
 1/2*a*b*d*log(c*x^n)/x^4 - 1/4*a^2*d/x^4
```

Fricas [A]
time = 0.38, size = 190, normalized size = 1.74

$$-\frac{27\,b^2dn^2+108\,abdn+216\,a^2d+32\,(2\,b^2n^2+6\,abn+9\,a^2)xe+72\,(4\,b^2xe+3\,b^2d)\log\left(c\right)^2+72\,(4\,b^2n^2xe+3\,b^2dn^2)\log\left(x\right)^2+12\,(9\,b^2dn+36\,abd+16\,(b^2n+3\,ab)xe)\log\left(c\right)+12\,(9\,b^2dn^2+36\,abdn+16\,(b^2n^2+3\,abn)xe+12\,(4\,b^2nxe+3\,b^2dn)\log\left(c\right))\log\left(x\right)}{864\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="fricas")
```

```
[Out] -1/864*(27*b^2*d*n^2 + 108*a*b*d*n + 216*a^2*d + 32*(2*b^2*n^2 + 6*a*b*n +
9*a^2)*x*e + 72*(4*b^2*x*e + 3*b^2*d)*log(c)^2 + 72*(4*b^2*n^2*x*e + 3*b^2*
d*n^2)*log(x)^2 + 12*(9*b^2*d*n + 36*a*b*d + 16*(b^2*n + 3*a*b)*x*e)*log(c)
 + 12*(9*b^2*d*n^2 + 36*a*b*d*n + 16*(b^2*n^2 + 3*a*b*n)*x*e + 12*(4*b^2*n*
x*e + 3*b^2*d*n)*log(c))*log(x))/x^4
```

Sympy [A]
time = 0.55, size = 187, normalized size = 1.72

$$-\frac{a^2d}{4x^4}-\frac{a^2e}{3x^3}-\frac{abdn}{8x^4}-\frac{abd\log(cx^n)}{2x^4}-\frac{2aben}{9x^3}-\frac{2abe\log(cx^n)}{3x^3}-\frac{b^2dn^2}{32x^4}-\frac{b^2dn\log(cx^n)}{8x^4}-\frac{b^2d\log(cx^n)^2}{4x^4}-\frac{2b^2en^2}{27x^3}-\frac{2b^2en\log(cx^n)}{9x^3}-\frac{b^2e\log(cx^n)^2}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**5,x)
```

```
[Out] -a**2*d/(4*x**4) - a**2*e/(3*x**3) - a*b*d*n/(8*x**4) - a*b*d*log(c*x**n)/(
2*x**4) - 2*a*b*e*n/(9*x**3) - 2*a*b*e*log(c*x**n)/(3*x**3) - b**2*d*n**2/(
32*x**4) - b**2*d*n*log(c*x**n)/(8*x**4) - b**2*d*log(c*x**n)**2/(4*x**4) -
 2*b**2*e*n**2/(27*x**3) - 2*b**2*e*n*log(c*x**n)/(9*x**3) - b**2*e*log(c*x
**n)**2/(3*x**3)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 206 vs. 2(100) = 200.
time = 2.93, size = 206, normalized size = 1.89

$$-\frac{288\,b^2n^2xe\log(x)^2+192\,b^2n^2xe\log(x)+576\,b^2nxe\log(c)\log(x)+216\,b^2dn^2\log(x)^2+64\,b^2n^2xe+192\,b^2nxe\log(c)+288\,b^2xe\log(c)^2+108\,b^2dn^2\log(x)+576\,abnxe\log(x)+432\,b^2dn\log(c)\log(x)+27\,b^2dn^2+192\,abnxe+108\,b^2dn\log(c)+576\,abxe\log(c)+216\,b^2d\log(c)^2+432\,abdn\log(x)+108\,abdn+288\,a^2xe+432\,abd\log(c)+216\,a^2d}{864\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="giac")
```

```
[Out] -1/864*(288*b^2*n^2*x*e*log(x)^2 + 192*b^2*n^2*x*e*log(x) + 576*b^2*n*x*e*l
og(c)*log(x) + 216*b^2*d*n^2*log(x)^2 + 64*b^2*n^2*x*e + 192*b^2*n*x*e*log(
c) + 288*b^2*x*e*log(c)^2 + 108*b^2*d*n^2*log(x) + 576*a*b*n*x*e*log(x) + 4
32*b^2*d*n*log(c)*log(x) + 27*b^2*d*n^2 + 192*a*b*n*x*e + 108*b^2*d*n*log(c
) + 576*a*b*x*e*log(c) + 216*b^2*d*log(c)^2 + 432*a*b*d*n*log(x) + 108*a*b*
d*n + 288*a^2*x*e + 432*a*b*d*log(c) + 216*a^2*d)/x^4
```

Mupad [B]
time = 3.51, size = 114, normalized size = 1.05

$$-\frac{x\left(24\,e\,a^2+16\,e\,a\,b\,n+\frac{16\,e\,b^2\,n^2}{3}\right)+18\,a^2\,d+\frac{9\,b^2\,d\,n^2}{4}+9\,a\,b\,d\,n}{72\,x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{3\,b\,d\,\left(4\,a+b\,n\right)}{4}+\frac{4\,b\,e\,x\,\left(3\,a+b\,n\right)}{3}\right)}{6\,x^4}-\frac{{\ln\left(c\,x^n\right)}^2\,\left(\frac{b^2\,d}{4}+\frac{b^2\,e\,x}{3}\right)}{x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x))/x^5,x)
```

```
[Out] - (x*(24*a^2*e + (16*b^2*e*n^2)/3 + 16*a*b*e*n) + 18*a^2*d + (9*b^2*d*n^2)/
4 + 9*a*b*d*n)/(72*x^4) - (log(c*x^n)*((3*b*d*(4*a + b*n))/4 + (4*b*e*x*(3*
a + b*n))/3))/(6*x^4) - (log(c*x^n)^2*((b^2*d)/4 + (b^2*e*x)/3))/x^4
```

3.84 $\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$

Optimal. Leaf size=178

$$\frac{2}{27}b^2d^2n^2x^3+\frac{1}{16}b^2den^2x^4+\frac{2}{125}b^2e^2n^2x^5-\frac{2}{9}bd^2nx^3(a+b\log\left(cx^n\right))-\frac{1}{4}bdenx^4(a+b\log\left(cx^n\right))-\frac{2}{25}be^2nx^5(a$$

```
[Out] 2/27*b^2*d^2*n^2*x^3+1/16*b^2*d*e*n^2*x^4+2/125*b^2*e^2*n^2*x^5-2/9*b*d^2*n
*x^3*(a+b*ln(c*x^n))-1/4*b*d*e*n*x^4*(a+b*ln(c*x^n))-2/25*b*e^2*n*x^5*(a+b*
ln(c*x^n))+1/3*d^2*x^3*(a+b*ln(c*x^n))^2+1/2*d*e*x^4*(a+b*ln(c*x^n))^2+1/5*
e^2*x^5*(a+b*ln(c*x^n))^2
```

Rubi [A]
time = 0.15, antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.130$, Rules used = {2395, 2342, 2341}

$$\frac{1}{3}d^2x^3(a+b\log\left(cx^n\right))^2-\frac{2}{9}bd^2nx^3(a+b\log\left(cx^n\right))+\frac{1}{2}dex^4(a+b\log\left(cx^n\right))^2-\frac{1}{4}bdenx^4(a+b\log\left(cx^n\right))+\frac{1}{5}e^2x^5(a+b\log\left(cx^n\right))^2-\frac{2}{25}be^2nx^5(a+b\log\left(cx^n\right))+\frac{2}{27}b^2d^2n^2x^3+\frac{1}{16}b^2den^2x^4+\frac{2}{125}b^2e^2n^2x^5$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b^2*d^2*n^2*x^3)/27 + (b^2*d*e*n^2*x^4)/16 + (2*b^2*e^2*n^2*x^5)/125 - (
2*b*d^2*n*x^3*(a + b*Log[c*x^n]))/9 - (b*d*e*n*x^4*(a + b*Log[c*x^n]))/4 -
(2*b*e^2*n*x^5*(a + b*Log[c*x^n]))/25 + (d^2*x^3*(a + b*Log[c*x^n])^2)/3 +
(d*e*x^4*(a + b*Log[c*x^n])^2)/2 + (e^2*x^5*(a + b*Log[c*x^n])^2)/5
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
```

```
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \int \left(d^2x^2(a+b\log\left(cx^n\right))^2+2dex^3(a+b\log\left(cx^n\right))^2+e^2x^4(a+b\log\left(c\right.\right.\\ &= d^2\int x^2(a+b\log\left(cx^n\right))^2\,dx+(2de)\int x^3(a+b\log\left(cx^n\right))^2\,dx+e^2\int\\ &= \frac{1}{3}d^2x^3(a+b\log\left(cx^n\right))^2+\frac{1}{2}dex^4(a+b\log\left(cx^n\right))^2+\frac{1}{5}e^2x^5(a+b\log\left(c\right.\\ &= \frac{2}{27}b^2d^2n^2x^3+\frac{1}{16}b^2den^2x^4+\frac{2}{125}b^2e^2n^2x^5-\frac{2}{9}bd^2nx^3(a+b\log\left(cx^n\right))\end{aligned}$$

Mathematica [A]
time = 0.06, size = 149, normalized size = 0.84

$$\frac{2}{125}be^2nx^5(-5a+bn-5b\log\left(cx^n\right))+\frac{1}{16}bdenx^4(-4a+bn-4b\log\left(cx^n\right))+\frac{2}{27}bd^2nx^3(-3a+bn-3b\log\left(cx^n\right))+\frac{1}{3}d^2x^3(a+b\log\left(cx^n\right))^2+\frac{1}{2}dex^4(a+b\log\left(cx^n\right))^2+\frac{1}{5}e^2x^5(a+b\log\left(cx^n\right))^2$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b*e^2*n*x^5*(-5*a + b*n - 5*b*Log[c*x^n]))/125 + (b*d*e*n*x^4*(-4*a + b*
n - 4*b*Log[c*x^n]))/16 + (2*b*d^2*n*x^3*(-3*a + b*n - 3*b*Log[c*x^n]))/27
+ (d^2*x^3*(a + b*Log[c*x^n])^2)/3 + (d*e*x^4*(a + b*Log[c*x^n])^2)/2 + (e^
2*x^5*(a + b*Log[c*x^n])^2)/5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 150.04, size = 2597, normalized size = 14.59

method	result	size
risch	Expression too large to display	2597

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/25*ln(c)*b^2*e^2*n*x^5+2/5*ln(c)*a*b*e^2*x^5+1/2*ln(c)^2*b^2*d*e*x^4+1/3
*x^3*a^2*d^2+1/5*x^5*a^2*e^2-1/2*I*ln(c)*Pi*b^2*d*e*x^4*csgn(I*c*x^n)^3+1/8
*I*Pi*b^2*d*e*n*x^4*csgn(I*c*x^n)^3-1/2*I*Pi*a*b*d*e*x^4*csgn(I*c*x^n)^3+1/
5*I*ln(c)*Pi*b^2*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^2-1/12*Pi^2*b^2*d^2*x^3*cs
gn(I*c*x^n)^6-1/20*Pi^2*b^2*e^2*x^5*csgn(I*c*x^n)^6+1/3*ln(c)^2*b^2*d^2*x^3
+1/5*ln(c)^2*b^2*e^2*x^5-1/20*Pi^2*b^2*e^2*x^5*csgn(I*x^n)^2*csgn(I*c*x^n)^
4+1/10*Pi^2*b^2*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^5-1/8*Pi^2*b^2*d*e*x^4*cs
```

gn(I*c*x^n)^6-1/12*Pi^2*b^2*d^2*x^3*csgn(I*c)^2*csgn(I*c*x^n)^4+1/6*Pi^2*b^2*d^2*x^3*csgn(I*c)*csgn(I*c*x^n)^5-1/12*Pi^2*b^2*d^2*x^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/6*Pi^2*b^2*d^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^5-1/20*Pi^2*b^2*e^2*x^5*csgn(I*c)^2*csgn(I*c*x^n)^4+1/10*Pi^2*b^2*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^5-2/9*a*b*d^2*n*x^3+1/30*b^2*x^3*(6*e^2*x^2+15*d*e*x+10*d^2)*ln(x^n)^2+1/2*a^2*d*e*x^4+2/27*b^2*d^2*n^2*x^3+2/125*b^2*e^2*n^2*x^5+1/900*b*(450*I*Pi*b*d*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+180*I*Pi*b*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2+300*I*Pi*b*d^2*x^3*csgn(I*c)*csgn(I*c*x^n)^2+300*I*Pi*b*d^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+360*ln(c)*b*e^2*x^5-72*b*e^2*n*x^5+360*x^5*a*e^2+450*I*Pi*b*d*e*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-180*I*Pi*b*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-180*I*Pi*b*e^2*x^5*csgn(I*c*x^n)^3-300*I*Pi*b*d^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+900*ln(c)*b*d*e*x^4-225*b*d*e*n*x^4+900*x^4*a*d*e-450*I*Pi*b*d*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-300*I*Pi*b*d^2*x^3*csgn(I*c*x^n)^3-450*I*Pi*b*d*e*x^4*csgn(I*c*x^n)^3+180*I*Pi*b*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^2+600*ln(c)*b*d^2*x^3-200*b*d^2*n*x^3+600*x^3*a*d^2)*ln(x^n)+1/4*Pi^2*b^2*d*e*x^4*csgn(I*x^n)*csgn(I*c*x^n)^5-1/12*Pi^2*b^2*d^2*x^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/6*Pi^2*b^2*d^2*x^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/6*Pi^2*b^2*d^2*x^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+1/3*I*ln(c)*Pi*b^2*d^2*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*ln(c)*Pi*b^2*d^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/9*I*Pi*b^2*d^2*n*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*Pi*a*b*d*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*Pi*a*b*d*e*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*ln(c)*Pi*b^2*d*e*x^4*csgn(I*c)*csgn(I*c*x^n)^2-1/5*I*ln(c)*Pi*b^2*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+ln(c)*a*b*d*e*x^4+1/8*I*Pi*b^2*d*e*n*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/8*Pi^2*b^2*d*e*x^4*csgn(I*c)^2*csgn(I*c*x^n)^4+1/4*Pi^2*b^2*d*e*x^4*csgn(I*c)*csgn(I*c*x^n)^5-1/3*I*Pi*a*b*d^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*Pi*a*b*d*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/5*I*ln(c)*Pi*b^2*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2-1/25*I*Pi*b^2*e^2*n*x^5*csgn(I*c)*csgn(I*c*x^n)^2-1/25*I*Pi*b^2*e^2*n*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2+1/5*I*Pi*a*b*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^2+1/4*Pi^2*b^2*d*e*x^4*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/4*Pi^2*b^2*d*e*x^4*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/2*Pi^2*b^2*d*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/8*Pi^2*b^2*d*e*x^4*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/3*Pi^2*b^2*d^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/20*Pi^2*b^2*e^2*x^5*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/10*Pi^2*b^2*e^2*x^5*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/10*Pi^2*b^2*e^2*x^5*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/5*Pi^2*b^2*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4*a*b*d*e*n*x^4+1/25*I*Pi*b^2*e^2*n*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/5*I*Pi*a*b*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*I*ln(c)*Pi*b^2*d^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/9*I*Pi*b^2*d^2*n*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2/9*ln(c)*b^2*d^2*n*x^3+2/3*ln(c)*a*b*d^2*x^3-1/4*ln(c)*b^2*d*e*n*x^4+1/16*b^2*d*e*n^2*x^4-2/25*a*b*e^2*n*x^5+1/2*I*ln(c)*Pi*b^2*d*e*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b^2*d*e*n*x^4*csgn(I*c)*csgn(I*c*x^n)^2-1/8*I*Pi*b^2*d*e*n*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(c)*Pi*b^2*d*e*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c

```
*x^n)+1/25*I*Pi*b^2*e^2*n*x^5*csgn(I*c*x^n)^3-1/5*I*Pi*a*b*e^2*x^5*csgn(I*c
*x^n)^3+1/5*I*Pi*a*b*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2-1/9*I*Pi*b^2*d^2*n
*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*I*Pi*a*b*d^2*x^3*csgn(I*c)*csgn(I*c*x^
n)^2+1/3*I*Pi*a*b*d^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8*Pi^2*b^2*d*e*x^4*
csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/3*I*ln(c)*Pi*b^2*d^2*x^3*csgn(I*c*x^n)^3+1/
9*I*Pi*b^2*d^2*n*x^3*csgn(I*c*x^n)^3-1/3*I*Pi*a*b*d^2*x^3*csgn(I*c*x^n)^3-1
/5*I*ln(c)*Pi*b^2*e^2*x^5*csgn(I*c*x^n)^3
```

Maxima [A]
time = 0.29, size = 250, normalized size = 1.40

$$\frac{1}{5}\,b^{2}x^{5}e^{2}\log\left(cx^{n}\right)^{2}+\frac{1}{2}\,b^{2}dx^{4}e\log\left(cx^{n}\right)^{2}-\frac{2}{25}\,abnx^{5}e^{2}-\frac{1}{4}\,abdnx^{4}e+\frac{2}{5}\,abx^{5}e^{2}\log\left(cx^{n}\right)+abdx^{4}e\log\left(cx^{n}\right)+\frac{1}{3}\,b^{2}d^{2}x^{3}\log\left(cx^{n}\right)^{2}-\frac{2}{9}\,abd^{2}nx^{3}+\frac{1}{5}\,a^{2}x^{5}e^{2}+\frac{1}{2}\,a^{2}dx^{4}e+\frac{2}{3}\,abd^{2}x^{3}\log\left(cx^{n}\right)+\frac{1}{3}\,a^{2}d^{2}x^{3}+\frac{2}{27}\,\left(n^{2}x^{3}-3\,nx^{3}\log\left(cx^{n}\right)\right)b^{2}d^{2}+\frac{1}{16}\,\left(n^{2}x^{4}-4\,nx^{4}\log\left(cx^{n}\right)\right)b^{2}de+\frac{2}{125}\,\left(n^{2}x^{5}-5\,nx^{5}\log\left(cx^{n}\right)\right)b^{2}e^{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/5*b^2*x^5*e^2*log(c*x^n)^2 + 1/2*b^2*d*x^4*e*log(c*x^n)^2 - 2/25*a*b*n*x^
5*e^2 - 1/4*a*b*d*n*x^4*e + 2/5*a*b*x^5*e^2*log(c*x^n) + a*b*d*x^4*e*log(c*
x^n) + 1/3*b^2*d^2*x^3*log(c*x^n)^2 - 2/9*a*b*d^2*n*x^3 + 1/5*a^2*x^5*e^2 +
 1/2*a^2*d*x^4*e + 2/3*a*b*d^2*x^3*log(c*x^n) + 1/3*a^2*d^2*x^3 + 2/27*(n^2
*x^3 - 3*n*x^3*log(c*x^n))*b^2*d^2 + 1/16*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^
2*d*e + 2/125*(n^2*x^5 - 5*n*x^5*log(c*x^n))*b^2*e^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 348 vs. $2(160) = 320$.
time = 0.36, size = 348, normalized size = 1.96

$$\frac{1}{125}\,\left(2\,b^{2}n^{2}-10\,abn+25\,a^{2}\right)x^{5}e^{2}+\frac{1}{16}\,\left(b^{2}dn^{2}-4\,abdn+8\,a^{2}d\right)x^{4}e+\frac{1}{27}\,\left(2\,b^{2}d^{2}n^{2}-6\,abd^{2}n+9\,a^{2}d^{2}\right)x^{3}+\frac{1}{30}\,\left(6\,b^{2}x^{5}e^{2}+15\,b^{2}dx^{4}e+10\,b^{2}d^{2}x^{3}\right)\log\left(c\right)^{2}+\frac{1}{30}\,\left(6\,b^{2}n^{2}x^{5}e^{2}+15\,b^{2}dn^{2}x^{4}e+10\,b^{2}d^{2}n^{2}x^{3}\right)\log\left(x\right)^{2}-\frac{1}{900}\,\left(72\,\left(b^{2}n-5\,ab\right)x^{5}e^{2}+225\,\left(b^{2}dn-4\,abd\right)x^{4}e+200\,\left(b^{2}d^{2}n-3\,abd^{2}\right)x^{3}\right)\log\left(c\right)-\frac{1}{900}\,\left(72\,\left(b^{2}n^{2}-5\,abn\right)x^{5}e^{2}+225\,\left(b^{2}dn^{2}-4\,abdn\right)x^{4}e+200\,\left(b^{2}d^{2}n^{2}-3\,abd^{2}n\right)x^{3}-60\,\left(6\,b^{2}nx^{5}e^{2}+15\,b^{2}dnx^{4}e+10\,b^{2}d^{2}nx^{3}\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/125*(2*b^2*n^2 - 10*a*b*n + 25*a^2)*x^5*e^2 + 1/16*(b^2*d*n^2 - 4*a*b*d*n
 + 8*a^2*d)*x^4*e + 1/27*(2*b^2*d^2*n^2 - 6*a*b*d^2*n + 9*a^2*d^2)*x^3 + 1/
30*(6*b^2*x^5*e^2 + 15*b^2*d*x^4*e + 10*b^2*d^2*x^3)*log(c)^2 + 1/30*(6*b^2
*n^2*x^5*e^2 + 15*b^2*d*n^2*x^4*e + 10*b^2*d^2*n^2*x^3)*log(x)^2 - 1/900*(7
2*(b^2*n - 5*a*b)*x^5*e^2 + 225*(b^2*d*n - 4*a*b*d)*x^4*e + 200*(b^2*d^2*n
- 3*a*b*d^2)*x^3)*log(c) - 1/900*(72*(b^2*n^2 - 5*a*b*n)*x^5*e^2 + 225*(b^2
*d*n^2 - 4*a*b*d*n)*x^4*e + 200*(b^2*d^2*n^2 - 3*a*b*d^2*n)*x^3 - 60*(6*b^2
*n*x^5*e^2 + 15*b^2*d*n*x^4*e + 10*b^2*d^2*n*x^3)*log(c))*log(x)
```

Sympy [A]
time = 0.65, size = 311, normalized size = 1.75

$$\frac{a^{2}d^{2}x^{3}}{3}+\frac{a^{2}dex^{4}}{2}+\frac{a^{2}e^{2}x^{5}}{5}-\frac{2abd^{2}nx^{3}}{9}+\frac{2abd^{2}x^{3}\log\left(cx^{n}\right)}{3}-\frac{abdenx^{4}}{4}+abdex^{4}\log\left(cx^{n}\right)-\frac{2abe^{2}nx^{5}}{25}+\frac{2abe^{2}x^{5}\log\left(cx^{n}\right)}{5}+\frac{2b^{2}d^{2}n^{2}x^{3}}{27}-\frac{2b^{2}d^{2}nx^{3}\log\left(cx^{n}\right)}{9}+\frac{b^{2}d^{2}x^{3}\log\left(cx^{n}\right)^{2}}{3}+\frac{b^{2}den^{2}x^{4}}{16}-\frac{b^{2}denx^{4}\log\left(cx^{n}\right)}{4}+\frac{b^{2}dex^{4}\log\left(cx^{n}\right)^{2}}{2}+\frac{2b^{2}e^{2}n^{2}x^{5}}{125}-\frac{2b^{2}e^{2}nx^{5}\log\left(cx^{n}\right)}{25}+\frac{b^{2}e^{2}x^{5}\log\left(cx^{n}\right)^{2}}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*d**2*x**3/3 + a**2*d*e*x**4/2 + a**2*e**2*x**5/5 - 2*a*b*d**2*n*x**3/9
 + 2*a*b*d**2*x**3*log(c*x**n)/3 - a*b*d*e*n*x**4/4 + a*b*d*e*x**4*log(c*x*
*n) - 2*a*b*e**2*n*x**5/25 + 2*a*b*e**2*x**5*log(c*x**n)/5 + 2*b**2*d**2*n*
*2*x**3/27 - 2*b**2*d**2*n*x**3*log(c*x**n)/9 + b**2*d**2*x**3*log(c*x**n)*
*2/3 + b**2*d*e*n**2*x**4/16 - b**2*d*e*n*x**4*log(c*x**n)/4 + b**2*d*e*x**
4*log(c*x**n)**2/2 + 2*b**2*e**2*n**2*x**5/125 - 2*b**2*e**2*n*x**5*log(c*x
**n)/25 + b**2*e**2*x**5*log(c*x**n)**2/5
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 408 vs. 2(160) = 320.
time = 3.92, size = 408, normalized size = 2.29

$$\frac{1}{5}b^2n^2x^5e^2\log(x)^2+\frac{1}{2}b^2dn^2x^4e\log(x)^2-\frac{2}{25}b^2n^2x^5e^2\log(x)-\frac{1}{4}b^2dn^2x^4e\log(x)+\frac{2}{5}b^2nx^5e^2\log(c)\log(x)+b^2dnx^4e\log(c)\log(x)+\frac{1}{3}b^2d^2n^2x^3\log(x)^2+\frac{2}{125}b^2n^2x^5e^2+\frac{1}{16}b^2dn^2x^4e-\frac{2}{25}b^2nx^5e^2\log(c)-\frac{1}{4}b^2dnx^4e\log(c)+\frac{1}{5}b^2x^5e^2\log(c)^2+\frac{1}{2}b^2dx^4e\log(c)^2-\frac{2}{9}b^2d^2n^2x^3\log(x)+\frac{2}{5}abnx^5e^2\log(x)+abdnx^4e\log(x)+\frac{2}{3}b^2d^2nx^3\log(c)\log(x)+\frac{2}{27}b^2d^2n^2x^3-\frac{2}{25}abnx^5e^2-\frac{1}{4}abdnx^4e-\frac{2}{9}b^2d^2nx^3\log(c)+\frac{2}{5}abx^5e^2\log(c)+abdx^4e\log(c)+\frac{1}{3}b^2d^2x^3\log(c)^2+\frac{2}{3}abd^2nx^3\log(x)-\frac{2}{9}abd^2nx^3+\frac{1}{5}a^2x^5e^2+\frac{1}{2}a^2dx^4e+\frac{2}{3}abd^2x^3\log(c)+\frac{1}{3}a^2d^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/5*b^2*n^2*x^5*e^2*log(x)^2 + 1/2*b^2*d*n^2*x^4*e*log(x)^2 - 2/25*b^2*n^2*
x^5*e^2*log(x) - 1/4*b^2*d*n^2*x^4*e*log(x) + 2/5*b^2*n*x^5*e^2*log(c)*log(
x) + b^2*d*n*x^4*e*log(c)*log(x) + 1/3*b^2*d^2*n^2*x^3*log(x)^2 + 2/125*b^2
*n^2*x^5*e^2 + 1/16*b^2*d*n^2*x^4*e - 2/25*b^2*n*x^5*e^2*log(c) - 1/4*b^2*d
*n*x^4*e*log(c) + 1/5*b^2*x^5*e^2*log(c)^2 + 1/2*b^2*d*x^4*e*log(c)^2 - 2/9
*b^2*d^2*n^2*x^3*log(x) + 2/5*a*b*n*x^5*e^2*log(x) + a*b*d*n*x^4*e*log(x) +
 2/3*b^2*d^2*n*x^3*log(c)*log(x) + 2/27*b^2*d^2*n^2*x^3 - 2/25*a*b*n*x^5*e^
2 - 1/4*a*b*d*n*x^4*e - 2/9*b^2*d^2*n*x^3*log(c) + 2/5*a*b*x^5*e^2*log(c) +
 a*b*d*x^4*e*log(c) + 1/3*b^2*d^2*x^3*log(c)^2 + 2/3*a*b*d^2*n*x^3*log(x) -
 2/9*a*b*d^2*n*x^3 + 1/5*a^2*x^5*e^2 + 1/2*a^2*d*x^4*e + 2/3*a*b*d^2*x^3*lo
g(c) + 1/3*a^2*d^2*x^3
```

Mupad [B]
time = 3.74, size = 180, normalized size = 1.01

$$\ln(c\,x^n)\,\left(\frac{2\,b\,(3\,a-b\,n)\,d^2\,x^3}{9}+\frac{b\,(4\,a-b\,n)\,d\,e\,x^4}{4}+\frac{2\,b\,(5\,a-b\,n)\,e^2\,x^5}{25}\right)+\ln(c\,x^n)^2\,\left(\frac{b^2\,d^2\,x^3}{3}+\frac{b^2\,d\,e\,x^4}{2}+\frac{b^2\,e^2\,x^5}{5}\right)+\frac{d^2\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}+\frac{e^2\,x^5\,(25\,a^2-10\,a\,b\,n+2\,b^2\,n^2)}{125}+\frac{d\,e\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)*((2*b*d^2*x^3*(3*a - b*n))/9 + (2*b*e^2*x^5*(5*a - b*n))/25 + (b
*d*e*x^4*(4*a - b*n))/4) + log(c*x^n)^2*((b^2*d^2*x^3)/3 + (b^2*e^2*x^5)/5
+ (b^2*d*e*x^4)/2) + (d^2*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27 + (e^2*x^5*
(25*a^2 + 2*b^2*n^2 - 10*a*b*n))/125 + (d*e*x^4*(8*a^2 + b^2*n^2 - 4*a*b*n)
)/16
```

3.85 $\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx$

Optimal. Leaf size=178

$$\frac{1}{4}b^2d^2n^2x^2+\frac{4}{27}b^2den^2x^3+\frac{1}{32}b^2e^2n^2x^4-\frac{1}{2}bd^2nx^2(a+b\log(cx^n))-\frac{4}{9}bdenx^3(a+b\log(cx^n))-\frac{1}{8}be^2nx^4(a+b\,\mathrm{lo}$$

```
[Out] 1/4*b^2*d^2*n^2*x^2+4/27*b^2*d*e*n^2*x^3+1/32*b^2*e^2*n^2*x^4-1/2*b*d^2*n*x
^2*(a+b*ln(c*x^n))-4/9*b*d*e*n*x^3*(a+b*ln(c*x^n))-1/8*b*e^2*n*x^4*(a+b*ln(
c*x^n))+1/2*d^2*x^2*(a+b*ln(c*x^n))^2+2/3*d*e*x^3*(a+b*ln(c*x^n))^2+1/4*e^2
*x^4*(a+b*ln(c*x^n))^2
```

Rubi [A]
time = 0.12, antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2395, 2342, 2341}

$$\frac{1}{2}d^2x^2(a+b\log(cx^n))^2-\frac{1}{2}bd^2nx^2(a+b\log(cx^n))+\frac{2}{3}dex^3(a+b\log(cx^n))^2-\frac{4}{9}bdenx^3(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))^2-\frac{1}{8}be^2nx^4(a+b\log(cx^n))+\frac{1}{4}b^2d^2n^2x^2+\frac{4}{27}b^2den^2x^3+\frac{1}{32}b^2e^2n^2x^4$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (b^2*d^2*n^2*x^2)/4 + (4*b^2*d*e*n^2*x^3)/27 + (b^2*e^2*n^2*x^4)/32 - (b*d^
2*n*x^2*(a + b*Log[c*x^n]))/2 - (4*b*d*e*n*x^3*(a + b*Log[c*x^n]))/9 - (b*e
^2*n*x^4*(a + b*Log[c*x^n]))/8 + (d^2*x^2*(a + b*Log[c*x^n])^2)/2 + (2*d*e*
x^3*(a + b*Log[c*x^n])^2)/3 + (e^2*x^4*(a + b*Log[c*x^n])^2)/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
```

```
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \int \left(d^2x(a+b\log\left(cx^n\right))^2+2dex^2(a+b\log\left(cx^n\right))^2+e^2x^3(a+b\log\left(c\right.\right.\\ &= d^2\int x(a+b\log\left(cx^n\right))^2\,dx+(2de)\int x^2(a+b\log\left(cx^n\right))^2\,dx+e^2\int\\ &= \frac{1}{2}d^2x^2(a+b\log\left(cx^n\right))^2+\frac{2}{3}dex^3(a+b\log\left(cx^n\right))^2+\frac{1}{4}e^2x^4(a+b\log\left(c\right.\\ &= \frac{1}{4}b^2d^2n^2x^2+\frac{4}{27}b^2den^2x^3+\frac{1}{32}b^2e^2n^2x^4-\frac{1}{2}bd^2nx^2(a+b\log\left(cx^n\right))-\end{aligned}$$

Mathematica [A]
time = 0.07, size = 134, normalized size = 0.75

$$\frac{1}{864}x^2\left(27be^2nx^2(-4a+bn-4b\log\left(cx^n\right))+128bdenx(-3a+bn-3b\log\left(cx^n\right))+216bd^2n(-2a+bn-2b\log\left(cx^n\right))+432d^2(a+b\log\left(cx^n\right))^2+576dex(a+b\log\left(cx^n\right))^2+216e^2x^2(a+b\log\left(cx^n\right))^2\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x^2*(27*b*e^2*n*x^2*(-4*a + b*n - 4*b*Log[c*x^n]) + 128*b*d*e*n*x*(-3*a +
b*n - 3*b*Log[c*x^n]) + 216*b*d^2*n*(-2*a + b*n - 2*b*Log[c*x^n]) + 432*d^2
*(a + b*Log[c*x^n])^2 + 576*d*e*x*(a + b*Log[c*x^n])^2 + 216*e^2*x^2*(a + b
*Log[c*x^n])^2))/864
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 83.60, size = 2597, normalized size = 14.59

method	result	size
risch	Expression too large to display	2597

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*a^2*e^2+1/2*x^2*a^2*d^2-1/2*a*b*d^2*n*x^2-1/8*Pi^2*b^2*d^2*x^2*csgn
(I*x^n)^2*csgn(I*c*x^n)^4+1/4*Pi^2*b^2*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5-
1/16*Pi^2*b^2*e^2*x^4*csgn(I*c)^2*csgn(I*c*x^n)^4+1/8*Pi^2*b^2*e^2*x^4*csgn
(I*c)*csgn(I*c*x^n)^5-1/16*Pi^2*b^2*e^2*x^4*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2
/3*x^3*a^2*d*e+1/2*I*ln(c)*Pi*b^2*d^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*l
n(c)*Pi*b^2*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I*Pi*b^2*d^2*n*x^2*csgn
(I*c)*csgn(I*c*x^n)^2-1/4*I*Pi*b^2*d^2*n*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/
```

16*I*Pi*b^2*e^2*n*x^4*csgn(I*c)*csgn(I*c*x^n)^2-1/16*I*Pi*b^2*e^2*n*x^4*csg
n(I*x^n)*csgn(I*c*x^n)^2+1/4*I*Pi*a*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/4
*I*Pi*a*b*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4*I*ln(c)*Pi*b^2*e^2*x^4*cs
gn(I*c)*csgn(I*c*x^n)^2+1/4*I*ln(c)*Pi*b^2*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n
)^2+1/72*b*(-48*I*Pi*b*d*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+18*I*Pi*
b*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-18*I*Pi*b*e^2*x^4*csgn(I*c*x^n)^3-18*
I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+36*ln(c)*b*e^2*x^4-9*b*e
^2*n*x^4+36*x^4*a*e^2+48*I*Pi*b*d*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+48*I*Pi
*b*d*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(I*c
*x^n)^2+18*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+96*ln(c)*b*d*e*x^3-32*b
*d*e*n*x^3+96*x^3*a*d*e+36*I*Pi*b*d^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-36*I*Pi
*b*d^2*x^2*csgn(I*c*x^n)^3-48*I*Pi*b*d*e*x^3*csgn(I*c*x^n)^3-36*I*Pi*b*d^2*
x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+72*ln(c)*b*d^2*x^2-36*b*d^2*n*x^2+7
2*x^2*a*d^2)*ln(x^n)+1/4*b^2*d^2*n^2*x^2+1/32*b^2*e^2*n^2*x^4+1/4*ln(c)^2*b
^2*e^2*x^4+1/2*ln(c)^2*b^2*d^2*x^2+1/12*b^2*x^2*(3*e^2*x^2+8*d*e*x+6*d^2)*l
n(x^n)^2-1/16*Pi^2*b^2*e^2*x^4*csgn(I*c*x^n)^6+1/2*I*Pi*a*b*d^2*x^2*csgn(I*
c)*csgn(I*c*x^n)^2+1/2*I*Pi*a*b*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2/3*I*l
n(c)*Pi*b^2*d*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/9*I*Pi*b^2*d*e*n*
x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2/3*I*Pi*a*b*d*e*x^3*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)-1/8*a*b*e^2*n*x^4-4/9*a*b*d*e*n*x^3+4/3*ln(c)*a*b*d*e
*x^3+4/27*b^2*d*e*n^2*x^3-1/2*I*ln(c)*Pi*b^2*d^2*x^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+1/4*I*Pi*b^2*d^2*n*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/
2*I*Pi*a*b*d^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/3*I*Pi*a*b*d*e*x^3
*csgn(I*c)*csgn(I*c*x^n)^2+1/8*Pi^2*b^2*e^2*x^4*csgn(I*c)^2*csgn(I*x^n)*csg
n(I*c*x^n)^3+1/8*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1
/4*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/8*Pi^2*b^2*d^2*
x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-4/9*ln(c)*b^2*d*e*n*x^3-1/8*P
i^2*b^2*d^2*x^2*csgn(I*c*x^n)^6+2/3*I*ln(c)*Pi*b^2*d*e*x^3*csgn(I*x^n)*csgn
(I*c*x^n)^2-2/9*I*Pi*b^2*d*e*n*x^3*csgn(I*c)*csgn(I*c*x^n)^2-2/9*I*Pi*b^2*d
*e*n*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/8*Pi^2*b^2*e^2*x^4*csgn(I*x^n)*csgn(
I*c*x^n)^5-1/6*Pi^2*b^2*d*e*x^3*csgn(I*c*x^n)^6-1/8*Pi^2*b^2*d^2*x^2*csgn(I
*c)^2*csgn(I*c*x^n)^4+1/4*Pi^2*b^2*d^2*x^2*csgn(I*c)*csgn(I*c*x^n)^5-1/6*Pi
^2*b^2*d*e*x^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/3*Pi^2*b^2*d*e*x
^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/3*Pi^2*b^2*d*e*x^3*csgn(I*c)*c
sgn(I*x^n)^2*csgn(I*c*x^n)^3-2/3*Pi^2*b^2*d*e*x^3*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4-2/3*I*Pi*a*b*d*e*x^3*csgn(I*c*x^n)^3+1/4*Pi^2*b^2*d^2*x^2*csgn
(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/4*Pi^2*b^2*d^2*x^2*csgn(I*c)*csgn(I*x
^n)^2*csgn(I*c*x^n)^3-1/2*Pi^2*b^2*d^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)^4-1/6*Pi^2*b^2*d*e*x^3*csgn(I*c)^2*csgn(I*c*x^n)^4+1/3*Pi^2*b^2*d*e*x^3
*csgn(I*c)*csgn(I*c*x^n)^5+1/16*I*Pi*b^2*e^2*n*x^4*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)-1/4*I*Pi*a*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/3*I*
ln(c)*Pi*b^2*d*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2-1/2*ln(c)*b^2*d^2*n*x^2+ln(c
)*a*b*d^2*x^2-1/8*ln(c)*b^2*e^2*n*x^4+1/2*ln(c)*a*b*e^2*x^4+2/3*ln(c)^2*b^2
*d*e*x^3-2/3*I*ln(c)*Pi*b^2*d*e*x^3*csgn(I*c*x^n)^3+2/9*I*Pi*b^2*d*e*n*x^3*
csgn(I*c*x^n)^3+2/3*I*Pi*a*b*d*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(c

```
)*Pi*b^2*d^2*x^2*csgn(I*c*x^n)^3+1/4*I*Pi*b^2*d^2*n*x^2*csgn(I*c*x^n)^3-1/2
*I*Pi*a*b*d^2*x^2*csgn(I*c*x^n)^3-1/16*Pi^2*b^2*e^2*x^4*csgn(I*c)^2*csgn(I*
x^n)^2*csgn(I*c*x^n)^2-1/6*Pi^2*b^2*d*e*x^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1
/3*Pi^2*b^2*d*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^5-1/4*I*ln(c)*Pi*b^2*e^2*x^4*
csgn(I*c*x^n)^3+1/16*I*Pi*b^2*e^2*n*x^4*csgn(I*c*x^n)^3-1/4*I*Pi*a*b*e^2*x^
4*csgn(I*c*x^n)^3-1/4*I*ln(c)*Pi*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)
```

Maxima [A]
time = 0.29, size = 250, normalized size = 1.40

$$\frac{1}{4}b^2x^4e^2\log\left(cx^n\right)^2+\frac{2}{3}b^2dx^3e\log\left(cx^n\right)^2-\frac{1}{8}abnx^4e^2-\frac{4}{9}abdnx^3e+\frac{1}{2}abx^4e^2\log\left(cx^n\right)+\frac{4}{3}abdx^3e\log\left(cx^n\right)+\frac{1}{2}b^2d^2x^2\log\left(cx^n\right)^2-\frac{1}{2}abd^2nx^2+\frac{1}{4}a^2x^4e^2+\frac{2}{3}a^2dx^3e+abd^2x^2\log\left(cx^n\right)+\frac{1}{2}a^2d^2x^2+\frac{1}{4}\left(n^2x^2-2\,nx^2\log\left(cx^n\right)\right)b^2d^2+\frac{4}{27}\left(n^2x^3-3\,nx^3\log\left(cx^n\right)\right)b^2de+\frac{1}{32}\left(n^2x^4-4\,nx^4\log\left(cx^n\right)\right)b^2e^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/4*b^2*x^4*e^2*log(c*x^n)^2 + 2/3*b^2*d*x^3*e*log(c*x^n)^2 - 1/8*a*b*n*x^4
*e^2 - 4/9*a*b*d*n*x^3*e + 1/2*a*b*x^4*e^2*log(c*x^n) + 4/3*a*b*d*x^3*e*log
(c*x^n) + 1/2*b^2*d^2*x^2*log(c*x^n)^2 - 1/2*a*b*d^2*n*x^2 + 1/4*a^2*x^4*e^
2 + 2/3*a^2*d*x^3*e + a*b*d^2*x^2*log(c*x^n) + 1/2*a^2*d^2*x^2 + 1/4*(n^2*x
^2 - 2*n*x^2*log(c*x^n))*b^2*d^2 + 4/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*
d*e + 1/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2*e^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 347 vs. $2(160) = 320$.
time = 0.35, size = 347, normalized size = 1.95

$$\frac{1}{32}\left(b^2n^2-4\,abn+8\,a^2\right)x^4e^2+\frac{2}{27}\left(2\,b^2dn^2-6\,abdn+9\,a^2d\right)x^3e+\frac{1}{4}\left(b^2d^2n^2-2\,abd^2n+2\,a^2d^2\right)x^2+\frac{1}{12}\left(3\,b^2x^4e^2+8\,b^2dx^3e+6\,b^2d^2x^2\right)\log\left(c\right)^2+\frac{1}{12}\left(3\,b^2n^2x^4e^2+8\,b^2dn^2x^3e+6\,b^2d^2n^2x^2\right)\log\left(x\right)^2-\frac{1}{72}\left(9\left(b^2n-4\,ab\right)x^4e^2+32\left(b^2dn-3\,abd\right)x^3e+36\left(b^2d^2n-2\,abd^2\right)x^2\right)\log\left(c\right)-\frac{1}{72}\left(9\left(b^2n^2-4\,abn\right)x^4e^2+32\left(b^2dn^2-3\,abdn\right)x^3e+36\left(b^2d^2n^2-2\,abd^2n\right)x^2-12\left(3\,b^2nx^4e^2+8\,b^2dnx^3e+6\,b^2d^2nx^2\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/32*(b^2*n^2 - 4*a*b*n + 8*a^2)*x^4*e^2 + 2/27*(2*b^2*d*n^2 - 6*a*b*d*n +
9*a^2*d)*x^3*e + 1/4*(b^2*d^2*n^2 - 2*a*b*d^2*n + 2*a^2*d^2)*x^2 + 1/12*(3*
b^2*x^4*e^2 + 8*b^2*d*x^3*e + 6*b^2*d^2*x^2)*log(c)^2 + 1/12*(3*b^2*n^2*x^4
*e^2 + 8*b^2*d*n^2*x^3*e + 6*b^2*d^2*n^2*x^2)*log(x)^2 - 1/72*(9*(b^2*n - 4
*a*b)*x^4*e^2 + 32*(b^2*d*n - 3*a*b*d)*x^3*e + 36*(b^2*d^2*n - 2*a*b*d^2)*x
^2)*log(c) - 1/72*(9*(b^2*n^2 - 4*a*b*n)*x^4*e^2 + 32*(b^2*d*n^2 - 3*a*b*d*
n)*x^3*e + 36*(b^2*d^2*n^2 - 2*a*b*d^2*n)*x^2 - 12*(3*b^2*n*x^4*e^2 + 8*b^2
*d*n*x^3*e + 6*b^2*d^2*n*x^2)*log(c))*log(x)
```

Sympy [A]
time = 0.44, size = 308, normalized size = 1.73

$$\frac{a^2d^2x^2}{2}+\frac{2a^2dex^3}{3}+\frac{a^2e^2x^4}{4}-\frac{abd^2nx^2}{2}+abd^2x^2\log\left(cx^n\right)-\frac{4abdenx^3}{9}+\frac{4abdex^3\log\left(cx^n\right)}{3}-\frac{abe^2nx^4}{8}+\frac{abe^2x^4\log\left(cx^n\right)}{2}+\frac{b^2d^2n^2x^2}{4}-\frac{b^2d^2nx^2\log\left(cx^n\right)}{2}+\frac{b^2d^2x^2\log\left(cx^n\right)^2}{2}+\frac{4b^2den^2x^3}{27}-\frac{4b^2denx^3\log\left(cx^n\right)}{9}+\frac{2b^2dex^3\log\left(cx^n\right)^2}{3}+\frac{b^2e^2n^2x^4}{32}-\frac{b^2e^2nx^4\log\left(cx^n\right)}{8}+\frac{b^2e^2x^4\log\left(cx^n\right)^2}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*d**2*x**2/2 + 2*a**2*d*e*x**3/3 + a**2*e**2*x**4/4 - a*b*d**2*n*x**2/2
 + a*b*d**2*x**2*log(c*x**n) - 4*a*b*d*e*n*x**3/9 + 4*a*b*d*e*x**3*log(c*x*
*n)/3 - a*b*e**2*n*x**4/8 + a*b*e**2*x**4*log(c*x**n)/2 + b**2*d**2*n**2*x*
*2/4 - b**2*d**2*n*x**2*log(c*x**n)/2 + b**2*d**2*x**2*log(c*x**n)**2/2 + 4
*b**2*d*e*n**2*x**3/27 - 4*b**2*d*e*n*x**3*log(c*x**n)/9 + 2*b**2*d*e*x**3*
log(c*x**n)**2/3 + b**2*e**2*n**2*x**4/32 - b**2*e**2*n*x**4*log(c*x**n)/8
+ b**2*e**2*x**4*log(c*x**n)**2/4
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 408 vs. 2(160) = 320.
time = 2.60, size = 408, normalized size = 2.29

$$\frac{1}{4}b^2n^2x^4e^2\log(x)^2+\frac{2}{3}b^2dn^2x^3e\log(x)^2-\frac{1}{8}b^2n^2x^4e^2\log(x)-\frac{4}{9}b^2dn^2x^3e\log(x)+\frac{1}{2}b^2nx^4e^2\log(c)\log(x)+\frac{4}{3}b^2dnx^3e\log(c)\log(x)+\frac{1}{2}b^2d^2n^2x^2\log(x)^2+\frac{1}{32}b^2n^2x^4e^2+\frac{4}{27}b^2dn^2x^3e-\frac{1}{8}b^2nx^4e^2\log(c)-\frac{4}{9}b^2dnx^3e\log(c)+\frac{1}{4}b^2x^4e^2\log(c)^2+\frac{2}{3}b^2dx^3e\log(c)^2-\frac{1}{2}b^2d^2n^2x^2\log(x)+\frac{1}{2}abnx^4e^2\log(x)+\frac{4}{3}abdnx^3e\log(x)+b^2d^2nx^2\log(c)\log(x)+\frac{1}{4}b^2d^2n^2x^2-\frac{1}{8}abnx^4e^2-\frac{4}{9}abdnx^3e-\frac{1}{2}b^2d^2nx^2\log(c)+\frac{1}{2}abx^4e^2\log(c)+\frac{4}{3}abdx^3e\log(c)+\frac{1}{2}b^2d^2x^2\log(c)^2+abd^2nx^2\log(x)-\frac{1}{2}abd^2nx^2+\frac{1}{4}a^2x^4e^2+\frac{2}{3}a^2dx^3e+abd^2x^2\log(c)+\frac{1}{2}a^2d^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/4*b^2*n^2*x^4*e^2*log(x)^2 + 2/3*b^2*d*n^2*x^3*e*log(x)^2 - 1/8*b^2*n^2*x
^4*e^2*log(x) - 4/9*b^2*d*n^2*x^3*e*log(x) + 1/2*b^2*n*x^4*e^2*log(c)*log(x
) + 4/3*b^2*d*n*x^3*e*log(c)*log(x) + 1/2*b^2*d^2*n^2*x^2*log(x)^2 + 1/32*b
^2*n^2*x^4*e^2 + 4/27*b^2*d*n^2*x^3*e - 1/8*b^2*n*x^4*e^2*log(c) - 4/9*b^2*
d*n*x^3*e*log(c) + 1/4*b^2*x^4*e^2*log(c)^2 + 2/3*b^2*d*x^3*e*log(c)^2 - 1/
2*b^2*d^2*n^2*x^2*log(x) + 1/2*a*b*n*x^4*e^2*log(x) + 4/3*a*b*d*n*x^3*e*log
(x) + b^2*d^2*n*x^2*log(c)*log(x) + 1/4*b^2*d^2*n^2*x^2 - 1/8*a*b*n*x^4*e^2
 - 4/9*a*b*d*n*x^3*e - 1/2*b^2*d^2*n*x^2*log(c) + 1/2*a*b*x^4*e^2*log(c) +
4/3*a*b*d*x^3*e*log(c) + 1/2*b^2*d^2*x^2*log(c)^2 + a*b*d^2*n*x^2*log(x) -
1/2*a*b*d^2*n*x^2 + 1/4*a^2*x^4*e^2 + 2/3*a^2*d*x^3*e + a*b*d^2*x^2*log(c)
+ 1/2*a^2*d^2*x^2
```

Mupad [**B**]
time = 3.62, size = 179, normalized size = 1.01

$$\ln(c\,x^n)\,\left(\frac{b\,(2\,a-b\,n)\,d^2\,x^2}{2}+\frac{4\,b\,(3\,a-b\,n)\,d\,e\,x^3}{9}+\frac{b\,(4\,a-b\,n)\,e^2\,x^4}{8}\right)+\ln(c\,x^n)^2\,\left(\frac{b^2\,d^2\,x^2}{2}+\frac{2\,b^2\,d\,e\,x^3}{3}+\frac{b^2\,e^2\,x^4}{4}\right)+\frac{d^2\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4}+\frac{e^2\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{32}+\frac{2\,d\,e\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)*((b*d^2*x^2*(2*a - b*n))/2 + (b*e^2*x^4*(4*a - b*n))/8 + (4*b*d*
e*x^3*(3*a - b*n))/9) + log(c*x^n)^2*((b^2*d^2*x^2)/2 + (b^2*e^2*x^4)/4 + (
2*b^2*d*e*x^3)/3) + (d^2*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + (e^2*x^4*(8*a
^2 + b^2*n^2 - 4*a*b*n))/32 + (2*d*e*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27
```

3.86 $\int (d+ex)^2 \left(a+b\log \left(cx^n\right)\right)^2 \, dx$

Optimal. Leaf size=173

$$2b^2d^2n^2x+\frac{1}{2}b^2den^2x^2+\frac{2}{27}b^2e^2n^2x^3+\frac{b^2d^3n^2\log^2(x)}{3e}-2bd^2nx(a+b\log \left(cx^n\right))-bdenx^2(a+b\log \left(cx^n\right))-\frac{2}{9}be^2$$

```
[Out] 2*b^2*d^2*n^2*x+1/2*b^2*d*e*n^2*x^2+2/27*b^2*e^2*n^2*x^3+1/3*b^2*d^3*n^2*ln
(x)^2/e-2*b*d^2*n*x*(a+b*ln(c*x^n))-b*d*e*n*x^2*(a+b*ln(c*x^n))-2/9*b*e^2*n
*x^3*(a+b*ln(c*x^n))-2/3*b*d^3*n*ln(x)*(a+b*ln(c*x^n))/e+1/3*(e*x+d)^3*(a+b
*ln(c*x^n))^2/e
```

Rubi [A]
time = 0.09, antiderivative size = 173, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2356, 45, 2372, 2338}

$$-\frac{2bd^3n\log(x)\left(a+b\log \left(cx^n\right)\right)}{3e}-2bd^2nx(a+b\log \left(cx^n\right))+\frac{(d+ex)^3\left(a+b\log \left(cx^n\right)\right)^2}{3e}-bdenx^2(a+b\log \left(cx^n\right))-\frac{2}{9}be^2nx^3(a+b\log \left(cx^n\right))+\frac{b^2d^3n^2\log^2(x)}{3e}+2b^2d^2n^2x+\frac{1}{2}b^2den^2x^2+\frac{2}{27}b^2e^2n^2x^3$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] 2*b^2*d^2*n^2*x + (b^2*d*e*n^2*x^2)/2 + (2*b^2*e^2*n^2*x^3)/27 + (b^2*d^3*n
^2*Log[x]^2)/(3*e) - 2*b*d^2*n*x*(a + b*Log[c*x^n]) - b*d*e*n*x^2*(a + b*Lo
g[c*x^n]) - (2*b*e^2*n*x^3*(a + b*Log[c*x^n]))/9 - (2*b*d^3*n*Log[x]*(a + b
*Log[c*x^n]))/(3*e) + ((d + e*x)^3*(a + b*Log[c*x^n])^2)/(3*e)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] && !IGtQ[q, 0]) || (EqQ[p, 2] &&
```

```
NeQ[q, 1]))
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] && !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{(d+ex)^3 (a+b\log(cx^n))^2}{3e} - \frac{(2bn)\int \frac{(d+ex)^3(a+b\log(cx^n))}{x} \, dx}{3e}$$

$$= -\frac{bn(18d^2ex+9de^2x^2+2e^3x^3+6d^3\log(x))(a+b\log(cx^n))}{9e} + \frac{(d+ex)^3}{}$$

$$= -\frac{bn(18d^2ex+9de^2x^2+2e^3x^3+6d^3\log(x))(a+b\log(cx^n))}{9e} + \frac{(d+ex)^3}{}$$

$$= 2b^2d^2n^2x + \frac{1}{2}b^2den^2x^2 + \frac{2}{27}b^2e^2n^2x^3 + \frac{b^2d^3n^2\log^2(x)}{3e} - \frac{bn(18d^2ex+9d}{}$$

Mathematica [A]
time = 0.05, size = 135, normalized size = 0.78

$$\frac{2}{27}be^2nx^3(-3a+bn-3b\log(cx^n)) + \frac{1}{2}bdenx^2(-2a+bn-2b\log(cx^n)) + d^2x(a+b\log(cx^n))^2 + dex^2(a+b\log(cx^n))^2 + \frac{1}{3}e^2x^3(a+b\log(cx^n))^2 - 2bd^2nx(a-bn+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b*e^2*n*x^3*(-3*a + b*n - 3*b*Log[c*x^n]))/27 + (b*d*e*n*x^2*(-2*a + b*n
 - 2*b*Log[c*x^n]))/2 + d^2*x*(a + b*Log[c*x^n])^2 + d*e*x^2*(a + b*Log[c*x
^n])^2 + (e^2*x^3*(a + b*Log[c*x^n])^2)/3 - 2*b*d^2*n*x*(a - b*n + b*Log[c*
x^n])
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 2565, normalized size = 14.83

method	result	size
risch	Expression too large to display	2565

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)

[Out] 1/3*a^2*e^2*x^3+x*a^2*d^2+1/6*e^2*Pi^2*b^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^5-1/4*e*Pi^2*b^2*d*x^2*csgn(I*c*x^n)^6-1/4*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^4*x+a^2*d*e*x^2+1/3*(e*x+d)^3*b^2/e*ln(x^n)^2-1/4*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x+1/2*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x+1/2*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*x-Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x-1/12*e^2*Pi^2*b^2*x^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/6*e^2*Pi^2*b^2*x^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/6*e^2*Pi^2*b^2*x^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/3*e^2*Pi^2*b^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4*e*Pi^2*b^2*d*x^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*e*Pi^2*b^2*d*x^2*csgn(I*c)*csgn(I*c*x^n)^5-1/4*e*Pi^2*b^2*d*x^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/2*e*Pi^2*b^2*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5+I*Pi*b^2*d^2*n*x*csgn(I*c*x^n)^3-1/3*I*e^2*Pi*ln(c)*b^2*x^3*csgn(I*c*x^n)^3+1/9*I*e^2*Pi*b^2*n*x^3*csgn(I*c*x^n)^3-1/3*I*e^2*Pi*a*b*x^3*csgn(I*c*x^n)^3-I*Pi*ln(c)*b^2*d^2*csgn(I*c*x^n)^3*x-I*Pi*a*b*d^2*csgn(I*c*x^n)^3*x-I*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-1/3*I*e^2*Pi*ln(c)*b^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/9*I*e^2*Pi*b^2*n*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*I*e^2*Pi*a*b*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2*x+I*Pi*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x+1/3*I*e^2*Pi*ln(c)*b^2*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*e^2*Pi*ln(c)*b^2*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/9*I*e^2*Pi*b^2*n*x^3*csgn(I*c)*csgn(I*c*x^n)^2-1/9*I*e^2*Pi*b^2*n*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b^2*d^2*n*x*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b^2*d^2*n*x*csgn(I*x^n)*csgn(I*c*x^n)^2-I*e*Pi*ln(c)*b^2*d*x^2*csgn(I*c*x^n)^3+1/3*I*e^2*Pi*a*b*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/3*I*e^2*Pi*a*b*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*e*Pi*b^2*d*n*x^2*csgn(I*c*x^n)^3-I*e*Pi*a*b*d*x^2*csgn(I*c*x^n)^3+1/3*ln(c)^2*b^2*e^2*x^3+ln(c)^2*b^2*d^2*x+2*b^2*d^2*n^2*x+2/27*b^2*e^2*n^2*x^3+I*e*Pi*a*b*d*x^2*csgn(I*c)*csgn(I*c*x^n)^2+I*e*Pi*a*b*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b^2*d^2*n*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*e*Pi*ln(c)*b^2*d*x^2*csgn(I*c)*csgn(I*c*x^n)^2+I*e*Pi*ln(c)*b^2*d*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*e*Pi*b^2*d*n*x^2*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I*e*Pi*b^2*d*n*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-1/9*b*(9*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I*Pi*b*e^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2*e*x+9*I*Pi*b*d^2*csgn(I*c*x^n)^3*e*x+3*I*Pi*b*e^3*x^3*csgn(I*c*x^n)^3+9*I*Pi*b*d*e^2*x^2*csgn(I*c*x^n)^3-9*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*e*x-9*I*Pi*b*d*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+3*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e*x-3*I*Pi*b*e^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2-9*I*Pi*b*d*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-6*ln(c)*b*e^3*x^3+2*b*e^3*n*x^3-18*ln(c)*b*d*e^2*x^2-6*a*e^3*x^3+9*b*d*e^2*

```
n*x^2+6*b*d^3*n*ln(x)-18*ln(c)*b*d^2*e*x-18*a*d*e^2*x^2+18*b*d^2*e*n*x-18*a
*d^2*e*x)/e*ln(x^n)-b*n*a*d*e*x^2+1/3*b^2*d^3*n^2*ln(x)^2/e-I*e*Pi*a*b*d*x^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*e*Pi*b^2*d*n*x^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)-I*e*Pi*ln(c)*b^2*d*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-2/9*b*n*a*e^2*x^3-2*b*n*a*d^2*x+1/2*b^2*d*e*n^2*x^2-1/4*Pi^2*b^2*d^2*
csgn(I*c*x^n)^6*x-2*ln(c)*b^2*d^2*n*x+2*ln(c)*a*b*d^2*x-2/9*ln(c)*b^2*e^2*n
*x^3+ln(c)^2*b^2*d*e*x^2+2/3*ln(c)*a*b*e^2*x^3-1/12*e^2*Pi^2*b^2*x^3*csgn(I
*c*x^n)^6-1/4*e*Pi^2*b^2*d*x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/
2*e*Pi^2*b^2*d*x^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2*e*Pi^2*b^2*d
*x^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-e*Pi^2*b^2*d*x^2*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)^4+I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^2*x+I*P
i*ln(c)*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x+1/2*Pi^2*b^2*d^2*csgn(I*c)*cs
gn(I*c*x^n)^5*x-1/4*Pi^2*b^2*d^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4*x+1/2*Pi^2*b
^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^5*x-1/12*e^2*Pi^2*b^2*x^3*csgn(I*c)^2*csgn
(I*c*x^n)^4+1/6*e^2*Pi^2*b^2*x^3*csgn(I*c)*csgn(I*c*x^n)^5-1/12*e^2*Pi^2*b^
2*x^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4-ln(c)*b^2*d*e*n*x^2+2*ln(c)*a*b*d*e*x^2
```

Maxima [A]
time = 0.29, size = 235, normalized size = 1.36

$$\frac{1}{3}\,b^2x^3e^2\log\left(cx^n\right)^2+b^2dx^2e\log\left(cx^n\right)^2-\frac{2}{9}\,abnx^3e^2-abdnx^2e+\frac{2}{3}\,abx^3e^2\log\left(cx^n\right)+2\,abdx^2e\log\left(cx^n\right)+b^2d^2x\log\left(cx^n\right)^2-2\,abd^2nx+\frac{1}{3}\,a^2x^3e^2+a^2dx^2e+2\,abd^2x\log\left(cx^n\right)+2\left(n^2x-nx\log\left(cx^n\right)\right)b^2d^2+a^2d^2x+\frac{1}{2}\left(n^2x^2-2\,nx^2\log\left(cx^n\right)\right)b^2de+\frac{2}{27}\left(n^2x^3-3\,nx^3\log\left(cx^n\right)\right)b^2e^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/3*b^2*x^3*e^2*log(c*x^n)^2 + b^2*d*x^2*e*log(c*x^n)^2 - 2/9*a*b*n*x^3*e^2
 - a*b*d*n*x^2*e + 2/3*a*b*x^3*e^2*log(c*x^n) + 2*a*b*d*x^2*e*log(c*x^n) +
b^2*d^2*x*log(c*x^n)^2 - 2*a*b*d^2*n*x + 1/3*a^2*x^3*e^2 + a^2*d*x^2*e + 2*
a*b*d^2*x*log(c*x^n) + 2*(n^2*x - n*x*log(c*x^n))*b^2*d^2 + a^2*d^2*x + 1/2
*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*d*e + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n
))*b^2*e^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 331 vs. $2(159) = 318$.
time = 0.38, size = 331, normalized size = 1.91

$$\frac{1}{27}\left(2\,b^2n^2-6\,abn+9\,a^2\right)x^3e^2+\frac{1}{2}\left(b^2dn^2-2\,abdn+2\,a^2d\right)x^2e+\frac{1}{3}\left(b^2x^3e^2+3\,b^2dx^2e+3\,b^2d^2x\right)\log\left(c\right)^2+\frac{1}{3}\left(b^2n^2x^3e^2+3\,b^2dn^2x^2e+3\,b^2d^2n^2x\right)\log\left(x\right)^2+\left(2\,b^2d^2n^2-2\,abd^2n+a^2d^2\right)x-\frac{1}{9}\left(2\left(b^2n-3\,ab\right)x^3e^2+9\left(b^2dn-2\,abd\right)x^2e+18\left(b^2d^2n-abd^2\right)x\right)\log\left(c\right)-\frac{1}{9}\left(2\left(b^2n^2-3\,abn\right)x^3e^2+9\left(b^2dn^2-2\,abdn\right)x^2e+18\left(b^2d^2n^2-abd^2n\right)x-6\left(b^2nx^3e^2+3\,b^2dnx^2e+3\,b^2d^2nx\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/27*(2*b^2*n^2 - 6*a*b*n + 9*a^2)*x^3*e^2 + 1/2*(b^2*d*n^2 - 2*a*b*d*n + 2
*a^2*d)*x^2*e + 1/3*(b^2*x^3*e^2 + 3*b^2*d*x^2*e + 3*b^2*d^2*x)*log(c)^2 +
1/3*(b^2*n^2*x^3*e^2 + 3*b^2*d*n^2*x^2*e + 3*b^2*d^2*n^2*x)*log(x)^2 + (2*b
^2*d^2*n^2 - 2*a*b*d^2*n + a^2*d^2)*x - 1/9*(2*(b^2*n - 3*a*b)*x^3*e^2 + 9*
(b^2*d*n - 2*a*b*d)*x^2*e + 18*(b^2*d^2*n - a*b*d^2)*x)*log(c) - 1/9*(2*(b^
```

```
2*n^2 - 3*a*b*n)*x^3*e^2 + 9*(b^2*d*n^2 - 2*a*b*d*n)*x^2*e + 18*(b^2*d^2*n^
2 - a*b*d^2*n)*x - 6*(b^2*n*x^3*e^2 + 3*b^2*d*n*x^2*e + 3*b^2*d^2*n*x)*log(
c))*log(x)
```

Sympy [A]
time = 0.31, size = 286, normalized size = 1.65

$$a^2d^2x + a^2dex^2 + \frac{a^2e^2x^3}{3} - 2abd^2nx + 2abd^2x\log(cx^n) - abdenx^2 + 2abdex^2\log(cx^n) - \frac{2abe^2nx^3}{9} + \frac{2abe^2x^3\log(cx^n)}{3} + 2b^2d^2n^2x - 2b^2d^2nx\log(cx^n) + b^2d^2x\log(cx^n)^2 + \frac{b^2den^2x^2}{2} - b^2denx^2\log(cx^n) + b^2dex^2\log(cx^n)^2 + \frac{2b^2e^2n^2x^3}{27} - \frac{2b^2e^2nx^3\log(cx^n)}{9} + \frac{b^2e^2x^3\log(cx^n)^2}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*d**2*x + a**2*d*e*x**2 + a**2*e**2*x**3/3 - 2*a*b*d**2*n*x + 2*a*b*d**
2*x*log(c*x**n) - a*b*d*e*n*x**2 + 2*a*b*d*e*x**2*log(c*x**n) - 2*a*b*e**2*
n*x**3/9 + 2*a*b*e**2*x**3*log(c*x**n)/3 + 2*b**2*d**2*n**2*x - 2*b**2*d**2
*n*x*log(c*x**n) + b**2*d**2*x*log(c*x**n)**2 + b**2*d*e*n**2*x**2/2 - b**2
*d*e*n*x**2*log(c*x**n) + b**2*d*e*x**2*log(c*x**n)**2 + 2*b**2*e**2*n**2*x
**3/27 - 2*b**2*e**2*n*x**3*log(c*x**n)/9 + b**2*e**2*x**3*log(c*x**n)**2/3
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 385 vs. 2(159) = 318.
time = 2.84, size = 385, normalized size = 2.23

$$\frac{1}{3}b^2n^2x^3e^2\log(x)^2 + b^2dn^2x^2e\log(x)^2 - \frac{2}{9}b^2n^2x^3e^2\log(x) - b^2dn^2x^2e\log(x) + \frac{2}{3}b^2nx^3e^2\log(c)\log(x) + 2b^2dnx^2e\log(c)\log(x) + b^2d^2n^2x\log(x)^2 + \frac{2}{27}b^2n^2x^3e^2 + \frac{1}{2}b^2dn^2x^2e - \frac{2}{9}b^2nx^3e^2\log(c) - b^2dnx^2e\log(c) + \frac{1}{3}b^2x^3e^2\log(c)^2 + b^2dx^2e\log(c)^2 - 2b^2d^2n^2x\log(x) + \frac{2}{3}abnx^3e^2\log(x) + 2abdnx^2e\log(x) + 2b^2d^2nx\log(c)\log(x) + 2b^2d^2n^2x - \frac{2}{9}abnx^3e^2 - abdnx^2e - 2b^2d^2nx\log(c) + \frac{2}{3}abx^3e^2\log(c) + 2abdx^2e\log(c) + b^2d^2x\log(c)^2 + 2abd^2nx\log(x) - 2abd^2nx + \frac{1}{3}a^2x^3e^2 + a^2dx^2e + 2abd^2x\log(c) + a^2d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/3*b^2*n^2*x^3*e^2*log(x)^2 + b^2*d*n^2*x^2*e*log(x)^2 - 2/9*b^2*n^2*x^3*e
^2*log(x) - b^2*d*n^2*x^2*e*log(x) + 2/3*b^2*n*x^3*e^2*log(c)*log(x) + 2*b^
2*d*n*x^2*e*log(c)*log(x) + b^2*d^2*n^2*x*log(x)^2 + 2/27*b^2*n^2*x^3*e^2 +
 1/2*b^2*d*n^2*x^2*e - 2/9*b^2*n*x^3*e^2*log(c) - b^2*d*n*x^2*e*log(c) + 1/
3*b^2*x^3*e^2*log(c)^2 + b^2*d*x^2*e*log(c)^2 - 2*b^2*d^2*n^2*x*log(x) + 2/
3*a*b*n*x^3*e^2*log(x) + 2*a*b*d*n*x^2*e*log(x) + 2*b^2*d^2*n*x*log(c)*log(
x) + 2*b^2*d^2*n^2*x - 2/9*a*b*n*x^3*e^2 - a*b*d*n*x^2*e - 2*b^2*d^2*n*x*lo
g(c) + 2/3*a*b*x^3*e^2*log(c) + 2*a*b*d*x^2*e*log(c) + b^2*d^2*x*log(c)^2 +
 2*a*b*d^2*n*x*log(x) - 2*a*b*d^2*n*x + 1/3*a^2*x^3*e^2 + a^2*d*x^2*e + 2*a
*b*d^2*x*log(c) + a^2*d^2*x
```

Mupad [B]
time = 3.49, size = 166, normalized size = 0.96

$$\ln(c\,x^n)^2\left(b^2\,d^2\,x + b^2\,d\,e\,x^2 + \frac{b^2\,e^2\,x^3}{3}\right) + \ln(c\,x^n)\,\left(2\,b\,(a - b\,n)\,d^2\,x + b\,(2\,a - b\,n)\,d\,e\,x^2 + \frac{2\,b\,(3\,a - b\,n)\,e^2\,x^3}{9}\right) + d^2\,x\,(a^2 - 2\,a\,b\,n + 2\,b^2\,n^2) + \frac{e^2\,x^3\,(9\,a^2 - 6\,a\,b\,n + 2\,b^2\,n^2)}{27} + \frac{d\,e\,x^2\,(2\,a^2 - 2\,a\,b\,n + b^2\,n^2)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

```
[Out] log(c*x^n)^2*(b^2*d^2*x + (b^2*e^2*x^3)/3 + b^2*d*e*x^2) + log(c*x^n)*((2*b
*e^2*x^3*(3*a - b*n))/9 + 2*b*d^2*x*(a - b*n) + b*d*e*x^2*(2*a - b*n)) + d^
2*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (e^2*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/2
7 + (d*e*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/2
```

3.87 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x}\,dx$

Optimal. Leaf size=137

$$-4abdenx+4b^2den^2x+\frac{1}{4}b^2e^2n^2x^2-4b^2denx\log\left(cx^n\right)-\frac{1}{2}be^2nx^2(a+b\log\left(cx^n\right))+2dex(a+b\log\left(cx^n\right))^2+\frac{1}{2}e$$

```
[Out] -4*a*b*d*e*n*x+4*b^2*d*e*n^2*x+1/4*b^2*e^2*n^2*x^2-4*b^2*d*e*n*x*ln(c*x^n)-
1/2*b*e^2*n*x^2*(a+b*ln(c*x^n))+2*d*e*x*(a+b*ln(c*x^n))^2+1/2*e^2*x^2*(a+b*
ln(c*x^n))^2+1/3*d^2*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.16, antiderivative size = 137, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2388, 2339, 30, 2333, 2332, 2367, 2342, 2341}

$$\frac{d^2(a+b\log\left(cx^n\right))^3}{3bn}+2dex(a+b\log\left(cx^n\right))^2+\frac{1}{2}e^2x^2(a+b\log\left(cx^n\right))^2-\frac{1}{2}be^2nx^2(a+b\log\left(cx^n\right))-4abdenx-4b^2denx\log\left(cx^n\right)+4b^2den^2x+\frac{1}{4}b^2e^2n^2x^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] -4*a*b*d*e*n*x + 4*b^2*d*e*n^2*x + (b^2*e^2*n^2*x^2)/4 - 4*b^2*d*e*n*x*Log[
c*x^n] - (b*e^2*n*x^2*(a + b*Log[c*x^n]))/2 + 2*d*e*x*(a + b*Log[c*x^n])^2
+ (e^2*x^2*(a + b*Log[c*x^n])^2)/2 + (d^2*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2388

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Dist[d, Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x),
 x], x] + Dist[e, Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Rubi steps

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx = d\int \frac{(d+ex)(a+b\log(cx^n))^2}{x} dx + e\int (d+ex)(a+b\log(cx^n))^2 \, dx$$

$$= d^2 \int \frac{(a+b\log(cx^n))^2}{x} dx + e\int \left(d(a+b\log(cx^n))^2 + ex(a+b\log(cx^n)\right.$$

$$= dex(a+b\log(cx^n))^2 + (de)\int (a+b\log(cx^n))^2 \, dx + e^2 \int x(a+b\log(c$$

$$= -2abdenx + 2dex(a+b\log(cx^n))^2 + \frac{1}{2}e^2x^2(a+b\log(cx^n))^2 + \frac{d^2(a+b}{3}$$

$$= -4abdenx + 2b^2den^2x + \frac{1}{4}b^2e^2n^2x^2 - 2b^2denx\log(cx^n) - \frac{1}{2}be^2nx^2(a+$$

$$= -4abdenx + 4b^2den^2x + \frac{1}{4}b^2e^2n^2x^2 - 4b^2denx\log(cx^n) - \frac{1}{2}be^2nx^2(a+$$

Mathematica [A]
time = 0.03, size = 114, normalized size = 0.83

$$\frac{1}{4}be^2nx^2(-2a+bn-2b\log(cx^n))+2dex(a+b\log(cx^n))^2+\frac{1}{2}e^2x^2(a+b\log(cx^n))^2+\frac{d^2(a+b\log(cx^n))^3}{3bn}-4bdenx(a-bn+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (b*e^2*n*x^2*(-2*a + b*n - 2*b*Log[c*x^n]))/4 + 2*d*e*x*(a + b*Log[c*x^n])^
2 + (e^2*x^2*(a + b*Log[c*x^n])^2)/2 + (d^2*(a + b*Log[c*x^n])^3)/(3*b*n) -
 4*b*d*e*n*x*(a - b*n + b*Log[c*x^n])
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 2543, normalized size = 18.56

method	result	size
risch	Expression too large to display	2543

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*a^2*e^2*x^2-1/2*I*ln(x)^2*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*
Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+Pi^2*b^2*d*e*x*csg
n(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)^2
*csgn(I*c*x^n)^3+2*a^2*d*e*x+a^2*d^2*ln(x)+1/2*I*Pi*a*b*e^2*x^2*csgn(I*x^n)
*csgn(I*c*x^n)^2+I*ln(x)*Pi*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+(1/2*b^2*e^
2*x^2+2*b^2*d*e*x+b^2*d^2*ln(x))*ln(x^n)^2+(-b^2*d^2*n*ln(x)^2-2*I*Pi*b^2*d
*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*ln(x)*Pi*b^2*d^2*csgn(I*c*x^n)^3
-1/2*I*Pi*b^2*e^2*x^2*csgn(I*c*x^n)^3+2*I*Pi*b^2*d*e*x*csgn(I*c)*csgn(I*c*x
^n)^2-I*ln(x)*Pi*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*ln(x)*Pi*b^2
*d^2*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2
-2*I*Pi*b^2*d*e*x*csgn(I*c*x^n)^3+ln(c)*b^2*e^2*x^2-1/2*b^2*e^2*n*x^2+4*ln(
c)*b^2*d*e*x+a*b*e^2*x^2-4*b^2*d*e*n*x+4*a*b*d*e*x-1/2*I*Pi*b^2*e^2*x^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*Pi*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*
x^n)^2+1/2*I*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x)*Pi*b^2*d^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2+2*ln(x)*ln(c)*b^2*d^2+2*ln(x)*a*b*d^2)*ln(x^n)-4*
a*b*d*e*n*x+1/4*b^2*e^2*n^2*x^2+1/2*ln(c)^2*b^2*e^2*x^2+ln(x)*ln(c)^2*b^2*d
^2+1/3*b^2*d^2*n^2*ln(x)^3+2*ln(x)*ln(c)*a*b*d^2-2*Pi^2*b^2*d*e*x*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)^4+I*ln(x)*ln(c)*Pi*b^2*d^2*csgn(I*c)*csgn(I*c*x^
n)^2-1/2*I*Pi*a*b*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*a*b*d*
e*x*csgn(I*c)*csgn(I*c*x^n)^2-2*I*ln(c)*Pi*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-ln(x)^2*ln(c)*b^2*d^2*n-ln(x)^2*b*d^2*n*a+1/2*I*ln(x)^2*Pi*b^
2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*I*Pi*a*b*d*e*x*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+2*I*n*Pi*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)-1/4*I*n*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+2*I*ln(c)*Pi*b^2*d*e*x*c
```

```
sgn(I*c)*csgn(I*c*x^n)^2+2*I*ln(c)*Pi*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2
+1/4*I*n*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*I*n*Pi*b^2*d*
e*x*csgn(I*c)*csgn(I*c*x^n)^2-2*I*n*Pi*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^
2-1/2*n*ln(c)*b^2*e^2*x^2+2*ln(c)^2*b^2*d*e*x+ln(c)*a*b*e^2*x^2+2*I*n*Pi*b^
2*d*e*x*csgn(I*c*x^n)^3-1/2*I*ln(x)^2*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^
2-1/8*Pi^2*b^2*e^2*x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/4*Pi^2*b
^2*e^2*x^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/4*I*n*Pi*b^2*e^2*x^2*c
sgn(I*c*x^n)^3-1/2*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c*x^n)^3-1/8*Pi^2*b^2*e^2*
x^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/4*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n
)^5+4*b^2*d*e*n^2*x-2*I*Pi*a*b*d*e*x*csgn(I*c*x^n)^3+1/2*I*ln(c)*Pi*b^2*e^2
*x^2*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)-1/2*I*Pi*a*b*e^2*x^2*csgn(I*c*x^n)^3-I*ln(x)*ln(c)*Pi*b^
2*d^2*csgn(I*c*x^n)^3-I*ln(x)*Pi*a*b*d^2*csgn(I*c*x^n)^3+1/2*I*ln(x)^2*Pi*b
^2*d^2*n*csgn(I*c*x^n)^3+2*I*Pi*a*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-I*ln(
x)*ln(c)*Pi*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*ln(x)*Pi*a*b*d^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*ln(x)*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x
^n)^2-1/2*Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I*c*x^n)^4+Pi^2*b^2*d*e*x*csgn(I*
c)*csgn(I*c*x^n)^5-1/2*Pi^2*b^2*d*e*x*csgn(I*x^n)^2*csgn(I*c*x^n)^4+Pi^2*b^
2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^5-1/8*Pi^2*b^2*e^2*x^2*csgn(I*x^n)^2*csgn
(I*c*x^n)^4+1/4*Pi^2*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/2*Pi^2*b^2*d
*e*x*csgn(I*c*x^n)^6-1/4*ln(x)*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2
*ln(x)*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5-1/4*ln(x)*Pi^2*b^2*d^2*csgn(I
*x^n)^2*csgn(I*c*x^n)^4+1/2*ln(x)*Pi^2*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^5-
1/4*I*n*Pi*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4*Pi^2*b^2*e^2*x^2*csg
n(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/2*b*n*x^2*a*e^2-1/4*ln(x)*Pi^2*b^2*d
^2*csgn(I*c*x^n)^6+I*ln(x)*ln(c)*Pi*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8
*Pi^2*b^2*e^2*x^2*csgn(I*c*x^n)^6-1/4*ln(x)*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I
*x^n)^2*csgn(I*c*x^n)^2+1/2*ln(x)*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)*csgn
(I*c*x^n)^3+1/2*ln(x)*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-
ln(x)*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/2*Pi^2*b^2*e^2*x
^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-2*I*ln(c)*Pi*b^2*d*e*x*csgn(I*c*x^
n)^3+1/2*I*Pi*a*b*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(c)*Pi*b^2*e^2*
x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*n*ln(c)*b^2*d*e*x+4*ln(c)*a*b*d*e*x
```

Maxima [A]
time = 0.28, size = 198, normalized size = 1.45

$$\frac{1}{2}b^2x^2e^2\log(cx^n)^2+2b^2dxe\log(cx^n)^2-\frac{1}{2}abnx^2e^2-4abdnxe+abx^2e^2\log(cx^n)+4abdxe\log(cx^n)+\frac{b^2d^2\log(cx^n)^3}{3n}+\frac{1}{2}a^2x^2e^2+4(n^2x-nx\log(cx^n))b^2de+2a^2dxe+\frac{abd^2\log(cx^n)^2}{n}+a^2d^2\log(x)+\frac{1}{4}(n^2x^2-2nx^2\log(cx^n))b^2e^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] 1/2*b^2*x^2*e^2*log(c*x^n)^2 + 2*b^2*d*x*e*log(c*x^n)^2 - 1/2*a*b*n*x^2*e^2
 - 4*a*b*d*n*x*e + a*b*x^2*e^2*log(c*x^n) + 4*a*b*d*x*e*log(c*x^n) + 1/3*b^
2*d^2*log(c*x^n)^3/n + 1/2*a^2*x^2*e^2 + 4*(n^2*x - n*x*log(c*x^n))*b^2*d*e
```

```
 + 2*a^2*d*x*e + a*b*d^2*log(c*x^n)^2/n + a^2*d^2*log(x) + 1/4*(n^2*x^2 - 2
*n*x^2*log(c*x^n))*b^2*e^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 277 vs. $2(130) = 260$.
time = 0.46, size = 277, normalized size = 2.02

$$\frac{1}{3}\,b^2d^2n^2\log\left(x\right)^3+\frac{1}{4}\,\left(b^2n^2-2\,abn+2\,a^2\right)x^2e^2+2\,\left(2\,b^2dn^2-2\,abdn+a^2d\right)xe+\frac{1}{2}\,\left(b^2x^2e^2+4\,b^2dxe\right)\log\left(c\right)^2+\frac{1}{2}\,\left(b^2n^2x^2e^2+4\,b^2dn^2xe+2\,b^2d^2n\log\left(c\right)+2\,abd^2n\right)\log\left(x\right)^2-\frac{1}{2}\,\left(\left(b^2n-2\,ab\right)x^2e^2+8\,\left(b^2dn-abd\right)xe\right)\log\left(c\right)+\frac{1}{2}\,\left(2\,b^2d^2\log\left(c\right)^2+2\,a^2d^2-\left(b^2n^2-2\,abn\right)x^2e^2-8\,\left(b^2dn^2-abdn\right)xe+2\,\left(b^2nx^2e^2+4\,b^2dnxe+2\,abd^2\right)\log\left(c\right)\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

```
[Out] 1/3*b^2*d^2*n^2*log(x)^3 + 1/4*(b^2*n^2 - 2*a*b*n + 2*a^2)*x^2*e^2 + 2*(2*b
^2*d*n^2 - 2*a*b*d*n + a^2*d)*x*e + 1/2*(b^2*x^2*e^2 + 4*b^2*d*x*e)*log(c)^
2 + 1/2*(b^2*n^2*x^2*e^2 + 4*b^2*d*n^2*x*e + 2*b^2*d^2*n*log(c) + 2*a*b*d^2
*n)*log(x)^2 - 1/2*((b^2*n - 2*a*b)*x^2*e^2 + 8*(b^2*d*n - a*b*d)*x*e)*log(
c) + 1/2*(2*b^2*d^2*log(c)^2 + 2*a^2*d^2 - (b^2*n^2 - 2*a*b*n)*x^2*e^2 - 8*
(b^2*d*n^2 - a*b*d*n)*x*e + 2*(b^2*n*x^2*e^2 + 4*b^2*d*n*x*e + 2*a*b*d^2)*l
og(c))*log(x)
```

Sympy [A]
time = 0.48, size = 269, normalized size = 1.96

$$\begin{cases} \frac{a^2d^2\log\left(cx^n\right)}{n}+2a^2dex+\frac{a^2e^2x^2}{2}+\frac{abd^2\log\left(cx^n\right)^2}{n}-4abdenx+4abdex\log\left(cx^n\right)-\frac{abe^2nx^2}{2}+abe^2x^2\log\left(cx^n\right)+\frac{b^2d^2\log\left(cx^n\right)^3}{3n}+4b^2den^2x-4b^2denx\log\left(cx^n\right)+2b^2dex\log\left(cx^n\right)^2+\frac{b^2e^2n^2x^2}{4}-\frac{b^2e^2nx^2\log\left(cx^n\right)}{2}+\frac{b^2e^2x^2\log\left(cx^n\right)^2}{2} & \text{for}\: n \neq 0 \\ \left(a+b\log\left(c\right)\right)^2\left(d^2\log\left(x\right)+2dex+\frac{e^2x^2}{2}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Piecewise((a**2*d**2*log(c*x**n)/n + 2*a**2*d*e*x + a**2*e**2*x**2/2 + a*b*
d**2*log(c*x**n)**2/n - 4*a*b*d*e*n*x + 4*a*b*d*e*x*log(c*x**n) - a*b*e**2*
n*x**2/2 + a*b*e**2*x**2*log(c*x**n) + b**2*d**2*log(c*x**n)**3/(3*n) + 4*b
**2*d*e*n**2*x - 4*b**2*d*e*n*x*log(c*x**n) + 2*b**2*d*e*x*log(c*x**n)**2 +
 b**2*e**2*n**2*x**2/4 - b**2*e**2*n*x**2*log(c*x**n)/2 + b**2*e**2*x**2*lo
g(c*x**n)**2/2, Ne(n, 0)), ((a + b*log(c))**2*(d**2*log(x) + 2*d*e*x + e**2
*x**2/2), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 321 vs. $2(130) = 260$.
time = 2.24, size = 321, normalized size = 2.34

$$\frac{1}{2}\,b^2n^2x^2e^2\log\left(x\right)^2+2\,b^2dn^2xe\log\left(x\right)^2+\frac{1}{3}\,b^2d^2n^2\log\left(x\right)^3-\frac{1}{2}\,b^2n^2x^2e^2\log\left(x\right)-4\,b^2dn^2xe\log\left(x\right)+b^2nx^2e^2\log\left(c\right)\log\left(x\right)+4\,b^2dnxe\log\left(c\right)\log\left(x\right)+b^2d^2n\log\left(c\right)\log\left(x\right)^2+\frac{1}{4}\,b^2n^2x^2e^2+4\,b^2dn^2xe-\frac{1}{2}\,b^2nx^2e^2\log\left(c\right)-4\,b^2dnxe\log\left(c\right)+\frac{1}{2}\,b^2x^2e^2\log\left(c\right)^2+2\,b^2dxe\log\left(c\right)^2+abnx^2e^2\log\left(x\right)+4\,abdnxe\log\left(x\right)+b^2d^2\log\left(c\right)^2\log\left(x\right)+abd^2n\log\left(x\right)^2-\frac{1}{2}\,abnx^2e^2-4\,abdnxe+abx^2e^2\log\left(c\right)+4\,abdxe\log\left(c\right)+2\,abd^2\log\left(c\right)\log\left(x\right)+\frac{1}{2}\,a^2x^2e^2+2\,a^2dxe+a^2d^2\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

```
[Out] 1/2*b^2*n^2*x^2*e^2*log(x)^2 + 2*b^2*d*n^2*x*e*log(x)^2 + 1/3*b^2*d^2*n^2*l
og(x)^3 - 1/2*b^2*n^2*x^2*e^2*log(x) - 4*b^2*d*n^2*x*e*log(x) + b^2*n*x^2*e
^2*log(c)*log(x) + 4*b^2*d*n*x*e*log(c)*log(x) + b^2*d^2*n*log(c)*log(x)^2
+ 1/4*b^2*n^2*x^2*e^2 + 4*b^2*d*n^2*x*e - 1/2*b^2*n*x^2*e^2*log(c) - 4*b^2*
d*n*x*e*log(c) + 1/2*b^2*x^2*e^2*log(c)^2 + 2*b^2*d*x*e*log(c)^2 + a*b*n*x^
2*e^2*log(x) + 4*a*b*d*n*x*e*log(x) + b^2*d^2*log(c)^2*log(x) + a*b*d^2*n*l
og(x)^2 - 1/2*a*b*n*x^2*e^2 - 4*a*b*d*n*x*e + a*b*x^2*e^2*log(c) + 4*a*b*d*
x*e*log(c) + 2*a*b*d^2*log(c)*log(x) + 1/2*a^2*x^2*e^2 + 2*a^2*d*x*e + a^2*
d^2*log(x)
```

Mupad [B]
time = 3.78, size = 152, normalized size = 1.11

$$\ln(c\,x^n)^2\,\left(\frac{b^2\,e^2\,x^2}{2}+2\,b^2\,d\,e\,x+\frac{a\,b\,d^2}{n}\right)+\ln(c\,x^n)\,\left(\frac{b\,(2\,a-b\,n)\,e^2\,x^2}{2}+4\,b\,d\,(a-b\,n)\,e\,x\right)+a^2\,d^2\,\ln(x)+\frac{e^2\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4}+2\,d\,e\,x\,(a^2-2\,a\,b\,n+2\,b^2\,n^2)+\frac{b^2\,d^2\,\ln(c\,x^n)^3}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x,x)
```

```
[Out] log(c*x^n)^2*((b^2*e^2*x^2)/2 + 2*b^2*d*e*x + (a*b*d^2)/n) + log(c*x^n)*((b
*e^2*x^2*(2*a - b*n))/2 + 4*b*d*e*x*(a - b*n)) + a^2*d^2*log(x) + (e^2*x^2*
(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + 2*d*e*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (b^2
*d^2*log(c*x^n)^3)/(3*n)
```

3.88 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^2}\,dx$

Optimal. Leaf size=133

$$-\frac{2b^2d^2n^2}{x}-2abe^2nx+2b^2e^2n^2x-2b^2e^2nx\log\left(cx^n\right)-\frac{2bd^2n(a+b\log\left(cx^n\right))}{x}-\frac{d^2(a+b\log\left(cx^n\right))^2}{x}+e^2x(a+b$$

```
[Out] -2*b^2*d^2*n^2/x-2*a*b*e^2*n*x+2*b^2*e^2*n^2*x-2*b^2*e^2*n*x*ln(c*x^n)-2*b*
d^2*n*(a+b*ln(c*x^n))/x-d^2*(a+b*ln(c*x^n))^2/x+e^2*x*(a+b*ln(c*x^n))^2+2/3
*d*e*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.12, antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2395, 2333, 2332, 2342, 2341, 2339, 30}

$$-\frac{d^2(a+b\log\left(cx^n\right))^2}{x}-\frac{2bd^2n(a+b\log\left(cx^n\right))}{x}+\frac{2de(a+b\log\left(cx^n\right))^3}{3bn}+e^2x(a+b\log\left(cx^n\right))^2-2abe^2nx-2b^2e^2nx\log\left(cx^n\right)-\frac{2b^2d^2n^2}{x}+2b^2e^2n^2x$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^2,x]
```

```
[Out] (-2*b^2*d^2*n^2)/x - 2*a*b*e^2*n*x + 2*b^2*e^2*n^2*x - 2*b^2*e^2*n*x*Log[c*
x^n] - (2*b*d^2*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/x + e^
2*x*(a + b*Log[c*x^n])^2 + (2*d*e*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx &= \int \left(e^2(a+b\log(cx^n))^2+\frac{d^2(a+b\log(cx^n))^2}{x^2}+\frac{2de(a+b\log(cx^n))^2}{x}\right)\\
&= d^2\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx+(2de)\int \frac{(a+b\log(cx^n))^2}{x}\,dx+e^2\int (a+b\\
&= -\frac{d^2(a+b\log(cx^n))^2}{x}+e^2x(a+b\log(cx^n))^2+\frac{(2de)\text{Subst}\left(\int x^2\,dx,x,a\right.}{bn}\\
&= -\frac{2b^2d^2n^2}{x}-2abe^2nx-\frac{2bd^2n(a+b\log(cx^n))}{x}-\frac{d^2(a+b\log(cx^n))^2}{x}+\\
&= -\frac{2b^2d^2n^2}{x}-2abe^2nx+2b^2e^2n^2x-2b^2e^2nx\log(cx^n)-\frac{2bd^2n(a+b\log(}{x}
\end{aligned}$$

Mathematica [A]
time = 0.03, size = 107, normalized size = 0.80

$$-\frac{d^2(a+b\log(cx^n))^2}{x}+e^2x(a+b\log(cx^n))^2+\frac{2de(a+b\log(cx^n))^3}{3bn}-2be^2nx(a-bn+b\log(cx^n))-\frac{2bd^2n(a+bn+b\log(cx^n))}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^2,x]
```

```
[Out] -((d^2*(a + b*Log[c*x^n])^2)/x) + e^2*x*(a + b*Log[c*x^n])^2 + (2*d*e*(a +
b*Log[c*x^n])^3)/(3*b*n) - 2*b*e^2*n*x*(a - b*n + b*Log[c*x^n]) - (2*b*d^2*
n*(a + b*n + b*Log[c*x^n]))/x
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.28, size = 2521, normalized size = 18.95

method	result	size
risch	Expression too large to display	2521

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b^2*(-2*d*e*x*ln(x)-e^2*x^2+d^2)/x*ln(x^n)^2-b*(I*Pi*b*e^2*x^2*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+2*I*ln(x)*Pi*b*d*e*csgn(I*c*x^n)^3*x-I*Pi*b*d^2*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^
2+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d^2*csgn(I*c*x^n)^3-I*Pi*b*e^
2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+2*I*ln(x)*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)*x-2*I*ln(x)*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x+I*Pi*b*e^2*x
^2*csgn(I*c*x^n)^3-2*I*ln(x)*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x+I*Pi*b*d^
2*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b*d*e*n*ln(x)^2*x-4*ln(x)*ln(c)*b*d*e*x-2*l
n(c)*b*e^2*x^2+2*b*e^2*n*x^2-4*ln(x)*a*d*e*x-2*a*e^2*x^2+2*d^2*b*ln(c)+2*b*
d^2*n+2*a*d^2)/x*ln(x^n)+1/12*(12*a^2*e^2*x^2-24*I*ln(x)*Pi*a*b*d*e*csgn(I*
c*x^n)^3*x+24*ln(x)*ln(c)^2*b^2*d*e*x+8*e*d*b^2*n^2*ln(x)^3*x-24*b^2*d^2*ln
(c)*n+12*I*Pi*b^2*d*e*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*ln(x)^2*x-24*I*
ln(x)*Pi*a*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-24*I*ln(x)*Pi*ln(c)*
b^2*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-12*I*Pi*b^2*d^2*n*csgn(I*x^n)
*csgn(I*c*x^n)^2+12*I*n*Pi*b^2*e^2*x^2*csgn(I*c*x^n)^3-12*d^2*b^2*ln(c)^2-1
2*a^2*d^2+3*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-6*Pi^2*b
^2*d^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-6*Pi^2*b^2*d^2*csgn(I*c)*csg
n(I*x^n)^2*csgn(I*c*x^n)^3+12*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)^4-24*d^2*a*b*ln(c)-12*I*Pi*b^2*d*e*n*csgn(I*c)*csgn(I*c*x^n)^2*ln(x)^2*
x-12*I*Pi*b^2*d*e*n*csgn(I*x^n)*csgn(I*c*x^n)^2*ln(x)^2*x-24*b^2*d^2*n^2+3*
Pi^2*b^2*d^2*csgn(I*c*x^n)^6+24*b^2*e^2*n^2*x^2-24*b*d^2*n*a+12*ln(c)^2*b^2
*e^2*x^2-6*Pi^2*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^5+3*Pi^2*b^2*d^2*csgn(I*c
)^2*csgn(I*c*x^n)^4-6*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5+3*Pi^2*b^2*d^2
*csgn(I*x^n)^2*csgn(I*c*x^n)^4-12*I*Pi*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-
6*ln(x)*Pi^2*b^2*d*e*csgn(I*c*x^n)^6*x-12*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+12*I*Pi*b^2*d*e*n*csgn(I*c*x^n)^3*ln(x)^2*x-24*I*
ln(x)*Pi*ln(c)*b^2*d*e*csgn(I*c*x^n)^3*x+24*ln(x)*e*d*a^2*x-6*ln(x)*Pi^2*b^
2*d*e*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x+12*ln(x)*Pi^2*b^2*d*e*csg
n(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x+12*ln(x)*Pi^2*b^2*d*e*csgn(I*c)*csgn
(I*x^n)^2*csgn(I*c*x^n)^3*x-24*ln(x)*Pi^2*b^2*d*e*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4*x-12*I*Pi*a*b*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-24*n
*ln(c)*b^2*e^2*x^2+24*ln(c)*a*b*e^2*x^2-12*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c*
```

```
x^n)^3-12*I*Pi*a*b*e^2*x^2*csgn(I*c*x^n)^3-12*I*Pi*ln(c)*b^2*d^2*csgn(I*x^n
)*csgn(I*c*x^n)^2-12*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-3*Pi^2*b^2*e^2*
x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+6*Pi^2*b^2*e^2*x^2*csgn(I*c)^
2*csgn(I*x^n)*csgn(I*c*x^n)^3-3*Pi^2*b^2*e^2*x^2*csgn(I*c)^2*csgn(I*c*x^n)^
4+6*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^5-6*ln(x)*Pi^2*b^2*d*e*csgn(I*
c)^2*csgn(I*c*x^n)^4*x+12*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+12*I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12*I*n*Pi*b^2*e
^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*c*x
^n)^2-12*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*ln(c)*b^2*d^2*csg
n(I*c*x^n)^3+12*I*Pi*a*b*d^2*csgn(I*c*x^n)^3+12*I*Pi*b^2*d^2*n*csgn(I*c*x^n
)^3+24*I*ln(x)*Pi*ln(c)*b^2*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x+12*I*Pi*a*b*d^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+12*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c)*cs
gn(I*c*x^n)^2+24*I*ln(x)*Pi*a*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x+24*I*ln(x)*
Pi*a*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x+12*I*n*Pi*b^2*e^2*x^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)-3*Pi^2*b^2*e^2*x^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+6*
Pi^2*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5+24*I*ln(x)*Pi*ln(c)*b^2*d*e*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x+6*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I*x^n)^2*csgn
(I*c*x^n)^3-24*b*n*x^2*a*e^2-3*Pi^2*b^2*e^2*x^2*csgn(I*c*x^n)^6+12*I*Pi*a*b
*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+12*ln(x)*Pi^2*b^2*d*e*csgn(I*c)*csgn(I
*c*x^n)^5*x-6*ln(x)*Pi^2*b^2*d*e*csgn(I*x^n)^2*csgn(I*c*x^n)^4*x+12*ln(x)*P
i^2*b^2*d*e*csgn(I*x^n)*csgn(I*c*x^n)^5*x-12*I*n*Pi*b^2*e^2*x^2*csgn(I*x^n)
*csgn(I*c*x^n)^2+12*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+12*I
*Pi*a*b*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-12*Pi^2*b^2*e^2*x^2*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)^4+48*ln(x)*ln(c)*a*b*d*e*x-24*a*b*d*e*n*ln(x)^2*x-24
*ln(c)*b^2*d*e*n*ln(x)^2*x)/x
```

Maxima [A]
time = 0.32, size = 198, normalized size = 1.49

$$b^2xe^2\log\left(cx^n\right)^2+\frac{2\,b^2de\log\left(cx^n\right)^3}{3\,n}-2\,b^2d^2\left(\frac{n^2}{x}+\frac{n\log\left(cx^n\right)}{x}\right)-2\,abnxe^2+2\,abxe^2\log\left(cx^n\right)-\frac{b^2d^2\log\left(cx^n\right)^2}{x}+\frac{2\,abde\log\left(cx^n\right)^2}{n}+2\,a^2de\log\left(x\right)-\frac{2\,abd^2n}{x}+2\,\left(n^2x-nx\log\left(cx^n\right)\right)b^2e^2+a^2xe^2-\frac{2\,abd^2\log\left(cx^n\right)}{x}-\frac{a^2d^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

```
[Out] b^2*x*e^2*log(c*x^n)^2 + 2/3*b^2*d*e*log(c*x^n)^3/n - 2*b^2*d^2*(n^2/x + n*
log(c*x^n)/x) - 2*a*b*n*x*e^2 + 2*a*b*x*e^2*log(c*x^n) - b^2*d^2*log(c*x^n)
^2/x + 2*a*b*d*e*log(c*x^n)^2/n + 2*a^2*d*e*log(x) - 2*a*b*d^2*n/x + 2*(n^2
*x - n*x*log(c*x^n))*b^2*e^2 + a^2*x*e^2 - 2*a*b*d^2*log(c*x^n)/x - a^2*d^2
/x
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 278 vs. $2(128) = 256$.
time = 0.36, size = 278, normalized size = 2.09

$$\frac{2\,b^2dn^2xe\log\left(x\right)^3-6\,b^2d^2n^2-6\,abd^2n-3\,a^2d^2+3\,\left(2\,b^2n^2-2\,abn+a^2\right)x^2e^2+3\,\left(b^2x^2e^2-b^2d^2\right)\log\left(c\right)^2+3\,\left(b^2n^2x^2e^2+2\,b^2dnxe\log\left(c\right)-b^2d^2n^2+2\,abdnxe\right)\log\left(x\right)^2-6\,\left(b^2d^2n+abd^2+\left(b^2n-ab\right)x^2e^2\right)\log\left(c\right)+6\,\left(b^2dxe\log\left(c\right)^2-b^2d^2n^2-abd^2n+a^2dxe-\left(b^2n^2-abn\right)x^2e^2+\left(b^2nx^2e^2-b^2d^2n+2\,abdxe\right)\log\left(c\right)\right)\log\left(x\right)}{3\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

```
[Out] 1/3*(2*b^2*d*n^2*x*e*log(x)^3 - 6*b^2*d^2*n^2 - 6*a*b*d^2*n - 3*a^2*d^2 + 3
*(2*b^2*n^2 - 2*a*b*n + a^2)*x^2*e^2 + 3*(b^2*x^2*e^2 - b^2*d^2)*log(c)^2 +
 3*(b^2*n^2*x^2*e^2 + 2*b^2*d*n*x*e*log(c) - b^2*d^2*n^2 + 2*a*b*d*n*x*e)*l
og(x)^2 - 6*(b^2*d^2*n + a*b*d^2 + (b^2*n - a*b)*x^2*e^2)*log(c) + 6*(b^2*d
*x*e*log(c)^2 - b^2*d^2*n^2 - a*b*d^2*n + a^2*d*x*e - (b^2*n^2 - a*b*n)*x^2
*e^2 + (b^2*n*x^2*e^2 - b^2*d^2*n + 2*a*b*d*x*e)*log(c))*log(x))/x
```

Sympy [**A**]
time = 0.56, size = 255, normalized size = 1.92

$$\begin{cases} -\frac{a^{2}d^{2}}{x} + \frac{2a^{2}de\log\left(cx^{n}\right)}{n} + a^{2}e^{2}x - \frac{2abd^{2}n}{x} - \frac{2abd^{2}\log\left(cx^{n}\right)}{x} + \frac{2abde\log\left(cx^{n}\right)^{2}}{n} - 2abe^{2}nx + 2abe^{2}x\log\left(cx^{n}\right) - \frac{2b^{2}d^{2}n^{2}}{x} - \frac{2b^{2}d^{2}n\log\left(cx^{n}\right)}{x} - \frac{b^{2}d^{2}\log\left(cx^{n}\right)^{2}}{x} + \frac{2b^{2}de\log\left(cx^{n}\right)^{3}}{3n} + 2b^{2}e^{2}n^{2}x - 2b^{2}e^{2}nx\log\left(cx^{n}\right) + b^{2}e^{2}x\log\left(cx^{n}\right)^{2} & \text{for}\: n \neq 0 \\ \left(a + b\log\left(c\right)\right)^{2}\left(-\frac{d^{2}}{x} + 2de\log\left(x\right) + e^{2}x\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**2,x)
```

```
[Out] Piecewise((-a**2*d**2/x + 2*a**2*d*e*log(c*x**n)/n + a**2*e**2*x - 2*a*b*d*
*2*n/x - 2*a*b*d**2*log(c*x**n)/x + 2*a*b*d*e*log(c*x**n)**2/n - 2*a*b*e**2
*n*x + 2*a*b*e**2*x*log(c*x**n) - 2*b**2*d**2*n**2/x - 2*b**2*d**2*n*log(c*
x**n)/x - b**2*d**2*log(c*x**n)**2/x + 2*b**2*d*e*log(c*x**n)**3/(3*n) + 2*
b**2*e**2*n**2*x - 2*b**2*e**2*n*x*log(c*x**n) + b**2*e**2*x*log(c*x**n)**2
, Ne(n, 0)), ((a + b*log(c))**2*(-d**2/x + 2*d*e*log(x) + e**2*x), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 329 vs. 2(128) = 256.
time = 2.99, size = 329, normalized size = 2.47

$$\frac{2\,b^{2}dn^{2}xe\log\left(x\right)^{3} + 3\,b^{2}n^{2}x^{2}e^{2}\log\left(x\right)^{2} + 6\,b^{2}dnxe\log\left(c\right)\log\left(x\right)^{2} - 6\,b^{2}n^{2}x^{2}e^{2}\log\left(x\right) + 6\,b^{2}nx^{2}e^{2}\log\left(c\right)\log\left(x\right) + 6\,b^{2}dxe\log\left(c\right)^{2}\log\left(x\right) - 3\,b^{2}d^{2}n^{2}\log\left(x\right)^{2} + 6\,abdnxe\log\left(x\right)^{2} + 6\,b^{2}n^{2}x^{2}e^{2} - 6\,b^{2}nx^{2}e^{2}\log\left(c\right) + 3\,b^{2}x^{2}e^{2}\log\left(c\right)^{2} - 6\,b^{2}d^{2}n^{2}\log\left(x\right) + 6\,abnx^{2}e^{2}\log\left(x\right) - 6\,b^{2}d^{2}n\log\left(c\right)\log\left(x\right) + 12\,abdxe\log\left(c\right)\log\left(x\right) - 6\,b^{2}d^{2}n^{2} - 6\,abnx^{2}e^{2} - 6\,b^{2}d^{2}n\log\left(c\right) + 6\,abx^{2}e^{2}\log\left(c\right) - 3\,b^{2}d^{2}\log\left(c\right)^{2} - 6\,abd^{2}n\log\left(x\right) + 6\,a^{2}dxe\log\left(x\right) - 6\,abd^{2}n + 3\,a^{2}x^{2}e^{2} - 6\,abd^{2}\log\left(c\right) - 3\,a^{2}d^{2}}{3\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

```
[Out] 1/3*(2*b^2*d*n^2*x*e*log(x)^3 + 3*b^2*n^2*x^2*e^2*log(x)^2 + 6*b^2*d*n*x*e*
log(c)*log(x)^2 - 6*b^2*n^2*x^2*e^2*log(x) + 6*b^2*n*x^2*e^2*log(c)*log(x)
+ 6*b^2*d*x*e*log(c)^2*log(x) - 3*b^2*d^2*n^2*log(x)^2 + 6*a*b*d*n*x*e*log(
x)^2 + 6*b^2*n^2*x^2*e^2 - 6*b^2*n*x^2*e^2*log(c) + 3*b^2*x^2*e^2*log(c)^2
- 6*b^2*d^2*n^2*log(x) + 6*a*b*n*x^2*e^2*log(x) - 6*b^2*d^2*n*log(c)*log(x)
 + 12*a*b*d*x*e*log(c)*log(x) - 6*b^2*d^2*n^2 - 6*a*b*n*x^2*e^2 - 6*b^2*d^2
*n*log(c) + 6*a*b*x^2*e^2*log(c) - 3*b^2*d^2*log(c)^2 - 6*a*b*d^2*n*log(x)
+ 6*a^2*d*x*e*log(x) - 6*a*b*d^2*n + 3*a^2*x^2*e^2 - 6*a*b*d^2*log(c) - 3*a
^2*d^2)/x
```

Mupad [**B**]
time = 3.74, size = 228, normalized size = 1.71

$$\ln\left(x\right)\,\left(2\,d\,e\,a^2+4\,d\,e\,a\,b\,n+4\,d\,e\,b^2\,n^2\right)-\frac{a^2\,d^2+2\,a\,b\,d^2\,n+2\,b^2\,d^2\,n^2}{x}-\ln\left(c\,x^n\right)\,\left(\frac{2\,b\,\left(a+b\,n\right)\,d^2+4\,b\,\left(a+b\,n\right)\,d\,e\,x+2\,b\,\left(a-b\,n\right)\,e^2\,x^2}{x}-4\,b\,e^2\,x\,\left(a-b\,n\right)\right)+{\ln\left(c\,x^n\right)}^2\,\left(2\,b^2\,e^2\,x-\frac{b^2\,d^2+2\,b^2\,d\,e\,x+b^2\,e^2\,x^2}{x}+\frac{2\,b\,d\,e\,\left(a+b\,n\right)}{n}\right)+e^2\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right)+\frac{2\,b^2\,d\,e\,{\ln\left(c\,x^n\right)}^3}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^2,x)
```

```
[Out] log(x)*(2*a^2*d*e + 4*b^2*d*e*n^2 + 4*a*b*d*e*n) - (a^2*d^2 + 2*b^2*d^2*n^2
 + 2*a*b*d^2*n)/x - log(c*x^n)*((2*b*d^2*(a + b*n) + 2*b*e^2*x^2*(a - b*n)
+ 4*b*d*e*x*(a + b*n))/x - 4*b*e^2*x*(a - b*n)) + log(c*x^n)^2*(2*b^2*e^2*x
 - (b^2*d^2 + b^2*e^2*x^2 + 2*b^2*d*e*x)/x + (2*b*d*e*(a + b*n))/n) + e^2*x
*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (2*b^2*d*e*log(c*x^n)^3)/(3*n)
```

3.89 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^3}\,dx$

Optimal. Leaf size=137

$$-\frac{b^2d^2n^2}{4x^2}-\frac{4b^2den^2}{x}-\frac{bd^2n(a+b\log(cx^n))}{2x^2}-\frac{4bden(a+b\log(cx^n))}{x}-\frac{d^2(a+b\log(cx^n))^2}{2x^2}-\frac{2de(a+b\log(cx^n))^2}{x}$$

```
[Out] -1/4*b^2*d^2*n^2/x^2-4*b^2*d*e*n^2/x-1/2*b*d^2*n*(a+b*ln(c*x^n))/x^2-4*b*d*
e*n*(a+b*ln(c*x^n))/x-1/2*d^2*(a+b*ln(c*x^n))^2/x^2-2*d*e*(a+b*ln(c*x^n))^2
/x+1/3*e^2*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.13, antiderivative size = 137, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2395, 2342, 2341, 2339, 30}

$$-\frac{d^2(a+b\log(cx^n))^2}{2x^2}-\frac{bd^2n(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))^2}{x}-\frac{4bden(a+b\log(cx^n))}{x}+\frac{e^2(a+b\log(cx^n))^3}{3bn}-\frac{b^2d^2n^2}{4x^2}-\frac{4b^2den^2}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^3,x]
```

```
[Out] -1/4*(b^2*d^2*n^2)/x^2 - (4*b^2*d*e*n^2)/x - (b*d^2*n*(a + b*Log[c*x^n]))/(
2*x^2) - (4*b*d*e*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/(2*x
^2) - (2*d*e*(a + b*Log[c*x^n])^2)/x + (e^2*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
```

```
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = \int \left(\frac{d^2(a+b\log\left(cx^n\right))^2}{x^3}+\frac{2de(a+b\log\left(cx^n\right))^2}{x^2}+\frac{e^2(a+b\log\left(cx^n\right))^2}{x}\right)$$

$$= d^2\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx+(2de)\int \frac{\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx+e^2\int \frac{(a+b}{}$$

$$= -\frac{d^2(a+b\log\left(cx^n\right))^2}{2x^2}-\frac{2de(a+b\log\left(cx^n\right))^2}{x}+\frac{e^2\mathrm{Subst}\left(\int x^2\,dx,x,a+\right.}{bn}$$

$$= -\frac{b^2d^2n^2}{4x^2}-\frac{4b^2den^2}{x}-\frac{bd^2n(a+b\log\left(cx^n\right))}{2x^2}-\frac{4bden(a+b\log\left(cx^n\right))}{x}-$$

Mathematica [A]
time = 0.06, size = 117, normalized size = 0.85

$$-\frac{d^2(a+b\log\left(cx^n\right))^2}{2x^2}-\frac{2de(a+b\log\left(cx^n\right))^2}{x}+\frac{e^2(a+b\log\left(cx^n\right))^3}{3bn}-\frac{4bden(a+bn+b\log\left(cx^n\right))}{x}-\frac{bd^2n(2a+bn+2b\log\left(cx^n\right))}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^3,x]
```

```
[Out] -1/2*(d^2*(a + b*Log[c*x^n])^2)/x^2 - (2*d*e*(a + b*Log[c*x^n])^2)/x + (e^2
*(a + b*Log[c*x^n])^3)/(3*b*n) - (4*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x - (
b*d^2*n*(2*a + b*n + 2*b*Log[c*x^n]))/(4*x^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.30, size = 2520, normalized size = 18.39

method	result	size
risch	Expression too large to display	2520

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b^2*(-2*e^2*ln(x)*x^2+4*d*e*x+d^2)/x^2*ln(x^n)^2-1/2*b*(2*I*ln(x)*Pi*b
*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^2-2*I*ln(x)*Pi*b*e^2*csgn(I*c)*c
sgn(I*c*x^n)^2*x^2-2*I*ln(x)*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^2-4*I*P
i*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d^2*csgn(I*x^n)*csgn(I
*c*x^n)^2-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*d^2*csgn(I*
c*x^n)^3+4*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2+2*I*ln(x)*Pi*b*e^2*csgn(I
*c*x^n)^3*x^2+4*I*Pi*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*d^2*csgn(I*
c)*csgn(I*c*x^n)^2-4*I*Pi*b*d*e*x*csgn(I*c*x^n)^3+2*e^2*b*n*ln(x)^2*x^2-4*l
n(x)*ln(c)*b*e^2*x^2-4*ln(x)*a*e^2*x^2+8*ln(c)*b*d*e*x+8*b*d*e*n*x+2*d^2*b*
ln(c)+8*a*d*e*x+b*d^2*n+2*a*d^2)/x^2*ln(x^n)+1/24*(12*Pi^2*b^2*d*e*x*csgn(I
*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-24*Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I*x^
n)*csgn(I*c*x^n)^3-24*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^
3-48*a^2*d*e*x-12*b^2*d^2*ln(c)*n-12*d^2*b^2*ln(c)^2-12*a^2*d^2+24*ln(x)*e^
2*a^2*x^2+3*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-6*Pi^2*b
^2*d^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-6*Pi^2*b^2*d^2*csgn(I*c)*csg
n(I*x^n)^2*csgn(I*c*x^n)^3+12*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)^4-24*d^2*a*b*ln(c)-6*b^2*d^2*n^2+3*Pi^2*b^2*d^2*csgn(I*c*x^n)^6+24*I*ln
(x)*Pi*a*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^2-96*a*b*d*e*n*x+12*ln(x)*Pi^2
*b^2*e^2*csgn(I*c)*csgn(I*c*x^n)^5*x^2-6*ln(x)*Pi^2*b^2*e^2*csgn(I*x^n)^2*c
sgn(I*c*x^n)^4*x^2+12*ln(x)*Pi^2*b^2*e^2*csgn(I*x^n)*csgn(I*c*x^n)^5*x^2-12
*b*d^2*n*a+6*I*Pi*b^2*d^2*n*csgn(I*c*x^n)^3-6*ln(x)*Pi^2*b^2*e^2*csgn(I*c*x
^n)^6*x^2+48*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-6*Pi^2*b^
2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^5+3*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^
4-6*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5+3*Pi^2*b^2*d^2*csgn(I*x^n)^2*csg
n(I*c*x^n)^4-12*I*Pi*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*b^2*e^2*n*
csgn(I*x^n)*csgn(I*c*x^n)^2*ln(x)^2*x^2-48*I*ln(c)*Pi*b^2*d*e*x*csgn(I*c)*c
sgn(I*c*x^n)^2-48*I*Pi*a*b*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2-48*I*Pi*a*b*d*e*
x*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*ln(x)*Pi*ln(c)*b^2*e^2*csgn(I*c)*csgn(I*
c*x^n)^2*x^2+24*I*ln(x)*Pi*ln(c)*b^2*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^2+24
*I*ln(x)*Pi*a*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*x^2-48*ln(c)^2*b^2*d*e*x-12*I
*Pi*b^2*e^2*n*csgn(I*c)*csgn(I*c*x^n)^2*ln(x)^2*x^2-12*I*Pi*ln(c)*b^2*d^2*c
sgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+24*ln(
x)*ln(c)^2*b^2*e^2*x^2+8*e^2*b^2*n^2*ln(x)^3*x^2-96*b^2*d*e*n^2*x+12*I*Pi*l
n(c)*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-6*ln(x)*Pi^2*b^2*e^2*csgn(
I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x^2+12*ln(x)*Pi^2*b^2*e^2*csgn(I*c)^2*
csgn(I*x^n)*csgn(I*c*x^n)^3*x^2+12*ln(x)*Pi^2*b^2*e^2*csgn(I*c)*csgn(I*x^n)
^2*csgn(I*c*x^n)^3*x^2-24*ln(x)*Pi^2*b^2*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)^4*x^2+6*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+48*I*Pi*ln
(c)*b^2*d*e*x*csgn(I*c*x^n)^3+48*I*Pi*a*b*d*e*x*csgn(I*c*x^n)^3-24*I*ln(x)*
Pi*ln(c)*b^2*e^2*csgn(I*c*x^n)^3*x^2+12*I*Pi*b^2*e^2*n*csgn(I*c*x^n)^3*ln(x
```

```
)^2*x^2+48*I*n*Pi*b^2*d*e*x*csgn(I*c*x^n)^3-12*I*Pi*ln(c)*b^2*d^2*csgn(I*c)
*csgn(I*c*x^n)^2+12*I*Pi*ln(c)*b^2*d^2*csgn(I*c*x^n)^3+12*I*Pi*a*b*d^2*csgn
(I*c*x^n)^3+12*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+48*ln(x)*ln
(c)*a*b*e^2*x^2-24*ln(c)*b^2*e^2*n*ln(x)^2*x^2-24*a*b*e^2*n*ln(x)^2*x^2-24*
I*ln(x)*Pi*a*b*e^2*csgn(I*c*x^n)^3*x^2+12*Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I
*c*x^n)^4-24*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*c*x^n)^5+12*Pi^2*b^2*d*e*x*csg
n(I*x^n)^2*csgn(I*c*x^n)^4-24*Pi^2*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^5+12
*Pi^2*b^2*d*e*x*csgn(I*c*x^n)^6+48*I*Pi*b^2*d*e*n*x*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+48*I*Pi*ln(c)*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+48
*I*Pi*a*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-24*I*ln(x)*Pi*ln(c)*b^2
*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^2-24*I*ln(x)*Pi*a*b*e^2*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*x^2+12*I*Pi*b^2*e^2*n*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)*ln(x)^2*x^2-96*n*ln(c)*b^2*d*e*x-96*ln(c)*a*b*d*e*x-6*I*Pi*b^2*d
^2*n*csgn(I*c)*csgn(I*c*x^n)^2-6*I*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2
-6*ln(x)*Pi^2*b^2*e^2*csgn(I*c)^2*csgn(I*c*x^n)^4*x^2-48*I*Pi*b^2*d*e*n*x*c
sgn(I*c)*csgn(I*c*x^n)^2-48*I*Pi*b^2*d*e*n*x*csgn(I*x^n)*csgn(I*c*x^n)^2-48
*I*Pi*ln(c)*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2)/x^2
```

Maxima [**A**]
time = 0.28, size = 212, normalized size = 1.55

$$-\frac{1}{4}\,b^2d^2\left(\frac{n^2}{x^2}+\frac{2\,n\log\left(cx^n\right)}{x^2}\right)-4\,b^2d\left(\frac{n^2}{x}+\frac{n\log\left(cx^n\right)}{x}\right)e-\frac{2\,b^2de\log\left(cx^n\right)^2}{x}+\frac{b^2e^2\log\left(cx^n\right)^3}{3\,n}-\frac{4\,abdne}{x}-\frac{4\,abde\log\left(cx^n\right)}{x}-\frac{b^2d^2\log\left(cx^n\right)^2}{2\,x^2}+\frac{abe^2\log\left(cx^n\right)^2}{n}+a^2e^2\log\left(x\right)-\frac{abd^2n}{2\,x^2}-\frac{2\,a^2de}{x}-\frac{abd^2\log\left(cx^n\right)}{x^2}-\frac{a^2d^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

```
[Out] -1/4*b^2*d^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 4*b^2*d*(n^2/x + n*log(c*x^n)
/x)*e - 2*b^2*d*e*log(c*x^n)^2/x + 1/3*b^2*e^2*log(c*x^n)^3/n - 4*a*b*d*n*e
/x - 4*a*b*d*e*log(c*x^n)/x - 1/2*b^2*d^2*log(c*x^n)^2/x^2 + a*b*e^2*log(c*
x^n)^2/n + a^2*e^2*log(x) - 1/2*a*b*d^2*n/x^2 - 2*a^2*d*e/x - a*b*d^2*log(c
*x^n)/x^2 - 1/2*a^2*d^2/x^2
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 286 vs. $2(131) = 262$.
time = 0.36, size = 286, normalized size = 2.09

$$\frac{4\,b^2n^2x^2e^2\log\left(x\right)^3-3\,b^2d^2n^2-6\,abd^2n-6\,a^2d^2-24\,(2\,b^2dn^2+2\,abdn+a^2d)xe-6\left(4\,b^2dxe+b^2d^2\right)\log\left(c\right)^2-6\left(4\,b^2dn^2xe-2\,b^2nx^2e^2\log\left(c\right)+b^2d^2n^2-2\,abnx^2e^2\right)\log\left(x\right)^2-6\left(b^2d^2n+2\,abd^2+8\,(b^2dn+abd)xe\right)\log\left(c\right)+6\left(2\,b^2x^2e^2\log\left(c\right)^2-b^2d^2n^2-2\,abd^2n+2\,a^2x^2e^2-8\,(b^2dn^2+abdn)xe-2\left(4\,b^2dnxe+b^2d^2n-2\,abx^2e^2\right)\log\left(c\right)\right)\log\left(x\right)}{12\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

```
[Out] 1/12*(4*b^2*n^2*x^2*e^2*log(x)^3 - 3*b^2*d^2*n^2 - 6*a*b*d^2*n - 6*a^2*d^2
- 24*(2*b^2*d*n^2 + 2*a*b*d*n + a^2*d)*x*e - 6*(4*b^2*d*x*e + b^2*d^2)*log(
c)^2 - 6*(4*b^2*d*n^2*x*e - 2*b^2*n*x^2*e^2*log(c) + b^2*d^2*n^2 - 2*a*b*n*
x^2*e^2)*log(x)^2 - 6*(b^2*d^2*n + 2*a*b*d^2 + 8*(b^2*d*n + a*b*d)*x*e)*log
(c) + 6*(2*b^2*x^2*e^2*log(c)^2 - b^2*d^2*n^2 - 2*a*b*d^2*n + 2*a^2*x^2*e^2
```

```
 - 8*(b^2*d*n^2 + a*b*d*n)*x*e - 2*(4*b^2*d*n*x*e + b^2*d^2*n - 2*a*b*x^2*e
^2)*log(c))*log(x))/x^2
```

Sympy [A]
time = 4.31, size = 258, normalized size = 1.88

$$-\frac{a^2d^2}{2x^2}-\frac{2a^2de}{x}+a^2e^2\log(x)-\frac{abd^2n}{2x^2}-\frac{abd^2\log(cx^n)}{x^2}-\frac{4abden}{x}-\frac{4abde\log(cx^n)}{x}-2abe^2\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)-\frac{b^2d^2n^2}{4x^2}-\frac{b^2d^2n\log(cx^n)}{2x^2}-\frac{b^2d^2\log(cx^n)^2}{2x^2}-\frac{4b^2den^2}{x}-\frac{4b^2den\log(cx^n)}{x}-\frac{2b^2de\log(cx^n)^2}{x}-b^2e^2\left(\begin{cases}-\log(c)^2\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^3}{3n} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**3,x)
```

```
[Out] -a**2*d**2/(2*x**2) - 2*a**2*d*e/x + a**2*e**2*log(x) - a*b*d**2*n/(2*x**2)
 - a*b*d**2*log(c*x**n)/x**2 - 4*a*b*d*e*n/x - 4*a*b*d*e*log(c*x**n)/x - 2*
a*b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True
)) - b**2*d**2*n**2/(4*x**2) - b**2*d**2*n*log(c*x**n)/(2*x**2) - b**2*d**2
*log(c*x**n)**2/(2*x**2) - 4*b**2*d*e*n**2/x - 4*b**2*d*e*n*log(c*x**n)/x -
 2*b**2*d*e*log(c*x**n)**2/x - b**2*e**2*Piecewise((-log(c)**2*log(x), Eq(n
, 0)), (-log(c*x**n)**3/(3*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 325 vs. 2(131) = 262.
time = 2.86, size = 325, normalized size = 2.37

$$\frac{4b^2n^2x^2e^2\log(x)^3-24b^2dn^2xe\log(x)^2+12b^2nx^2e^2\log(c)\log(x)^2-48b^2dn^2xe\log(x)-48b^2dnxe\log(c)\log(x)+12b^2x^2e^2\log(c)^2\log(x)-6b^2d^2n^2\log(x)^2+12abnx^2e^2\log(x)^2-48b^2dn^2xe-48b^2dnxe\log(c)-24b^2dxe\log(c)^2-6b^2d^2n^2\log(x)-48abdnxe\log(x)-12b^2d^2n\log(c)\log(x)+24abx^2e^2\log(c)\log(x)-3b^2d^2n^2-48abdnxe-6b^2d^2n\log(c)-48abdxe\log(c)-6b^2d^2\log(c)^2-12abd^2n\log(x)+12a^2x^2e^2\log(x)-6abd^2n-24a^2dxe-12abd^2\log(c)-6a^2d^2}{12x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

```
[Out] 1/12*(4*b^2*n^2*x^2*e^2*log(x)^3 - 24*b^2*d*n^2*x*e*log(x)^2 + 12*b^2*n*x^2
*e^2*log(c)*log(x)^2 - 48*b^2*d*n^2*x*e*log(x) - 48*b^2*d*n*x*e*log(c)*log(
x) + 12*b^2*x^2*e^2*log(c)^2*log(x) - 6*b^2*d^2*n^2*log(x)^2 + 12*a*b*n*x^2
*e^2*log(x)^2 - 48*b^2*d*n^2*x*e - 48*b^2*d*n*x*e*log(c) - 24*b^2*d*x*e*log
(c)^2 - 6*b^2*d^2*n^2*log(x) - 48*a*b*d*n*x*e*log(x) - 12*b^2*d^2*n*log(c)*
log(x) + 24*a*b*x^2*e^2*log(c)*log(x) - 3*b^2*d^2*n^2 - 48*a*b*d*n*x*e - 6*
b^2*d^2*n*log(c) - 48*a*b*d*x*e*log(c) - 6*b^2*d^2*log(c)^2 - 12*a*b*d^2*n*
log(x) + 12*a^2*x^2*e^2*log(x) - 6*a*b*d^2*n - 24*a^2*d*x*e - 12*a*b*d^2*lo
g(c) - 6*a^2*d^2)/x^2
```

Mupad [B]
time = 3.77, size = 221, normalized size = 1.61

$$\ln(x)\left(a^2e^2+3abe^2n+\frac{9b^2e^2n^2}{2}\right)-\frac{x\left(4dea^2+8deabn+8deb^2n^2\right)+a^2d^2+\frac{b^2d^2n^2}{2}+abd^2n}{2x^2}-\ln(cx^n)^2\left(\frac{\frac{b^2d^2}{2}+2b^2dex+\frac{3b^2e^2x^2}{2}}{x^2}-\frac{be^2(2a+3bn)}{2n}\right)-\frac{\ln(cx^n)\left(\frac{b(2a+bn)d^2}{2}+4b(a+bn)dex+\frac{3b(2a+3bn)e^2x^2}{2}\right)}{x^2}+\frac{b^2e^2\ln(cx^n)^3}{3n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^3,x)
```

```
[Out] log(x)*(a^2*e^2 + (9*b^2*e^2*n^2)/2 + 3*a*b*e^2*n) - (x*(4*a^2*d*e + 8*b^2*
d*e*n^2 + 8*a*b*d*e*n) + a^2*d^2 + (b^2*d^2*n^2)/2 + a*b*d^2*n)/(2*x^2) - l
og(c*x^n)^2*(((b^2*d^2)/2 + (3*b^2*e^2*x^2)/2 + 2*b^2*d*e*x)/x^2 - (b*e^2*(
2*a + 3*b*n))/(2*n)) - (log(c*x^n)*((b*d^2*(2*a + b*n))/2 + (3*b*e^2*x^2*(2
*a + 3*b*n))/2 + 4*b*d*e*x*(a + b*n)))/x^2 + (b^2*e^2*log(c*x^n)^3)/(3*n)
```

3.90 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^4}\,dx$

Optimal. Leaf size=168

$$-\frac{2b^2d^2n^2}{27x^3}-\frac{b^2den^2}{2x^2}-\frac{2b^2e^2n^2}{x}-\frac{2bd^2n(a+b\log(cx^n))}{9x^3}-\frac{bden(a+b\log(cx^n))}{x^2}-\frac{2be^2n(a+b\log(cx^n))}{x}-\frac{d^2(a$$

```
[Out] -2/27*b^2*d^2*n^2/x^3-1/2*b^2*d*e*n^2/x^2-2*b^2*e^2*n^2/x-2/9*b*d^2*n*(a+b*
ln(c*x^n))/x^3-b*d*e*n*(a+b*ln(c*x^n))/x^2-2*b*e^2*n*(a+b*ln(c*x^n))/x-1/3*
d^2*(a+b*ln(c*x^n))^2/x^3-d*e*(a+b*ln(c*x^n))^2/x^2-e^2*(a+b*ln(c*x^n))^2/x
```

Rubi [A]
time = 0.14, antiderivative size = 168, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2395, 2342, 2341}

$$-\frac{d^2(a+b\log(cx^n))^2}{3x^3}-\frac{2bd^2n(a+b\log(cx^n))}{9x^3}-\frac{de(a+b\log(cx^n))^2}{x^2}-\frac{bden(a+b\log(cx^n))}{x^2}-\frac{e^2(a+b\log(cx^n))^2}{x}-\frac{2be^2n(a+b\log(cx^n))}{x}-\frac{2b^2d^2n^2}{27x^3}-\frac{b^2den^2}{2x^2}-\frac{2b^2e^2n^2}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^4,x]
```

```
[Out] (-2*b^2*d^2*n^2)/(27*x^3) - (b^2*d*e*n^2)/(2*x^2) - (2*b^2*e^2*n^2)/x - (2*
b*d^2*n*(a + b*Log[c*x^n]))/(9*x^3) - (b*d*e*n*(a + b*Log[c*x^n]))/x^2 - (2
*b*e^2*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/(3*x^3) - (d*e*
(a + b*Log[c*x^n])^2)/x^2 - (e^2*(a + b*Log[c*x^n])^2)/x
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$
\begin{aligned}
\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx &= \int \left(\frac{d^2(a+b\log(cx^n))^2}{x^4}+\frac{2de(a+b\log(cx^n))^2}{x^3}+\frac{e^2(a+b\log(cx^n))^2}{x^2}\right) \\
&= d^2\int \frac{(a+b\log(cx^n))^2}{x^4}\,dx+(2de)\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx+e^2\int \frac{(a+b \\
&= -\frac{d^2(a+b\log(cx^n))^2}{3x^3}-\frac{de(a+b\log(cx^n))^2}{x^2}-\frac{e^2(a+b\log(cx^n))^2}{x}+\frac{1}{3}(\\
&= -\frac{2b^2d^2n^2}{27x^3}-\frac{b^2den^2}{2x^2}-\frac{2b^2e^2n^2}{x}-\frac{2bd^2n(a+b\log(cx^n))}{9x^3}-\frac{bden(a+b\,\mathrm{lo}}{x^2}
\end{aligned}
$$

Mathematica [A]
time = 0.07, size = 131, normalized size = 0.78

$$
-\frac{18d^2(a+b\log(cx^n))^2+54dex(a+b\log(cx^n))^2+54e^2x^2(a+b\log(cx^n))^2+108be^2nx^2(a+bn+b\log(cx^n))+27bdenx(2a+bn+2b\log(cx^n))+4bd^2n(3a+bn+3b\log(cx^n))}{54x^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^4,x]
```

```
[Out] -1/54*(18*d^2*(a + b*Log[c*x^n])^2 + 54*d*e*x*(a + b*Log[c*x^n])^2 + 54*e^2
*x^2*(a + b*Log[c*x^n])^2 + 108*b*e^2*n*x^2*(a + b*n + b*Log[c*x^n]) + 27*b
*d*e*n*x*(2*a + b*n + 2*b*Log[c*x^n]) + 4*b*d^2*n*(3*a + b*n + 3*b*Log[c*x^
n]))/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.20, size = 2473, normalized size = 14.72

method	result	size
risch	Expression too large to display	2473

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b^2*(3*e^2*x^2+3*d*e*x+d^2)/x^3*ln(x^n)^2-1/9*(9*I*Pi*b^2*d*e*x*csgn(I
*c)*csgn(I*c*x^n)^2-9*I*Pi*b^2*d*e*x*csgn(I*c*x^n)^3+3*I*Pi*b^2*d^2*csgn(I*
x^n)*csgn(I*c*x^n)^2-9*I*Pi*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1
8*ln(c)*b^2*e^2*x^2+18*b^2*e^2*n*x^2+18*a*b*e^2*x^2+9*I*Pi*b^2*e^2*x^2*csgn
(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b
^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi*b^2*e^2*x^2*csgn(I*x^n)*c
sgn(I*c*x^n)^2+18*ln(c)*b^2*d*e*x+9*b^2*d*e*n*x+18*a*b*d*e*x-9*I*Pi*b^2*e^2
*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I*Pi*b^2*d^2*csgn(I*c*x^n)^3-9*I
```

*Pi*b^2*e^2*x^2*csgn(I*c*x^n)^3+3*I*Pi*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^2+6*
b^2*d^2*ln(c)+2*b^2*d^2*n+6*a*d^2*b)/x^3*ln(x^n)-1/108*(108*a^2*e^2*x^2-27*
Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+54*Pi^2*b^2*d*e*x*
csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+54*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*
x^n)^2*csgn(I*c*x^n)^3+108*I*Pi*a*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-108
*I*Pi*a*b*d*e*x*csgn(I*c*x^n)^3-54*I*n*Pi*b^2*d*e*x*csgn(I*c*x^n)^3+108*I*l
n(c)*Pi*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+108*a^2*d*e*x+24*b^2*d^2*ln
(c)*n+108*I*Pi*a*b*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-108*I*n*Pi*b^2*e^2*x^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+36*d^2*b^2*ln(c)^2+36*a^2*d^2+108*I*Pi
*a*b*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+108*I*ln(c)*Pi*b^2*d*e*x*csgn(I*c)*c
sgn(I*c*x^n)^2-108*I*Pi*a*b*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-108
*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+54*I*Pi*b^2*d*e
*n*x*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)-36*I*Pi*ln(c)*b^2*d^2*csgn(I*c*x^n)^3-36*I*Pi*a*b*d^2*csgn(I*c*x^
n)^3-9*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+18*Pi^2*b^2*d
^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+18*Pi^2*b^2*d^2*csgn(I*c)*csgn(I
*x^n)^2*csgn(I*c*x^n)^3-36*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
^4-12*I*Pi*b^2*d^2*n*csgn(I*c*x^n)^3+108*I*n*Pi*b^2*e^2*x^2*csgn(I*x^n)*csg
n(I*c*x^n)^2+108*I*Pi*ln(c)*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+72*d^2*a*
b*ln(c)+8*b^2*d^2*n^2-36*I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)-36*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-108*I*Pi*ln(c)*b^2
*d*e*x*csgn(I*c*x^n)^3+108*I*n*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-9*P
i^2*b^2*d^2*csgn(I*c*x^n)^6+54*I*Pi*b^2*d*e*n*x*csgn(I*x^n)*csgn(I*c*x^n)^2
+108*I*Pi*ln(c)*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+108*I*Pi*a*b*d*e*x*cs
gn(I*c)*csgn(I*c*x^n)^2+108*a*b*d*e*n*x+216*b^2*e^2*n^2*x^2+24*b*d^2*n*a+10
8*ln(c)^2*b^2*e^2*x^2-108*I*Pi*a*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)-108*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+18*Pi^2*b^2*d^2*
csgn(I*x^n)*csgn(I*c*x^n)^5-9*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^4+18*P
i^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5-9*Pi^2*b^2*d^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^4+12*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*b^2*d^2*n*csgn(
I*x^n)*csgn(I*c*x^n)^2+216*n*ln(c)*b^2*e^2*x^2+108*ln(c)^2*b^2*d*e*x+216*ln
(c)*a*b*e^2*x^2-27*Pi^2*b^2*e^2*x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)
^2+54*Pi^2*b^2*e^2*x^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-27*Pi^2*b^2*
e^2*x^2*csgn(I*c)^2*csgn(I*c*x^n)^4+54*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*
x^n)^5+54*b^2*d*e*n^2*x-54*I*Pi*b^2*d*e*n*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)-108*I*Pi*ln(c)*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-27*Pi^2*b
^2*d*e*x*csgn(I*c)^2*csgn(I*c*x^n)^4+54*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*c*x
^n)^5-27*Pi^2*b^2*d*e*x*csgn(I*x^n)^2*csgn(I*c*x^n)^4+54*Pi^2*b^2*d*e*x*csg
n(I*x^n)*csgn(I*c*x^n)^5-27*Pi^2*b^2*e^2*x^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+
54*Pi^2*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5-27*Pi^2*b^2*d*e*x*csgn(I*c*
x^n)^6-108*I*n*Pi*b^2*e^2*x^2*csgn(I*c*x^n)^3+36*I*Pi*ln(c)*b^2*d^2*csgn(I*
x^n)*csgn(I*c*x^n)^2+36*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*a*b*
d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-108*I*Pi*ln(c)*b^2*e^2*x^2*csgn(I*c*x^n)^3-
108*I*Pi*a*b*e^2*x^2*csgn(I*c*x^n)^3+36*I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I
*c*x^n)^2+54*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+216*b

```
*n*x^2*a*e^2-27*Pi^2*b^2*e^2*x^2*csgn(I*c*x^n)^6-108*Pi^2*b^2*e^2*x^2*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+108*n*ln(c)*b^2*d*e*x+216*ln(c)*a*b*d*e*x)
/x^3
```

Maxima [A]
time = 0.27, size = 250, normalized size = 1.49

$$-\frac{2}{27}\,b^2d^2\left(\frac{n^2}{x^3}+\frac{3\,n\log\left(cx^n\right)}{x^3}\right)-\frac{1}{2}\,b^2d\left(\frac{n^2}{x^2}+\frac{2\,n\log\left(cx^n\right)}{x^2}\right)e-2\,b^2\left(\frac{n^2}{x}+\frac{n\log\left(cx^n\right)}{x}\right)e^2-\frac{b^2e^2\log\left(cx^n\right)^2}{x}-\frac{b^2de\log\left(cx^n\right)^2}{x^2}-\frac{2\,abne^2}{x}-\frac{abdne}{x^2}-\frac{2\,abe^2\log\left(cx^n\right)}{x}-\frac{2\,abde\log\left(cx^n\right)}{x^2}-\frac{b^2d^2\log\left(cx^n\right)^2}{3\,x^3}-\frac{2\,abd^2n}{9\,x^3}-\frac{a^2e^2}{x}-\frac{a^2de}{x^2}-\frac{2\,abd^2\log\left(cx^n\right)}{3\,x^3}-\frac{a^2d^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="maxima")
```

```
[Out] -2/27*b^2*d^2*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - 1/2*b^2*d*(n^2/x^2 + 2*n*log
(c*x^n)/x^2)*e - 2*b^2*(n^2/x + n*log(c*x^n)/x)*e^2 - b^2*e^2*log(c*x^n)^2/
x - b^2*d*e*log(c*x^n)^2/x^2 - 2*a*b*n*e^2/x - a*b*d*n*e/x^2 - 2*a*b*e^2*lo
g(c*x^n)/x - 2*a*b*d*e*log(c*x^n)/x^2 - 1/3*b^2*d^2*log(c*x^n)^2/x^3 - 2/9*
a*b*d^2*n/x^3 - a^2*e^2/x - a^2*d*e/x^2 - 2/3*a*b*d^2*log(c*x^n)/x^3 - 1/3*
a^2*d^2/x^3
```

Fricas [A]
time = 0.35, size = 309, normalized size = 1.84

$$-\frac{4\,b^2d^2n^2+12\,abd^2n+18\,a^2d^2+54\,\left(2\,b^2n^2+2\,abn+a^2\right)x^2e^2+27\,\left(b^2dn^2+2\,abdn+2\,a^2d\right)xe+18\,\left(3\,b^2x^2e^2+3\,b^2dxe+b^2d^2\right)\log\left(c\right)^2+18\,\left(3\,b^2n^2x^2e^2+3\,b^2dn^2xe+b^2d^2n^2\right)\log\left(x\right)^2+6\,\left(2\,b^2d^2n+6\,abd^2+18\,\left(b^2n+ab\right)x^2e^2+9\,\left(b^2dn+2\,abd\right)xe\right)\log\left(c\right)+6\,\left(2\,b^2d^2n^2+6\,abd^2n+18\,\left(b^2n^2+abn\right)x^2e^2+9\,\left(b^2dn^2+2\,abdn\right)xe+6\,\left(3\,b^2nx^2e^2+3\,b^2dnxe+b^2d^2n\right)\log\left(c\right)\right)\log\left(x\right)}{54\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="fricas")
```

```
[Out] -1/54*(4*b^2*d^2*n^2 + 12*a*b*d^2*n + 18*a^2*d^2 + 54*(2*b^2*n^2 + 2*a*b*n
+ a^2)*x^2*e^2 + 27*(b^2*d*n^2 + 2*a*b*d*n + 2*a^2*d)*x*e + 18*(3*b^2*x^2*e
^2 + 3*b^2*d*x*e + b^2*d^2)*log(c)^2 + 18*(3*b^2*n^2*x^2*e^2 + 3*b^2*d*n^2*
x*e + b^2*d^2*n^2)*log(x)^2 + 6*(2*b^2*d^2*n + 6*a*b*d^2 + 18*(b^2*n + a*b)
*x^2*e^2 + 9*(b^2*d*n + 2*a*b*d)*x*e)*log(c) + 6*(2*b^2*d^2*n^2 + 6*a*b*d^2
*n + 18*(b^2*n^2 + a*b*n)*x^2*e^2 + 9*(b^2*d*n^2 + 2*a*b*d*n)*x*e + 6*(3*b^
2*n*x^2*e^2 + 3*b^2*d*n*x*e + b^2*d^2*n)*log(c))*log(x))/x^3
```

Sympy [A]
time = 0.41, size = 287, normalized size = 1.71

$$-\frac{a^2d^2}{3x^3}-\frac{a^2de}{x^2}-\frac{a^2e^2}{x}-\frac{2abd^2n}{9x^3}-\frac{2abd^2\log\left(cx^n\right)}{3x^3}-\frac{abden}{x^2}-\frac{2abde\log\left(cx^n\right)}{x^2}-\frac{2abe^2n}{x}-\frac{2abe^2\log\left(cx^n\right)}{x}-\frac{2b^2d^2n^2}{27x^3}-\frac{2b^2d^2n\log\left(cx^n\right)}{9x^3}-\frac{b^2d^2\log\left(cx^n\right)^2}{3x^3}-\frac{b^2den^2}{2x^2}-\frac{b^2den\log\left(cx^n\right)}{x^2}-\frac{b^2de\log\left(cx^n\right)^2}{x^2}-\frac{2b^2e^2n^2}{x}-\frac{2b^2e^2n\log\left(cx^n\right)}{x}-\frac{b^2e^2\log\left(cx^n\right)^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**4,x)
```

```
[Out] -a**2*d**2/(3*x**3) - a**2*d*e/x**2 - a**2*e**2/x - 2*a*b*d**2*n/(9*x**3) -
 2*a*b*d**2*log(c*x**n)/(3*x**3) - a*b*d*e*n/x**2 - 2*a*b*d*e*log(c*x**n)/x
**2 - 2*a*b*e**2*n/x - 2*a*b*e**2*log(c*x**n)/x - 2*b**2*d**2*n**2/(27*x**3
```

```
) - 2*b**2*d**2*n*log(c*x**n)/(9*x**3) - b**2*d**2*log(c*x**n)**2/(3*x**3)
- b**2*d*e*n**2/(2*x**2) - b**2*d*e*n*log(c*x**n)/x**2 - b**2*d*e*log(c*x**
n)**2/x**2 - 2*b**2*e**2*n**2/x - 2*b**2*e**2*n*log(c*x**n)/x - b**2*e**2*l
og(c*x**n)**2/x
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 366 vs. 2(160) = 320.
time = 2.62, size = 366, normalized size = 2.18

$$-\frac{54 b^2n^2x^2e^2\log(x)^2 + 54 b^2dn^2xe\log(x)^2 + 108 b^2n^2x^2e^2\log(x) + 54 b^2dn^2xe\log(x) + 108 b^2nx^2e^2\log(c)\log(x) + 108 b^2dnxe\log(c)\log(x) + 18 b^2d^2n^2\log(x)^2 + 108 b^2n^2x^2e^2 + 27 b^2dn^2xe + 108 b^2nx^2e^2\log(c) + 54 b^2dnxe\log(c) + 54 b^2x^2e^2\log(c)^2 + 54 b^2dxe\log(c)^2 + 12 b^2d^2n^2\log(x) + 108 abnx^2e^2\log(x) + 108 abdnxe\log(x) + 36 b^2d^2n\log(c)\log(x) + 4 b^2d^2n^2 + 108 abnx^2e^2 + 54 abdnxe + 12 b^2d^2n\log(c) + 108 abx^2e^2\log(c) + 108 abdxe\log(c) + 18 b^2d^2\log(c)^2 + 36 abd^2n\log(x) + 12 abd^2n + 54 a^2x^2e^2 + 54 a^2dxe + 36 abd^2\log(c) + 18 a^2d^2}{54 x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="giac")
```

```
[Out] -1/54*(54*b^2*n^2*x^2*e^2*log(x)^2 + 54*b^2*d*n^2*x*e*log(x)^2 + 108*b^2*n^
2*x^2*e^2*log(x) + 54*b^2*d*n^2*x*e*log(x) + 108*b^2*n*x^2*e^2*log(c)*log(x
) + 108*b^2*d*n*x*e*log(c)*log(x) + 18*b^2*d^2*n^2*log(x)^2 + 108*b^2*n^2*x
^2*e^2 + 27*b^2*d*n^2*x*e + 108*b^2*n*x^2*e^2*log(c) + 54*b^2*d*n*x*e*log(c
) + 54*b^2*x^2*e^2*log(c)^2 + 54*b^2*d*x*e*log(c)^2 + 12*b^2*d^2*n^2*log(x)
 + 108*a*b*n*x^2*e^2*log(x) + 108*a*b*d*n*x*e*log(x) + 36*b^2*d^2*n*log(c)*
log(x) + 4*b^2*d^2*n^2 + 108*a*b*n*x^2*e^2 + 54*a*b*d*n*x*e + 12*b^2*d^2*n*
log(c) + 108*a*b*x^2*e^2*log(c) + 108*a*b*d*x*e*log(c) + 18*b^2*d^2*log(c)^
2 + 36*a*b*d^2*n*log(x) + 12*a*b*d^2*n + 54*a^2*x^2*e^2 + 54*a^2*d*x*e + 36
*a*b*d^2*log(c) + 18*a^2*d^2)/x^3
```

Mupad [B]
time = 3.90, size = 184, normalized size = 1.10

$$-\frac{x\left(9\,d\,e\,a^2+9\,d\,e\,a\,b\,n+\frac{9\,d\,e\,b^2\,n^2}{2}\right)+x^2\,\left(9\,a^2\,e^2+18\,a\,b\,e^2\,n+18\,b^2\,e^2\,n^2\right)+3\,a^2\,d^2+\frac{2\,b^2\,d^2\,n^2}{3}+2\,a\,b\,d^2\,n}{9\,x^3}-\frac{\ln\left(c\,x^n\right)^2\,\left(\frac{b^2\,d^2}{3}+b^2\,d\,e\,x+b^2\,e^2\,x^2\right)}{x^3}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{2\,b\,\left(3\,a+b\,n\right)\,d^2}{3}+3\,b\,\left(2\,a+b\,n\right)\,d\,e\,x+6\,b\,\left(a+b\,n\right)\,e^2\,x^2\right)}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^4,x)
```

```
[Out] - (x*(9*a^2*d*e + (9*b^2*d*e*n^2)/2 + 9*a*b*d*e*n) + x^2*(9*a^2*e^2 + 18*b^
2*e^2*n^2 + 18*a*b*e^2*n) + 3*a^2*d^2 + (2*b^2*d^2*n^2)/3 + 2*a*b*d^2*n)/(9
*x^3) - (log(c*x^n)^2*((b^2*d^2)/3 + b^2*e^2*x^2 + b^2*d*e*x))/x^3 - (log(c
*x^n)*((2*b*d^2*(3*a + b*n))/3 + 6*b*e^2*x^2*(a + b*n) + 3*b*d*e*x*(2*a + b
*n)))/(3*x^3)
```

3.91 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^5}\,dx$

Optimal. Leaf size=178

$$-\frac{b^2d^2n^2}{32x^4}-\frac{4b^2den^2}{27x^3}-\frac{b^2e^2n^2}{4x^2}-\frac{bd^2n(a+b\log(cx^n))}{8x^4}-\frac{4bden(a+b\log(cx^n))}{9x^3}-\frac{be^2n(a+b\log(cx^n))}{2x^2}-\frac{d^2(a+b}{4}$$

```
[Out] -1/32*b^2*d^2*n^2/x^4-4/27*b^2*d*e*n^2/x^3-1/4*b^2*e^2*n^2/x^2-1/8*b*d^2*n*
(a+b*ln(c*x^n))/x^4-4/9*b*d*e*n*(a+b*ln(c*x^n))/x^3-1/2*b*e^2*n*(a+b*ln(c*x
^n))/x^2-1/4*d^2*(a+b*ln(c*x^n))^2/x^4-2/3*d*e*(a+b*ln(c*x^n))^2/x^3-1/2*e^
2*(a+b*ln(c*x^n))^2/x^2
```

Rubi [A]
time = 0.14, antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2395, 2342, 2341}

$$-\frac{d^2(a+b\log(cx^n))^2}{4x^4}-\frac{bd^2n(a+b\log(cx^n))}{8x^4}-\frac{2de(a+b\log(cx^n))^2}{3x^3}-\frac{4bden(a+b\log(cx^n))}{9x^3}-\frac{e^2(a+b\log(cx^n))^2}{2x^2}-\frac{be^2n(a+b\log(cx^n))}{2x^2}-\frac{b^2d^2n^2}{32x^4}-\frac{4b^2den^2}{27x^3}-\frac{b^2e^2n^2}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^5,x]
```

```
[Out] -1/32*(b^2*d^2*n^2)/x^4 - (4*b^2*d*e*n^2)/(27*x^3) - (b^2*e^2*n^2)/(4*x^2)
- (b*d^2*n*(a + b*Log[c*x^n]))/(8*x^4) - (4*b*d*e*n*(a + b*Log[c*x^n]))/(9*
x^3) - (b*e^2*n*(a + b*Log[c*x^n]))/(2*x^2) - (d^2*(a + b*Log[c*x^n])^2)/(4
*x^4) - (2*d*e*(a + b*Log[c*x^n])^2)/(3*x^3) - (e^2*(a + b*Log[c*x^n])^2)/(
2*x^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
```

```
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^5}\,dx = \int \left(\frac{d^2(a+b\log(cx^n))^2}{x^5} + \frac{2de(a+b\log(cx^n))^2}{x^4} + \frac{e^2(a+b\log(cx^n))^2}{x^3}\right.$$

$$= d^2\int \frac{(a+b\log(cx^n))^2}{x^5}\,dx + (2de)\int \frac{(a+b\log(cx^n))^2}{x^4}\,dx + e^2\int \frac{(a+}{}$$

$$= -\frac{d^2(a+b\log(cx^n))^2}{4x^4} - \frac{2de(a+b\log(cx^n))^2}{3x^3} - \frac{e^2(a+b\log(cx^n))^2}{2x^2} +$$

$$= -\frac{b^2d^2n^2}{32x^4} - \frac{4b^2den^2}{27x^3} - \frac{b^2e^2n^2}{4x^2} - \frac{bd^2n(a+b\log(cx^n))}{8x^4} - \frac{4bden(a+b\log}{9x^3}$$

Mathematica [A]
time = 0.07, size = 134, normalized size = 0.75

$$-\frac{216d^2(a+b\log(cx^n))^2+576dex(a+b\log(cx^n))^2+432e^2x^2(a+b\log(cx^n))^2+216be^2nx^2(2a+bn+2b\log(cx^n))+128bdenx(3a+bn+3b\log(cx^n))+27bd^2n(4a+bn+4b\log(cx^n))}{864x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^5,x]
```

```
[Out] -1/864*(216*d^2*(a + b*Log[c*x^n])^2 + 576*d*e*x*(a + b*Log[c*x^n])^2 + 432
*e^2*x^2*(a + b*Log[c*x^n])^2 + 216*b*e^2*n*x^2*(2*a + b*n + 2*b*Log[c*x^n]
) + 128*b*d*e*n*x*(3*a + b*n + 3*b*Log[c*x^n]) + 27*b*d^2*n*(4*a + b*n + 4*
b*Log[c*x^n]))/x^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.21, size = 2475, normalized size = 13.90

method	result	size
risch	Expression too large to display	2475

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/12*b^2*(6*e^2*x^2+8*d*e*x+3*d^2)/x^4*ln(x^n)^2-1/72*(-18*I*Pi*b^2*d^2*cs
gn(I*c*x^n)^3-48*I*Pi*b^2*d*e*x*csgn(I*c*x^n)^3-18*I*Pi*b^2*d^2*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)-36*I*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+72*ln(c)*b^2*e^2*x^2+36*b^2*e^2*n*x^2+72*a*b*e^2*x^2+48*I*Pi*b^2*d*e*
x*csgn(I*c)*csgn(I*c*x^n)^2-48*I*Pi*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*
```

c*x^n)+18*I*Pi*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^2-36*I*Pi*b^2*e^2*x^2*csgn(I
*c*x^n)^3+96*ln(c)*b^2*d*e*x+32*b^2*d*e*n*x+96*a*b*d*e*x+18*I*Pi*b^2*d^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2+48*I*Pi*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2+36*
I*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*b^2*e^2*x^2*csgn(I*x^n)*
csgn(I*c*x^n)^2+36*b^2*d^2*ln(c)+9*b^2*d^2*n+36*a*d^2*b)/x^4*ln(x^n)-1/864*
(432*a^2*e^2*x^2+576*I*Pi*a*b*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2+576*I*Pi*a*b*
d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-144*Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I*x^n
)^2*csgn(I*c*x^n)^2+288*Pi^2*b^2*d*e*x*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n
)^3+288*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-576*I*Pi*ln(
c)*b^2*d*e*x*csgn(I*c*x^n)^3+216*I*n*Pi*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)
^2+216*I*n*Pi*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-54*I*Pi*b^2*d^2*n*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-216*I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-216*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+576*a
^2*d*e*x+108*b^2*d^2*ln(c)*n+432*I*Pi*ln(c)*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*
x^n)^2+432*I*Pi*a*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-576*I*Pi*a*b*d*e*x*
csgn(I*c*x^n)^3-192*I*n*Pi*b^2*d*e*x*csgn(I*c*x^n)^3+432*I*ln(c)*Pi*b^2*e^2
*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+216*d^2*b^2*ln(c)^2+216*a^2*d^2+432*I*Pi*a
*b*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2-54*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n
)^2*csgn(I*c*x^n)^2+108*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^
3+108*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-216*Pi^2*b^2*d^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+432*d^2*a*b*ln(c)-216*I*Pi*ln(c)*b^2
*d^2*csgn(I*c*x^n)^3+27*b^2*d^2*n^2-54*Pi^2*b^2*d^2*csgn(I*c*x^n)^6+216*I*P
i*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+384*a*b*d*e*n*x+216*b^2*e^2*n^2*x^2+1
08*b*d^2*n*a+432*ln(c)^2*b^2*e^2*x^2-216*I*Pi*a*b*d^2*csgn(I*c*x^n)^3-54*I*
Pi*b^2*d^2*n*csgn(I*c*x^n)^3-576*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)^4+108*Pi^2*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^5-54*Pi^2*b^2*d^2*csg
n(I*c)^2*csgn(I*c*x^n)^4+108*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5-54*Pi^2
*b^2*d^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-432*I*ln(c)*Pi*b^2*e^2*x^2*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+192*I*Pi*b^2*d*e*n*x*csgn(I*c)*csgn(I*c*x^n)^2+1
92*I*Pi*b^2*d*e*n*x*csgn(I*x^n)*csgn(I*c*x^n)^2+216*I*Pi*ln(c)*b^2*d^2*csgn
(I*x^n)*csgn(I*c*x^n)^2+216*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-432*I*Pi
*a*b*e^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-216*I*n*Pi*b^2*e^2*x^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+576*I*ln(c)*Pi*b^2*d*e*x*csgn(I*c)*csgn(I*
c*x^n)^2+432*n*ln(c)*b^2*e^2*x^2+576*ln(c)^2*b^2*d*e*x+864*ln(c)*a*b*e^2*x^
2-108*Pi^2*b^2*e^2*x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+216*Pi^2*b
^2*e^2*x^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-108*Pi^2*b^2*e^2*x^2*csg
n(I*c)^2*csgn(I*c*x^n)^4+216*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I*c*x^n)^5+128
*b^2*d*e*n^2*x-576*I*Pi*ln(c)*b^2*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-576*I*Pi*a*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+216*I*Pi*ln(c)*b^2*
d^2*csgn(I*c)*csgn(I*c*x^n)^2+54*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^2+5
4*I*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-216*I*n*Pi*b^2*e^2*x^2*csgn(I*
c*x^n)^3+576*I*Pi*ln(c)*b^2*d*e*x*csgn(I*x^n)*csgn(I*c*x^n)^2-144*Pi^2*b^2*
d*e*x*csgn(I*c)^2*csgn(I*c*x^n)^4+288*Pi^2*b^2*d*e*x*csgn(I*c)*csgn(I*c*x^n
)^5-144*Pi^2*b^2*d*e*x*csgn(I*x^n)^2*csgn(I*c*x^n)^4+288*Pi^2*b^2*d*e*x*csg
n(I*x^n)*csgn(I*c*x^n)^5-108*Pi^2*b^2*e^2*x^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4

```
+216*Pi^2*b^2*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5-144*Pi^2*b^2*d*e*x*csgn(I
*c*x^n)^6-192*I*Pi*b^2*d*e*n*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+216*Pi^2
*b^2*e^2*x^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+432*b*n*x^2*a*e^2-432*
I*Pi*ln(c)*b^2*e^2*x^2*csgn(I*c*x^n)^3-432*I*Pi*a*b*e^2*x^2*csgn(I*c*x^n)^3
-108*Pi^2*b^2*e^2*x^2*csgn(I*c*x^n)^6-432*Pi^2*b^2*e^2*x^2*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)^4+384*n*ln(c)*b^2*d*e*x+1152*ln(c)*a*b*d*e*x)/x^4
```

Maxima [A]
time = 0.30, size = 251, normalized size = 1.41

$$-\frac{1}{32}b^2d^2\left(\frac{n^2}{x^4}+\frac{4n\log(cx^n)}{x^4}\right)-\frac{4}{27}b^2d\left(\frac{n^2}{x^3}+\frac{3n\log(cx^n)}{x^3}\right)e-\frac{1}{4}b^2\left(\frac{n^2}{x^2}+\frac{2n\log(cx^n)}{x^2}\right)e^2-\frac{b^2e^2\log(cx^n)^2}{2x^2}-\frac{2b^2de\log(cx^n)^2}{3x^3}-\frac{abne^2}{2x^2}-\frac{4abdne}{9x^3}-\frac{abe^2\log(cx^n)}{x^2}-\frac{4abde\log(cx^n)}{3x^3}-\frac{b^2d^2\log(cx^n)^2}{4x^4}-\frac{abd^2n}{8x^4}-\frac{a^2e^2}{2x^2}-\frac{2a^2de}{3x^3}-\frac{abd^2\log(cx^n)}{2x^4}-\frac{a^2d^2}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="maxima")
```

```
[Out] -1/32*b^2*d^2*(n^2/x^4 + 4*n*log(c*x^n)/x^4) - 4/27*b^2*d*(n^2/x^3 + 3*n*lo
g(c*x^n)/x^3)*e - 1/4*b^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2)*e^2 - 1/2*b^2*e^2*
log(c*x^n)^2/x^2 - 2/3*b^2*d*e*log(c*x^n)^2/x^3 - 1/2*a*b*n*e^2/x^2 - 4/9*a
*b*d*n*e/x^3 - a*b*e^2*log(c*x^n)/x^2 - 4/3*a*b*d*e*log(c*x^n)/x^3 - 1/4*b^
2*d^2*log(c*x^n)^2/x^4 - 1/8*a*b*d^2*n/x^4 - 1/2*a^2*e^2/x^2 - 2/3*a^2*d*e/
x^3 - 1/2*a*b*d^2*log(c*x^n)/x^4 - 1/4*a^2*d^2/x^4
```

Fricas [A]
time = 0.35, size = 316, normalized size = 1.78

$$-\frac{27b^2d^2n^2+108abd^2n+216a^2d^2+216(b^2n^2+2abn+2a^2)x^2e^2+64(2b^2dn^2+6abdn+9a^2d)xe+72(6b^2x^2e^2+8b^2dxe+3b^2d^2)\log(c)^2+72(6b^2n^2x^2e^2+8b^2dn^2xe+3b^2d^2n^2)\log(x)^2+12(9b^2d^2n+36abd^2+36(b^2n+2ab)x^2e^2+32(b^2dn+3abd)xe)\log(c)+12(9b^2d^2n^2+36abd^2n+36(b^2n^2+2abn)x^2e^2+32(b^2dn^2+3abdn)xe+12(6b^2nx^2e^2+8b^2dnxe+3b^2d^2n)\log(c))\log(x)}{864x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="fricas")
```

```
[Out] -1/864*(27*b^2*d^2*n^2 + 108*a*b*d^2*n + 216*a^2*d^2 + 216*(b^2*n^2 + 2*a*b
*n + 2*a^2)*x^2*e^2 + 64*(2*b^2*d*n^2 + 6*a*b*d*n + 9*a^2*d)*x*e + 72*(6*b^
2*x^2*e^2 + 8*b^2*d*x*e + 3*b^2*d^2)*log(c)^2 + 72*(6*b^2*n^2*x^2*e^2 + 8*b
^2*d*n^2*x*e + 3*b^2*d^2*n^2)*log(x)^2 + 12*(9*b^2*d^2*n + 36*a*b*d^2 + 36*
(b^2*n + 2*a*b)*x^2*e^2 + 32*(b^2*d*n + 3*a*b*d)*x*e)*log(c) + 12*(9*b^2*d^
2*n^2 + 36*a*b*d^2*n + 36*(b^2*n^2 + 2*a*b*n)*x^2*e^2 + 32*(b^2*d*n^2 + 3*a
*b*d*n)*x*e + 12*(6*b^2*n*x^2*e^2 + 8*b^2*d*n*x*e + 3*b^2*d^2*n)*log(c))*lo
g(x))/x^4
```

Sympy [A]
time = 0.57, size = 309, normalized size = 1.74

$$-\frac{a^2d^2}{4x^4}-\frac{2a^2de}{3x^3}-\frac{a^2e^2}{2x^2}-\frac{abd^2n}{8x^4}-\frac{abd^2\log(cx^n)}{2x^4}-\frac{4abden}{9x^3}-\frac{4abde\log(cx^n)}{3x^3}-\frac{abe^2n}{2x^2}-\frac{abe^2\log(cx^n)}{x^2}-\frac{b^2d^2n^2}{32x^4}-\frac{b^2d^2n\log(cx^n)}{8x^4}-\frac{b^2d^2\log(cx^n)^2}{4x^4}-\frac{4b^2den^2}{27x^3}-\frac{4b^2den\log(cx^n)}{9x^3}-\frac{2b^2de\log(cx^n)^2}{3x^3}-\frac{b^2e^2n^2}{4x^2}-\frac{b^2e^2n\log(cx^n)}{2x^2}-\frac{b^2e^2\log(cx^n)^2}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**5,x)
```

```
[Out] -a**2*d**2/(4*x**4) - 2*a**2*d*e/(3*x**3) - a**2*e**2/(2*x**2) - a*b*d**2*n
/(8*x**4) - a*b*d**2*log(c*x**n)/(2*x**4) - 4*a*b*d*e*n/(9*x**3) - 4*a*b*d*
e*log(c*x**n)/(3*x**3) - a*b*e**2*n/(2*x**2) - a*b*e**2*log(c*x**n)/x**2 -
b**2*d**2*n**2/(32*x**4) - b**2*d**2*n*log(c*x**n)/(8*x**4) - b**2*d**2*log
(c*x**n)**2/(4*x**4) - 4*b**2*d*e*n**2/(27*x**3) - 4*b**2*d*e*n*log(c*x**n)
/(9*x**3) - 2*b**2*d*e*log(c*x**n)**2/(3*x**3) - b**2*e**2*n**2/(4*x**2) -
b**2*e**2*n*log(c*x**n)/(2*x**2) - b**2*e**2*log(c*x**n)**2/(2*x**2)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 366 vs. 2(160) = 320.
time = 3.43, size = 366, normalized size = 2.06

$$-\frac{432\,b^2n^2x^2e^2\log\left(x\right)^2+576\,b^2dn^2xe\log\left(x\right)^2+432\,b^2n^2x^2e^2\log\left(x\right)+384\,b^2dn^2xe\log\left(x\right)+864\,b^2nx^2e^2\log\left(c\right)\log\left(x\right)+1152\,b^2dnxe\log\left(c\right)\log\left(x\right)+216\,b^2d^2n^2\log\left(x\right)^2+216\,b^2n^2x^2e^2+128\,b^2dn^2xe+432\,b^2nx^2e^2\log\left(c\right)+384\,b^2dnxe\log\left(c\right)+432\,b^2x^2e^2\log\left(c\right)^2+576\,b^2dxe\log\left(c\right)^2+108\,b^2d^2n^2\log\left(x\right)+864\,abnx^2e^2\log\left(x\right)+1152\,abdnxe\log\left(x\right)+432\,b^2d^2n\log\left(c\right)\log\left(x\right)+27\,b^2d^2n^2+432\,abnx^2e^2+384\,abdnxe+108\,b^2d^2n\log\left(c\right)+864\,abx^2e^2\log\left(c\right)+1152\,abdxe\log\left(c\right)+216\,b^2d^2\log\left(c\right)^2+432\,abd^2n\log\left(x\right)+108\,abd^2n+432\,a^2x^2e^2+576\,a^2dxe+432\,abd^2\log\left(c\right)+216\,a^2d^2}{864\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="giac")
```

```
[Out] -1/864*(432*b^2*n^2*x^2*e^2*log(x)^2 + 576*b^2*d*n^2*x*e*log(x)^2 + 432*b^2
*n^2*x^2*e^2*log(x) + 384*b^2*d*n^2*x*e*log(x) + 864*b^2*n*x^2*e^2*log(c)*l
og(x) + 1152*b^2*d*n*x*e*log(c)*log(x) + 216*b^2*d^2*n^2*log(x)^2 + 216*b^2
*n^2*x^2*e^2 + 128*b^2*d*n^2*x*e + 432*b^2*n*x^2*e^2*log(c) + 384*b^2*d*n*x
*e*log(c) + 432*b^2*x^2*e^2*log(c)^2 + 576*b^2*d*x*e*log(c)^2 + 108*b^2*d^2
*n^2*log(x) + 864*a*b*n*x^2*e^2*log(x) + 1152*a*b*d*n*x*e*log(x) + 432*b^2*
d^2*n*log(c)*log(x) + 27*b^2*d^2*n^2 + 432*a*b*n*x^2*e^2 + 384*a*b*d*n*x*e
+ 108*b^2*d^2*n*log(c) + 864*a*b*x^2*e^2*log(c) + 1152*a*b*d*x*e*log(c) + 2
16*b^2*d^2*log(c)^2 + 432*a*b*d^2*n*log(x) + 108*a*b*d^2*n + 432*a^2*x^2*e^
2 + 576*a^2*d*x*e + 432*a*b*d^2*log(c) + 216*a^2*d^2)/x^4
```

Mupad [B]
time = 3.67, size = 188, normalized size = 1.06

$$-\frac{x\,\left(48\,d\,e\,a^2+32\,d\,e\,a\,b\,n+\frac{32\,d\,e\,b^2\,n^2}{3}\right)+x^2\,\left(36\,a^2\,e^2+36\,a\,b\,e^2\,n+18\,b^2\,e^2\,n^2\right)+18\,a^2\,d^2+\frac{9\,b^2\,d^2\,n^2}{4}+9\,a\,b\,d^2\,n}{72\,x^4}-\frac{\ln\left(c\,x^n\right)^2\,\left(\frac{b^2\,d^2}{4}+\frac{2\,b^2\,d\,e\,x}{3}+\frac{b^2\,e^2\,x^2}{2}\right)}{x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{3\,b\,\left(4\,a+b\,n\right)\,d^2}{4}+\frac{8\,b\,\left(3\,a+b\,n\right)\,d\,e\,x}{3}+3\,b\,\left(2\,a+b\,n\right)\,e^2\,x^2\right)}{6\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^5,x)
```

```
[Out] - (x*(48*a^2*d*e + (32*b^2*d*e*n^2)/3 + 32*a*b*d*e*n) + x^2*(36*a^2*e^2 + 1
8*b^2*e^2*n^2 + 36*a*b*e^2*n) + 18*a^2*d^2 + (9*b^2*d^2*n^2)/4 + 9*a*b*d^2*
n)/(72*x^4) - (log(c*x^n)^2*((b^2*d^2)/4 + (b^2*e^2*x^2)/2 + (2*b^2*d*e*x)/
3))/x^4 - (log(c*x^n)*((3*b*d^2*(4*a + b*n))/4 + 3*b*e^2*x^2*(2*a + b*n) +
(8*b*d*e*x*(3*a + b*n))/3))/(6*x^4)
```

3.92 $\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$

Optimal. Leaf size=271

$$-\frac{2abd^2nx}{e^3}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e}-\frac{2b^2d^2nx\log(cx^n)}{e^3}+\frac{bdnx^2(a+b\log(cx^n))}{2e^2}-\frac{2bnx^3(a+b\log(cx$$

```
[Out] -2*a*b*d^2*n*x/e^3+2*b^2*d^2*n^2*x/e^3-1/4*b^2*d*n^2*x^2/e^2+2/27*b^2*n^2*x
^3/e-2*b^2*d^2*n*x*ln(c*x^n)/e^3+1/2*b*d*n*x^2*(a+b*ln(c*x^n))/e^2-2/9*b*n*
x^3*(a+b*ln(c*x^n))/e+d^2*x*(a+b*ln(c*x^n))^2/e^3-1/2*d*x^2*(a+b*ln(c*x^n))
^2/e^2+1/3*x^3*(a+b*ln(c*x^n))^2/e-d^3*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4-2*
b*d^3*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^4+2*b^2*d^3*n^2*polylog(3,-e*x/
d)/e^4
```

Rubi [A]
time = 0.20, antiderivative size = 271, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2395, 2333, 2332, 2342, 2341, 2354, 2421, 6724}

$$-\frac{2bd^3n\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}+\frac{2b^2d^3n^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}-\frac{d^3\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}+\frac{d^2x(a+b\log(cx^n))^2}{e^3}-\frac{dx^2(a+b\log(cx^n))^2}{2e^2}+\frac{bdnx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))^2}{3e}-\frac{2bnx^3(a+b\log(cx^n))}{9e}-\frac{2abd^2nx}{e^3}-\frac{2b^2d^2nx\log(cx^n)}{e^3}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

```
[Out] (-2*a*b*d^2*n*x)/e^3 + (2*b^2*d^2*n^2*x)/e^3 - (b^2*d*n^2*x^2)/(4*e^2) + (2
*b^2*n^2*x^3)/(27*e) - (2*b^2*d^2*n*x*Log[c*x^n])/e^3 + (b*d*n*x^2*(a + b*L
og[c*x^n]))/(2*e^2) - (2*b*n*x^3*(a + b*Log[c*x^n]))/(9*e) + (d^2*x*(a + b*
Log[c*x^n])^2)/e^3 - (d*x^2*(a + b*Log[c*x^n])^2)/(2*e^2) + (x^3*(a + b*Log
[c*x^n])^2)/(3*e) - (d^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 - (2*b*
d^3*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^4 + (2*b^2*d^3*n^2*PolyL
og[3, -((e*x)/d)])/e^4
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \left(\frac{d^2(a+b\log(cx^n))^2}{e^3} - \frac{dx(a+b\log(cx^n))^2}{e^2} + \frac{x^2(a+b\log(cx^n))^2}{e} - \frac{d^3(a \cdots}{e \cdots}\right.$$

$$= \frac{d^2\int (a+b\log(cx^n))^2\,dx}{e^3} - \frac{d^3\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^3} - \frac{d\int x(a+b\log(cx^n))^2\,dx}{e^2} \cdots$$

$$= \frac{d^2x(a+b\log(cx^n))^2}{e^3} - \frac{dx^2(a+b\log(cx^n))^2}{2e^2} + \frac{x^3(a+b\log(cx^n))^2}{3e} - \frac{d^3(a+\cdots}{\cdots}$$

$$= -\frac{2abd^2nx}{e^3} - \frac{b^2dn^2x^2}{4e^2} + \frac{2b^2n^2x^3}{27e} + \frac{bdnx^2(a+b\log(cx^n))}{2e^2} - \frac{2bnx^3(a+b\log(\cdots}{9e}$$

$$= -\frac{2abd^2nx}{e^3} + \frac{2b^2d^2n^2x}{e^3} - \frac{b^2dn^2x^2}{4e^2} + \frac{2b^2n^2x^3}{27e} - \frac{2b^2d^2nx\log(cx^n)}{e^3} + \frac{bdnx^2(a\cdots}{\cdots}$$

Mathematica [A]
time = 0.12, size = 211, normalized size = 0.78

$$-\frac{-108d^2ex(a+b\log(cx^n))^2 + 54de^2x^2(a+b\log(cx^n))^2 - 36e^3x^3(a+b\log(cx^n))^2 + 216bd^2enx(a-bn+b\log(cx^n)) - 8be^3nx^3(bn-3(a+b\log(cx^n))) + 27bde^2nx^2(bn-2(a+b\log(cx^n))) + 108d^3(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 216bd^3n\left((a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{ex}{d}\right) - bn\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)}{108e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

```
[Out] -1/108*(-108*d^2*e*x*(a + b*Log[c*x^n])^2 + 54*d*e^2*x^2*(a + b*Log[c*x^n])
^2 - 36*e^3*x^3*(a + b*Log[c*x^n])^2 + 216*b*d^2*e*n*x*(a - b*n + b*Log[c*x
^n]) - 8*b*e^3*n*x^3*(b*n - 3*(a + b*Log[c*x^n])) + 27*b*d*e^2*n*x^2*(b*n -
 2*(a + b*Log[c*x^n])) + 108*d^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 21
6*b*d^3*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*
x)/d)]))/e^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.24, size = 4508, normalized size = 16.63

method	result	size
risch	Expression too large to display	4508

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] -1/4/e^2*d*x^2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+1/3*a^2/e*x^3+a^2/e^3*x*d
^2-a^2*d^3/e^4*ln(e*x+d)-1/2*a^2/e^2*d*x^2-1/2*d^3/e^4*ln(e*x+d)*Pi^2*b^2*c
sgn(I*x^n)*csgn(I*c*x^n)^5+1/6/e*x^3*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(
I*c*x^n)^3+I*d^3/e^4*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3+1/2/e^2*d*x^2*Pi^2*b^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4/e^3*x*d^2*Pi^2*b^2*csgn(I*c)^2*
```

```
csgn(I*x^n)^2*csgn(I*c*x^n)^2+2/e^3*x*d^2*ln(c)*a*b-2*d^3/e^4*ln(e*x+d)*ln(
c)*a*b+2*n*d^3/e^4*dilog(-e*x/d)*b^2*ln(c)+1/2/e^2*n*d*x^2*b^2*ln(c)-2/e^3*
n*x*d^2*b^2*ln(c)-1/e^2*d*x^2*ln(c)*a*b-2/9*b/e*n*x^3*a+1/3*b^2*ln(x^n)^2/e
*x^3-1/9*I/e*n*x^3*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I/e^2*n*d*x^2*b^2
*Pi*csgn(I*c*x^n)^3+1/6/e*x^3*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n
)^3+1/8/e^2*d*x^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*b/e^2*n*d*x^2*a+
2*b*n*d^3/e^4*dilog(-e*x/d)*a-1/3*I/e*x^3*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-1/3*
I/e*x^3*Pi*a*b*csgn(I*c*x^n)^3+49/36*I*d^3/e^4*n*b^2*Pi*csgn(I*c*x^n)^3+1/2
/e^3*x*d^2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-1/4/e^3*x*d^2*Pi^2*b^2*csgn(I
*x^n)^2*csgn(I*c*x^n)^4-1/12/e*x^3*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(
I*c*x^n)^2+2*b^2*n*d^3/e^4*ln(e*x+d)*ln(x^n)*ln(-e*x/d)+1/4*d^3/e^4*ln(e*x+
d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-1/2*d^3/e^4*ln(e*x+d)*Pi^2*b^2*csgn
(I*c)*csgn(I*c*x^n)^5+1/4*d^3/e^4*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^4+1/9*I/e*n*x^3*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/e^2*
d*x^2*Pi*a*b*csgn(I*c*x^n)^3-1/4/e^2*d*x^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)
*csgn(I*c*x^n)^3-1/4/e^2*d*x^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^
n)^3-b^2*ln(x^n)^2*d^3/e^4*ln(e*x+d)-2/9*b^2*n/e*ln(x^n)*x^3+2/3*b/e*ln(x^n
)*x^3*a+I*d^3/e^4*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+1/2/e^3*x*d^2*Pi^2
*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-49/18*b*d^3/e^4*n*a-I/e^3*ln(x
^n)*x*d^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*I/e^2*n*d*x^2*b^2*
Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*n*d^3/e^4*dilog(-e*x/d)*b^2*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/12/e*x^3*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^4+1/6/e*x^3*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+2/3/e*ln(x^n)*x^3*b^
2*ln(c)-2/9/e*n*x^3*b^2*ln(c)-49/18*d^3/e^4*n*b^2*ln(c)-d^3/e^4*ln(e*x+d)*l
n(c)^2*b^2-1/2/e^2*d*x^2*ln(c)^2*b^2+2/3/e*x^3*ln(c)*a*b+1/e^3*x*d^2*ln(c)^
2*b^2+1/8/e^2*d*x^2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-49/36*I*d^3/e^4*
n*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4/e^3*x*d^2*Pi^2*b^2*csgn(I*c*x^n)^6
+1/4*d^3/e^4*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/12/e*x^3*Pi^2*b^2*csgn(I*
c)^2*csgn(I*c*x^n)^4+1/6/e*x^3*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-I*n*d^3/e
^4*dilog(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+1/3*I/e*ln(x^n)*x^3*b^2*Pi*csgn(I*c
)*csgn(I*c*x^n)^2+1/3*I/e*x^3*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/9*
I/e*n*x^3*b^2*Pi*csgn(I*c*x^n)^3-1/3*I/e*ln(x^n)*x^3*b^2*Pi*csgn(I*c*x^n)^3
+2*n*d^3/e^4*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)-I/e^3*n*x*d^2*b^2*Pi*csgn(I*c)*
csgn(I*c*x^n)^2-I*ln(x^n)*d^3/e^4*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^
2-1/4/e^3*x*d^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/3*I/e*x^3*ln(c)*Pi*b
^2*csgn(I*c)*csgn(I*c*x^n)^2-2*b^2*d^3/e^4*ln(x)*dilog(-e*x/d)*n^2+b^2*d^3/
e^4*n^2*ln(x)^2*ln(e*x+d)-b^2*d^3/e^4*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2*d^3/e^4
*n^2*ln(x)*polylog(2,-e*x/d)+b^2*ln(x^n)^2/e^3*x*d^2-1/2*d^3/e^4*ln(e*x+d)*
Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+d^3/e^4*ln(e*x+d)*Pi^2*b^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-2*b^2*d^3/e^4*ln(x)*ln(e*x+d)*ln(-e*
x/d)*n^2+2*b*n*d^3/e^4*ln(e*x+d)*ln(-e*x/d)*a+1/3*I/e*x^3*Pi*a*b*csgn(I*c)*
csgn(I*c*x^n)^2+1/3*I/e*x^3*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4/e^2*d*x^
2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-I/e^3*x*d^2*ln(c)*Pi*b^2*csgn(I*c*x^
n)^3-I/e^3*x*d^2*Pi*a*b*csgn(I*c*x^n)^3-I/e^3*x*d^2*ln(c)*Pi*b^2*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-I/e^3*x*d^2*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c
```

```
*x^n)+1/2*I/e^2*ln(x^n)*d*x^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/
2/e^3*x*d^2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-49/36*I*d^3/e^4*n*b^2*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2-I/e^3*ln(x^n)*x*d^2*b^2*Pi*csgn(I*c*x^n)^3-1/9*I/e
*n*x^3*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/e^2*ln(x^n)*d*x^2*b^2*Pi*csgn
(I*c*x^n)^3+1/3/e*x^3*ln(c)^2*b^2+1/3*I/e*ln(x^n)*x^3*b^2*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2+1/2*I/e^2*d*x^2*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-1/e^3*x*d^2*Pi^2
*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+1/4*d^3/e^4*ln(e*x+d)*Pi^2*b^2*c
sgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/8/e^2*d*x^2*Pi^2*b^2*csgn(I*c)^2
*csgn(I*x^n)^2*csgn(I*c*x^n)^2-I*n*d^3/e^4*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*a*b*d^2*n*x/e^3+1/2/e^3*x*d^2*Pi^2*b^2*cs
gn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2/27*b^2*n^2*x^3/e-2*ln(x^n)*d^3/e^4*
ln(e*x+d)*b^2*ln(c)-b/e^2*ln(x^n)*d*x^2*a+2*b/e^3*ln(x^n)*x*d^2*a-2*b*ln(x^
n)*d^3/e^4*ln(e*x+d)*a+1/8/e^2*d*x^2*Pi^2*b^2*csgn(I*c*x^n)^6-1/e^2*ln(x^n)
*d*x^2*b^2*ln(c)+2/e^3*ln(x^n)*x*d^2*b^2*ln(c)+I/e^3*n*x*d^2*b^2*Pi*csgn(I*
c*x^n)^3+I*ln(x^n)*d^3/e^4*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+1/2*b^2*n/e^2*l
n(x^n)*d*x^2-2*b^2*n/e^3*ln(x^n)*x*d^2+2*b^2*n*d^3/e^4*ln(x^n)*dilog(-e*x/d
)-1/3/e*x^3*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

```
[Out] -1/6*(6*d^3*e^(-4)*log(x*e + d) - (2*x^3*e^2 - 3*d*x^2*e + 6*d^2*x)*e^(-3))
*a^2 + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^3*log(x^n) +
(b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(x*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(x*e + d),
 x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^3/(x*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^3\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

```
[Out] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

3.93 $\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$

Optimal. Leaf size=200

$$\frac{2abdnx}{e^2}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}+\frac{2b^2dnx\log\left(cx^n\right)}{e^2}-\frac{bnx^2\left(a+b\log\left(cx^n\right)\right)}{2e}-\frac{dx\left(a+b\log\left(cx^n\right)\right)^2}{e^2}+\frac{x^2\left(a+b\log\left(c\right.\right.}{2e}$$

```
[Out] 2*a*b*d*n*x/e^2-2*b^2*d*n^2*x/e^2+1/4*b^2*n^2*x^2/e+2*b^2*d*n*x*ln(c*x^n)/e
^2-1/2*b*n*x^2*(a+b*ln(c*x^n))/e-d*x*(a+b*ln(c*x^n))^2/e^2+1/2*x^2*(a+b*ln(
c*x^n))^2/e+d^2*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^3+2*b*d^2*n*(a+b*ln(c*x^n))
*polylog(2,-e*x/d)/e^3-2*b^2*d^2*n^2*polylog(3,-e*x/d)/e^3
```

Rubi [A]
time = 0.15, antiderivative size = 200, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2395, 2333, 2332, 2342, 2341, 2354, 2421, 6724}

$$\frac{2bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{e^3}-\frac{2b^2d^2n^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}+\frac{d^2\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2}{e^3}-\frac{dx\left(a+b\log\left(cx^n\right)\right)^2}{e^2}-\frac{bnx^2\left(a+b\log\left(cx^n\right)\right)}{2e}+\frac{x^2\left(a+b\log\left(cx^n\right)\right)^2}{2e}+\frac{2abdnx}{e^2}+\frac{2b^2dnx\log\left(cx^n\right)}{e^2}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

```
[Out] (2*a*b*d*n*x)/e^2 - (2*b^2*d*n^2*x)/e^2 + (b^2*n^2*x^2)/(4*e) + (2*b^2*d*n*
x*Log[c*x^n])/e^2 - (b*n*x^2*(a + b*Log[c*x^n]))/(2*e) - (d*x*(a + b*Log[c*
x^n])^2)/e^2 + (x^2*(a + b*Log[c*x^n])^2)/(2*e) + (d^2*(a + b*Log[c*x^n])^2
*Log[1 + (e*x)/d])/e^3 + (2*b*d^2*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d
)])/e^3 - (2*b^2*d^2*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \left(-\frac{d(a+b\log(cx^n))^2}{e^2}+\frac{x(a+b\log(cx^n))^2}{e}+\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)}\right)dx$$

$$= -\frac{d\int (a+b\log(cx^n))^2\,dx}{e^2}+\frac{d^2\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^2}+\frac{\int x(a+b\log(cx^n))^2\,dx}{e}$$

$$= -\frac{dx(a+b\log(cx^n))^2}{e^2}+\frac{x^2(a+b\log(cx^n))^2}{2e}+\frac{d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right.}{e^3}$$

$$= \frac{2abdnx}{e^2}+\frac{b^2n^2x^2}{4e}-\frac{bnx^2(a+b\log(cx^n))}{2e}-\frac{dx(a+b\log(cx^n))^2}{e^2}+\frac{x^2(a+b\,\mathrm{lo}}{2e}$$

$$= \frac{2abdnx}{e^2}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}+\frac{2b^2dnx\log(cx^n)}{e^2}-\frac{bnx^2(a+b\log(cx^n))}{2e}-\frac{dx}{}$$

Mathematica [A]
time = 0.07, size = 158, normalized size = 0.79

$$\frac{-4dex(a+b\log(cx^n))^2+2e^2x^2(a+b\log(cx^n))^2+8bdenx(a-bn+b\log(cx^n))+be^2nx^2(bn-2(a+b\log(cx^n)))+4d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)+8bd^2n\left((a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right)-bn\operatorname{Li}_3\left(-\frac{ex}{d}\right)\right)}{4e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

```
[Out] (-4*d*e*x*(a + b*Log[c*x^n])^2 + 2*e^2*x^2*(a + b*Log[c*x^n])^2 + 8*b*d*e*n
*x*(a - b*n + b*Log[c*x^n]) + b*e^2*n*x^2*(b*n - 2*(a + b*Log[c*x^n])) + 4*
d^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 8*b*d^2*n*((a + b*Log[c*x^n])*P
olyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*e^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.23, size = 3479, normalized size = 17.40

method	result	size
risch	Expression too large to display	3479

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] -b^2*ln(x^n)^2/e^2*d*x+b^2*ln(x^n)^2*d^2/e^3*ln(e*x+d)-1/2*b^2*n/e*ln(x^n)*
x^2-a^2/e^2*d*x+a^2*d^2/e^3*ln(e*x+d)-2*b^2*n*d^2/e^3*ln(-e*x/d)*ln(e*x+d)*
ln(x^n)-1/4*I/e*n*x^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*a^2/e*x^2+2*d^
2/e^3*ln(e*x+d)*ln(c)*a*b-2/e^2*d*x*ln(c)*a*b+2/e^2*n*d*x*b^2*ln(c)-2*n*d^2
/e^3*dilog(-e*x/d)*b^2*ln(c)+5/2*b*d^2/e^3*n*a-1/2*b/e*n*x^2*a+2*b^2*d^2/e^
3*ln(x)*dilog(-e*x/d)*n^2-b^2*d^2/e^3*n^2*ln(x)^2*ln(e*x+d)+b^2*d^2/e^3*n^2
*ln(x)^2*ln(1+e*x/d)-2*b*n*d^2/e^3*dilog(-e*x/d)*a+I/e^2*d*x*Pi*a*b*csgn(I*
```

c)*csgn(I*x^n)*csgn(I*c*x^n)+I*n*d^2/e^3*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)+1/4/e^2*d*x*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1
/4/e^2*d*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-1/2/e^2*d*x*Pi^2*b^2*csgn(I
*c)*csgn(I*c*x^n)^5-1/2*I/e*ln(x^n)*x^2*b^2*Pi*csgn(I*c*x^n)^3+1/e*ln(x^n)*
x^2*b^2*ln(c)-1/2*I/e*x^2*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/
e*x^2*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2*n*d^2/e^3*ln(e*x+d)*ln(-e*
x/d)*b^2*ln(c)+I/e^2*d*x*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+I/e^2*d*x*Pi*a*b*csgn
(I*c*x^n)^3+1/e^2*d*x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4*I/
e*n*x^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+5/2*d^2/e^3*n*b^2*ln(c)+1/e*x^2*ln
(c)*a*b-1/e^2*d*x*ln(c)^2*b^2+d^2/e^3*ln(e*x+d)*ln(c)^2*b^2-1/8/e*x^2*Pi^2*
b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/4/e*x^2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x
^n)^5+1/2*I/e*ln(x^n)*x^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+5/4*I*d^2/e^3*
n*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/2/e^2*d*x*Pi^2*b^2*csgn(I*x^n)*csgn(I*
c*x^n)^5+1/4/e*x^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/4*d^2
/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*I/e*x^2*Pi*a*b*csgn
(I*c)*csgn(I*c*x^n)^2+2*b^2*d^2/e^3*ln(x)*ln(-e*x/d)*ln(e*x+d)*n^2-1/2/e*n*
x^2*b^2*ln(c)+2*b^2*d^2/e^3*n^2*ln(x)*polylog(2,-e*x/d)-1/2*I/e*x^2*Pi*a*b*
csgn(I*c*x^n)^3+1/4*I/e*n*x^2*b^2*Pi*csgn(I*c*x^n)^3-1/2/e^2*d*x*Pi^2*b^2*c
sgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+1/4/e^2*d*x*Pi^2*b^2*csgn(I*c)^2*csg
n(I*x^n)^2*csgn(I*c*x^n)^2-1/2/e^2*d*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csg
n(I*c*x^n)^3-1/4*d^2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(
I*c*x^n)^2+I*n*d^2/e^3*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+1/2*d^2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-1/4*d^
2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/2*I/e*x^2*ln(c)*Pi
*b^2*csgn(I*c*x^n)^3-2*b*n*d^2/e^3*ln(e*x+d)*ln(-e*x/d)*a+b/e*ln(x^n)*x^2*a
+5/4*I*d^2/e^3*n*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I/e*x^2*Pi*a*b*csgn
(I*x^n)*csgn(I*c*x^n)^2+1/2*d^2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c
*x^n)^5-1/8/e*x^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/2*d^
2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2*d^2/e^
3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-d^2/e^3*ln(e*x
+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-5/4*I*d^2/e^3*n*b^2*Pi*c
sgn(I*c*x^n)^3+1/2*b^2*ln(x^n)^2/e*x^2+1/2/e*x^2*ln(c)^2*b^2+1/2*I/e*x^2*ln
(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I*n*d^2/e^3*dilog(-e*x/d)*b^2*Pi*csgn(
I*c*x^n)^3+1/4/e*x^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2*I
/e*ln(x^n)*x^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/8/e*x^2*Pi^2*b^2*csgn(I*c
*x^n)^6+2*a*b*d*n*x/e^2-I/e^2*n*d*x*b^2*Pi*csgn(I*c*x^n)^3+1/4*b^2*n^2*x^2/
e+1/4/e^2*d*x*Pi^2*b^2*csgn(I*c*x^n)^6+2*b*ln(x^n)*d^2/e^3*ln(e*x+d)*a-1/4*
d^2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/8/e*x^2*Pi^2*b^2*csgn(I*c)^2*c
sgn(I*c*x^n)^4-2/e^2*ln(x^n)*d*x*b^2*ln(c)+2*ln(x^n)*d^2/e^3*ln(e*x+d)*b^2*
ln(c)-2*b^2*n*d^2/e^3*dilog(-e*x/d)*ln(x^n)-2*b/e^2*ln(x^n)*d*x*a-I*d^2/e^3
*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-I*d^2/e^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c
*x^n)^3+I/e^2*ln(x^n)*d*x*b^2*Pi*csgn(I*c*x^n)^3-I*ln(x^n)*d^2/e^3*ln(e*x+d
)*b^2*Pi*csgn(I*c*x^n)^3+2*b^2*n/e^2*ln(x^n)*d*x+1/4/e*x^2*Pi^2*b^2*csgn(I*
c)*csgn(I*c*x^n)^5-1/2/e*x^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4
-I/e^2*d*x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I*d^2/e^3*ln(e*x+d)*ln(c)

```
*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I*d^2/e^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x
^n)*csgn(I*c*x^n)^2+I*d^2/e^3*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I*
n*d^2/e^3*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3-I/e^2*ln(x^n)*d*x*b^2
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e*ln(x^n)*x^2*b^2*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)-5/4*I*d^2/e^3*n*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)-I*d^2/e^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/
e^2*ln(x^n)*d*x*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/e^2*n*d*x*b^2*
Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x^n)*d^2/e^3*ln(e*x+d)*b^2*Pi*csgn(I*c)*c
sgn(I*c*x^n)^2+I*ln(x^n)*d^2/e^3*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2+I/e^2*n*d*x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-2*b^2*d*n^2*x/e^2-2*b^2*d
^2*n^2*polylog(3,-e*x/d)/e^3-I*n*d^2/e^3*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csg
n(I*c*x^n)^2-I/e^2*d*x*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-I/e^2*d*x*ln(c)*Pi*
b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e*x^2*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)+1/4*I/e*n*x^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-
I/e^2*ln(x^n)*d*x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

```
[Out] 1/2*(2*d^2*e^(-3)*log(x*e + d) + (x^2*e - 2*d*x)*e^(-2))*a^2 + integrate((b
^2*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n) + (b^2*log(c)^2 + 2*a
*b*log(c))*x^2)/(x*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(x*e + d),
 x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log(cx^n))^2}{d + ex}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^2/(x*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^2\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{d+e\,x} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

3.94 $\int \frac{x(a+b\log(cx^n))^2}{d+ex} \, dx$

Optimal. Leaf size=130

$$-\frac{2abnx}{e}+\frac{2b^2n^2x}{e}-\frac{2b^2nx\log\left(cx^n\right)}{e}+\frac{x(a+b\log\left(cx^n\right))^2}{e}-\frac{d(a+b\log\left(cx^n\right))^2\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{2bdn(a+b\log\left(c\right.}{e^2}$$

```
[Out] -2*a*b*n*x/e+2*b^2*n^2*x/e-2*b^2*n*x*ln(c*x^n)/e+x*(a+b*ln(c*x^n))^2/e-d*(a
+b*ln(c*x^n))^2*ln(1+e*x/d)/e^2-2*b*d*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e
^2+2*b^2*d*n^2*polylog(3,-e*x/d)/e^2
```

Rubi [A]
time = 0.11, antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2395, 2333, 2332, 2354, 2421, 6724}

$$-\frac{2bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{e^2}+\frac{2b^2dn^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}-\frac{d\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2}{e^2}+\frac{x\left(a+b\log\left(cx^n\right)\right)^2}{e}-\frac{2abnx}{e}-\frac{2b^2nx\log\left(cx^n\right)}{e}+\frac{2b^2n^2x}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

```
[Out] (-2*a*b*n*x)/e + (2*b^2*n^2*x)/e - (2*b^2*n*x*Log[c*x^n])/e + (x*(a + b*Log
[c*x^n])^2)/e - (d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^2 - (2*b*d*n*(a
 + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^2 + (2*b^2*d*n^2*PolyLog[3, -((e
*x)/d)])/e^2
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{e}-\frac{d(a+b\log(cx^n))^2}{e(d+ex)}\right)dx$$

$$= \frac{\int (a+b\log(cx^n))^2\,dx}{e}-\frac{d\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e}$$

$$= \frac{x(a+b\log(cx^n))^2}{e}-\frac{d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{(2bdn)\int \frac{(a+b\log(cx^n))\log(1-}{x}}{e^2}$$

$$= -\frac{2abnx}{e}+\frac{x(a+b\log(cx^n))^2}{e}-\frac{d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{2bdn(a+b\log}{}$$

$$= -\frac{2abnx}{e}+\frac{2b^2n^2x}{e}-\frac{2b^2nx\log(cx^n)}{e}+\frac{x(a+b\log(cx^n))^2}{e}-\frac{d(a+b\log(cx^n))^2}{e^2}$$

Mathematica [A]
time = 0.05, size = 103, normalized size = 0.79

$$\frac{ex(a+b\log(cx^n))^2-2benx(a-bn+b\log(cx^n))-d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)-2bdn\left((a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)-bn\,\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

```
[Out] (e*x*(a + b*Log[c*x^n])^2 - 2*b*e*n*x*(a - b*n + b*Log[c*x^n]) - d*(a + b*L
og[c*x^n])^2*Log[1 + (e*x)/d] - 2*b*d*n*((a + b*Log[c*x^n])*PolyLog[2, -((e
*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/e^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 2420, normalized size = 18.62

method	result	size
risch	Expression too large to display	2420

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] I*ln(x^n)*d/e^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*n*d/
e^2*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*n*d/e^2*ln(e*x+
d)*ln(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*n*d/e^2*dilog(-e*x/d)*b^
2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*b/e*x*ln(x^n)*a-2*b^2*n/e*x*ln(x
^n)-a^2*d/e^2*ln(e*x+d)+I/e*x*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+a^
2/e*x-2*b*d/e^2*n*a-1/e*x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+1/
4*d/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/4*d/e^2*ln(e*x+d)*
Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/2/e*x*Pi^2*b^2*csgn(I*c)*csgn(I*x^
n)^2*csgn(I*c*x^n)^3-I/e*x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+2*n*d/e^2*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)+2*b*n*d/e^2*dilog(-e*x/d)*a+I*ln(
x^n)*d/e^2*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+1/4*d/e^2*ln(e*x+d)*Pi^2*b^2*cs
gn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+2*n*d/e^2*dilog(-e*x/d)*b^2*ln(c)-2
*d/e^2*ln(e*x+d)*ln(c)*a*b-1/4/e*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2
/e*x*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+1/2/e*x*Pi^2*b^2*csgn(I*x^n)*csgn(I
*c*x^n)^5-I*n*d/e^2*dilog(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3-2*b^2*d/e^2*ln(x)*
dilog(-e*x/d)*n^2+b^2*d/e^2*n^2*ln(x)^2*ln(e*x+d)-b^2*d/e^2*n^2*ln(x)^2*ln(
1+e*x/d)-2*b^2*d/e^2*n^2*ln(x)*polylog(2,-e*x/d)-1/2*d/e^2*ln(e*x+d)*Pi^2*b
^2*csgn(I*x^n)*csgn(I*c*x^n)^5+1/2/e*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csg
n(I*c*x^n)^3-1/2*d/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-2*b^2*d
/e^2*ln(x)*ln(-e*x/d)*ln(e*x+d)*n^2+2*b*n*d/e^2*ln(e*x+d)*ln(-e*x/d)*a+2/e*
x*ln(x^n)*b^2*ln(c)-I*d/e^2*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+2*b^
2*n*d/e^2*ln(-e*x/d)*ln(e*x+d)*ln(x^n)-d/e^2*ln(e*x+d)*ln(c)^2*b^2-2/e*n*x*
b^2*ln(c)+I*d/e^2*n*b^2*Pi*csgn(I*c*x^n)^3+I/e*n*x*b^2*Pi*csgn(I*c*x^n)^3-b
^2*ln(x^n)^2*d/e^2*ln(e*x+d)-I*d/e^2*n*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*d
/e^2*n*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+2/e*x*ln(c)*a*b-2*d/e^2*n*b^2*ln(
c)-I/e*x*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-I/e*x*ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3-
I/e*x*Pi*a*b*csgn(I*c*x^n)^3-I/e*n*x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I/e
*n*x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*d/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I
*c*x^n)^3+1/e*x*ln(c)^2*b^2+I/e*x*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/e*x*Pi
*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I/e*x*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^
n)^2+d/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+I/e*x*l
n(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-1/4/e*x*Pi^2*b^2*csgn(I*c*x^n)^6-1/2*
```

```
d/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/2*d/e^2*
ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-I*n*d/e^2*ln(e*x
+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*b^2*n^2*x/e-1/4
/e*x*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+I/e*x*ln(x^n)*b^2*Pi*csgn(I*c)*
csgn(I*c*x^n)^2+I*d/e^2*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-2*b*ln(x^n)*d/e^2*
ln(e*x+d)*a-2*ln(x^n)*d/e^2*ln(e*x+d)*b^2*ln(c)+2*b^2*n*d/e^2*dilog(-e*x/d)
*ln(x^n)+1/4*d/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/4/e*x*Pi^2*b^2*csgn
(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+b^2*ln(x^n)^2/e*x+I*d/e^2*ln(e*x+d)*l
n(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*a*b*n*x/e+2*b^2*d*n^2*pol
ylog(3,-e*x/d)/e^2+I*n*d/e^2*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*ln(x^n)*d/e^2*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*n*d/e^2*l
n(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3-I/e*x*Pi*a*b*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-I*d/e^2*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I*n*d
/e^2*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*d/e^2*n*b^2*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/e*x*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)-I*ln(x^n)*d/e^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/e*
n*x*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*d/e^2*ln(e*x+d)*Pi*a*b*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*d/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*c
sgn(I*c*x^n)^2-I*d/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

```
[Out] -(d*e^(-2)*log(x*e + d) - x*e^(-1))*a^2 + integrate((b^2*x*log(x^n)^2 + 2*(
b^2*log(c) + a*b)*x*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x)/(x*e + d),
x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(x*e + d), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\log{(cx^n)})^2}{d+ex}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))**2/(d + e*x), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x/(x*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{d+e\,x} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

```
[Out] int((x*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

3.95 $\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$

Optimal. Leaf size=72

$$\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e}+\frac{2bn(a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right)}{e}-\frac{2b^2n^2\operatorname{Li}_3\left(-\frac{ex}{d}\right)}{e}$$

```
[Out] (a+b*ln(c*x^n))^2*ln(1+e*x/d)/e+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e-2
*b^2*n^2*polylog(3,-e*x/d)/e
```

Rubi [A]
time = 0.04, antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2354, 2421, 6724}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d + e*x),x]
```

```
[Out] ((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e + (2*b*n*(a + b*Log[c*x^n])*PolyL
og[2, -((e*x)/d)])/e - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e} - \frac{(2bn)\int \frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{x}\,dx}{e}$$
$$= \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e} + \frac{2bn(a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right)}{e} - \frac{(2b^2n^2)\int \frac{\operatorname{Li}_2(-}{x}}{e}$$
$$= \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e} + \frac{2bn(a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right)}{e} - \frac{2b^2n^2\operatorname{Li}_3\left(-\frac{ex}{d}\right)}{e}$$

Mathematica [A]
time = 0.02, size = 68, normalized size = 0.94

$$\frac{(a+b\log(cx^n))^2\log\left(\frac{d+ex}{d}\right)}{e} - \frac{2bn\left(-\left((a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right)\right)+bn\operatorname{Li}_3\left(-\frac{ex}{d}\right)\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d + e*x),x]
```

```
[Out] ((a + b*Log[c*x^n])^2*Log[(d + e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*Po
lyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -((e*x)/d)]))/e
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.16, size = 1392, normalized size = 19.33

method	result	size
risch	Expression too large to display	1392

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] I/e*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+a^2*ln(e*x+d)/e-I/e*n*ln(
e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*ln(e*x+d)/e*ln(c)*Pi
*b^2*csgn(I*c)*csgn(I*c*x^n)^2-I/e*n*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*
c*x^n)^2-I/e*n*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-2*b/e*n*ln(
e*x+d)*ln(-e*x/d)*a+2*b^2/e*n^2*ln(x)*ln(-e*x/d)*ln(e*x+d)+2*b*ln(e*x+d)/e*
ln(x^n)*a-1/4*ln(e*x+d)/e*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-2*b^2/e*n*ln
(-e*x/d)*ln(e*x+d)*ln(x^n)-2*b/e*n*dilog(-e*x/d)*a+1/2*ln(e*x+d)/e*Pi^2*b^2
*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-I*ln(e*x+d)/e*ln(c)*Pi*b^2*csgn(I*
c*x^n)^3-2/e*n*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)+I*ln(e*x+d)/e*ln(c)*Pi*b^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2-2*b^2/e*n*dilog(-e*x/d)*ln(x^n)-b^2/e*n^2*ln(x)^2
*ln(e*x+d)+b^2/e*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2/e*n^2*ln(x)*polylog(2,-e*x/d
)-ln(e*x+d)/e*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I*ln(e*x+d)/e*
ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3-I*ln(e*x+d)/e*Pi*a*b*csgn(I*c*x^n)^3+2*b^2/e
```

```
*n^2*ln(x)*dilog(-e*x/d)+I*ln(e*x+d)/e*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2-2/e*n*dilog(-e*x/d)*b^2*ln(c)+2*ln(e*x+d)/e*ln(c)*a*b+b^2*ln(e*x+d)/
e*ln(x^n)^2+ln(e*x+d)/e*ln(c)^2*b^2+1/2*ln(e*x+d)/e*Pi^2*b^2*csgn(I*c)*csgn
(I*c*x^n)^5-1/4*ln(e*x+d)/e*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-2*b^2*n^
2*polylog(3,-e*x/d)/e+1/2*ln(e*x+d)/e*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-
1/4*ln(e*x+d)/e*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+I/e*n*di
log(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+1/2*ln(e*x+d)/e*Pi^2*b^2*csgn(I*c)^2*csg
n(I*x^n)*csgn(I*c*x^n)^3-1/4*ln(e*x+d)/e*Pi^2*b^2*csgn(I*c*x^n)^6+2*ln(e*x+
d)/e*ln(x^n)*b^2*ln(c)+I*ln(e*x+d)/e*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(
e*x+d)/e*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I*ln(e*x+d)/e*ln(x^n)*b^2*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2+I/e*n*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)-I*ln(e*x+d)/e*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+
I/e*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*ln(
e*x+d)/e*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/e*n*ln(e*x+d)*ln(-e*x
/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*ln(e*x+d)/e*ln(x^n)*b^2*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

```
[Out] a^2*e^(-1)*log(x*e + d) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*
log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x*e + d), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b \log{(c x^n)})^2}{d + ex}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(e*x+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(d + e*x), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/(x*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d + e*x),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(d + e*x), x)
```

3.96 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx$

Optimal. Leaf size=79

$$-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d}+\frac{2bn(a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{d}{ex}\right)}{d}+\frac{2b^2n^2\operatorname{Li}_3\left(-\frac{d}{ex}\right)}{d}$$

```
[Out] -ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d+
2*b^2*n^2*polylog(3,-d/e/x)/d
```

Rubi [A]
time = 0.08, antiderivative size = 79, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2379, 2421, 6724}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d}+\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)),x]
```

```
[Out] -((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*(a + b*Log[c*x^n])*Po
lyLog[2, -(d/(e*x))])/d + (2*b^2*n^2*PolyLog[3, -(d/(e*x))])/d
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \frac{\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{d}$$

$$= -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d} + \frac{\text{Subst}\left(\int x^2\,dx, x, a+b\log(cx^n)\right)}{bdn} + \frac{(2bn)\int \frac{(a}{}}{}$$

$$= \frac{(a+b\log(cx^n))^3}{3bdn} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d} - \frac{2bn(a+b\log(cx^n))\,\text{Li}_2\left(-\frac{e}{}\right.}{d}$$

$$= \frac{(a+b\log(cx^n))^3}{3bdn} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d} - \frac{2bn(a+b\log(cx^n))\,\text{Li}_2\left(-\frac{e}{}\right.}{d}$$

Mathematica [A]
time = 0.04, size = 94, normalized size = 1.19

$$\frac{(a+b\log(cx^n))^3}{3bdn} - \frac{(a+b\log(cx^n))^2\log\left(\frac{d+ex}{d}\right)}{d} - \frac{2bn\left((a+b\log(cx^n))\,\text{Li}_2\left(-\frac{ex}{d}\right) - bn\text{Li}_3\left(-\frac{ex}{d}\right)\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)),x]
```

```
[Out] (a + b*Log[c*x^n])^3/(3*b*d*n) - ((a + b*Log[c*x^n])^2*Log[(d + e*x)/d])/d
- (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x
)/d)]))/d
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 2293, normalized size = 29.03

method	result	size
risch	Expression too large to display	2293

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] 2*b^2*n/d*ln(x^n)*dilog(-e*x/d)+I/d*ln(x)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^
2-2/d*ln(e*x+d)*ln(x^n)*b^2*ln(c)+I/d*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^
3+I*n/d*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b*ln(x^n)
/d*ln(x)*a-2*b/d*ln(e*x+d)*ln(x^n)*a+a^2/d*ln(x)-a^2/d*ln(e*x+d)-1/2/d*ln(e
*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-2*b^2/d*ln(x)*ln(e*x
+d)*ln(-e*x/d)*n^2-I/d*ln(x)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+I/d*ln(e*x+d)*ln(
x^n)*b^2*Pi*csgn(I*c*x^n)^3+I/d*ln(x)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n
)^2+I/d*ln(x)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-I/d*ln(x)*Pi*a*b*csgn(I*c*x^
n)^3-I*ln(x^n)/d*ln(x)*b^2*Pi*csgn(I*c*x^n)^3+I/d*ln(e*x+d)*Pi*a*b*csgn(I*c
```

```
*x^n)^3-b*n/d*ln(x)^2*a+2*b*n/d*dilog(-e*x/d)*a+1/4/d*ln(e*x+d)*Pi^2*b^2*cs
gn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/2/d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^
2*csgn(I*x^n)*csgn(I*c*x^n)^3+I*n/d*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2+I*ln(x^n)/d*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*n/d*dilog(-e
*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/d*ln(x)*ln(c)*Pi*b^2*csgn(I*c)*csg
n(I*c*x^n)^2+2*ln(x^n)/d*ln(x)*b^2*ln(c)-1/4/d*ln(x)*Pi^2*b^2*csgn(I*c*x^n)
^6+1/2/d*ln(x)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/2/d*ln(e*x+d)*Pi^2*b^
2*csgn(I*c)*csgn(I*c*x^n)^5-1/4/d*ln(x)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n
)^4+2*n/d*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)-1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2-I*n/d*dilog(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+1/2*I*n/d*ln(
x)^2*b^2*Pi*csgn(I*c*x^n)^3+2*b*n/d*ln(e*x+d)*ln(-e*x/d)*a+I/d*ln(e*x+d)*Pi
*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/d*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)^4-1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I
/d*ln(e*x+d)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-b^2*n/d*ln(x)^2*ln(x^
n)+1/4/d*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6+1/d*ln(e*x+d)*Pi^2*b^2*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4/d*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^
2*csgn(I*c*x^n)^2-I/d*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-I/d*
ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2/d*ln(x)*Pi^2*b^2*csg
n(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2/d*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*
x^n)^2*csgn(I*c*x^n)^3-b^2*ln(x^n)^2/d*ln(e*x+d)+b^2*ln(x^n)^2/d*ln(x)-1/d*
ln(e*x+d)*ln(c)^2*b^2+1/d*ln(x)*ln(c)^2*b^2-I*n/d*ln(e*x+d)*ln(-e*x/d)*b^2*
Pi*csgn(I*c*x^n)^3+2*b^2/d*n^2*polylog(3,-e*x/d)-I/d*ln(e*x+d)*ln(x^n)*b^2*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*b^2/d*ln(x)^3*n^2-n/d*ln(x)^2*b^2*ln(c)+
2/d*ln(x)*ln(c)*a*b+2*n/d*dilog(-e*x/d)*b^2*ln(c)-2/d*ln(e*x+d)*ln(c)*a*b+1
/4/d*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/2/d*ln(e*x+d)*Pi^2*
b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/4/d*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x
^n)^4+1/4/d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2/d*ln(x)*Pi^2
*b^2*csgn(I*c)*csgn(I*c*x^n)^5-I/d*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)
^2-I/d*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I*ln(x^n)/d*ln(x)*b^2*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b^2*n/d*ln(e*x+d)*ln(x^n)*ln(-e*x/d)-2*b^2/
d*ln(x)*dilog(-e*x/d)*n^2+b^2/d*n^2*ln(x)^2*ln(e*x+d)-b^2/d*n^2*ln(x)^2*ln(
1+e*x/d)-2*b^2/d*n^2*ln(x)*polylog(2,-e*x/d)-I*ln(x^n)/d*ln(x)*b^2*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/d*ln(x)*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+I/d*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*n
/d*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/d*ln(e*x+d)*ln(x
^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/d*ln(x)*ln(c)*Pi*b^2*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*n/d*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-I*n/d*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="maxima")
```

```
[Out] -a^2*(log(x*e + d)/d - log(x)/d) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2
 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^2*e + d*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^2*e + d*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})^2}{x\,(d + ex)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(e*x+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x*(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a + b\,\ln(c\,x^n))^2}{x\,(d + e\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x)),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x)), x)
```

3.97 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx$

Optimal. Leaf size=135

$$-\frac{2b^2n^2}{dx}-\frac{2bn(a+b\log(cx^n))}{dx}-\frac{(a+b\log(cx^n))^2}{dx}+\frac{e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2}-\frac{2ben(a+b\log(cx^n))\,\mathrm{Li}_2}{d^2}$$

```
[Out] -2*b^2*n^2/d/x-2*b*n*(a+b*ln(c*x^n))/d/x-(a+b*ln(c*x^n))^2/d/x+e*ln(1+d/e/x
)*(a+b*ln(c*x^n))^2/d^2-2*b*e*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d^2-2*b^2
*e*n^2*polylog(3,-d/e/x)/d^2
```

Rubi [A]

time = 0.16, antiderivative size = 135, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2380, 2342, 2341, 2379, 2421, 6724}

$$-\frac{2ben\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2}-\frac{2b^2en^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2}+\frac{e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^2}-\frac{2bn(a+b\log(cx^n))}{dx}-\frac{(a+b\log(cx^n))^2}{dx}-\frac{2b^2n^2}{dx}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)),x]
```

```
[Out] (-2*b^2*n^2)/(d*x) - (2*b*n*(a + b*Log[c*x^n]))/(d*x) - (a + b*Log[c*x^n])^
2/(d*x) + (e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^2 - (2*b*e*n*(a + b*L
og[c*x^n])*PolyLog[2, -(d/(e*x))])/d^2 - (2*b^2*e*n^2*PolyLog[3, -(d/(e*x))
])/d^2
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx &= \int \left(\frac{(a+b\log(cx^n))^2}{dx^2} - \frac{e(a+b\log(cx^n))^2}{d^2x} + \frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)}\right)dx \\
&= \frac{\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^2} + \frac{e^2\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{d^2} \\
&= -\frac{(a+b\log(cx^n))^2}{dx} + \frac{e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} - \frac{e\text{Subst}\left(\int x^2\,dx, x, a+b\right.}{bd^2n} \\
&= -\frac{2b^2n^2}{dx} - \frac{2bn(a+b\log(cx^n))}{dx} - \frac{(a+b\log(cx^n))^2}{dx} - \frac{e(a+b\log(cx^n))^3}{3bd^2n} + \frac{e(a-}{} \\
&= -\frac{2b^2n^2}{dx} - \frac{2bn(a+b\log(cx^n))}{dx} - \frac{(a+b\log(cx^n))^2}{dx} - \frac{e(a+b\log(cx^n))^3}{3bd^2n} + \frac{e(a-}{}
\end{aligned}
$$

Mathematica [A]

time = 0.07, size = 130, normalized size = 0.96

$$
-\frac{\frac{3d(a+b\log(cx^n))^2}{x} + \frac{e(a+b\log(cx^n))^3}{bn} + \frac{6bdn(a+bn+b\log(cx^n))}{x} - 3e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) - 6ben\left((a+b\log(cx^n))\,\text{Li}_2\left(-\frac{ex}{d}\right) - bn\text{Li}_3\left(-\frac{ex}{d}\right)\right)}{3d^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)),x]
```

```
[Out] -1/3*((3*d*(a + b*Log[c*x^n])^2)/x + (e*(a + b*Log[c*x^n])^3)/(b*n) + (6*b*
d*n*(a + b*n + b*Log[c*x^n]))/x - 3*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d]
 - 6*b*e*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e
*x)/d)]))/d^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.21, size = 3292, normalized size = 24.39

method	result	size
risch	Expression too large to display	3292

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^2/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] -I/d*n/x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4/d/x*Pi^2*b^2*csgn(I*c*x^n)^
6+I/d/x*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+I/d/x*Pi*a*b*csgn(I*c*x^n)^3+I/d/x*ln(
x^n)*b^2*Pi*csgn(I*c*x^n)^3+I/d*n/x*b^2*Pi*csgn(I*c*x^n)^3-1/2/d/x*Pi^2*b^2
*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-2/d/x*ln(c)*a*b+e/d^2*ln(e*x+d)*ln
(c)^2*b^2-2*b^2*n*e/d^2*ln(e*x+d)*ln(x^n)*ln(-e*x/d)-b^2*ln(x^n)^2/d/x-2*n*
e/d^2*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)+2*b*ln(x^n)*e/d^2*ln(e*x+d)*a+2*b^2*e/
d^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b*n*e/d^2*ln(e*x+d)*ln(-e*x/d)*a-b^2*e
/d^2*n^2*ln(x)^2*ln(e*x+d)+b^2*e/d^2*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2*e/d^2*n^
2*ln(x)*polylog(2,-e*x/d)+1/4*e/d^2*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n
)^4-1/2*e/d^2*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-I*n*e/d^2*ln(e*x+d)*
ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*n*e/d^2*ln(e*x+d)*ln(-e*x/d)*
b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-2*b^2*n/d/x*ln(x^n)-b^2*ln(x^n)^2*e/d^2*
ln(x)-I/d/x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-I/d/x*ln(c)*Pi*b^2*csgn(
I*x^n)*csgn(I*c*x^n)^2-I/d*n/x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-a^2/d/x+1/2
*I*n*e/d^2*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-2*ln(x^n)*e/d^2*ln(x)*b
^2*ln(c)+2*ln(x^n)*e/d^2*ln(e*x+d)*b^2*ln(c)+a^2*e/d^2*ln(e*x+d)-a^2*e/d^2*
ln(x)-2*b*ln(x^n)*e/d^2*ln(x)*a+I*e/d^2*ln(x)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+
1/4/d/x*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-e/d^2*ln(x)*ln(c
)^2*b^2-2/d*n/x*b^2*ln(c)+I*e/d^2*ln(x)*Pi*a*b*csgn(I*c*x^n)^3+I*n*e/d^2*di
log(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+I*ln(x^n)*e/d^2*ln(x)*b^2*Pi*csgn(I*c*x^
n)^3+I*n*e/d^2*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+1/4*e/d^2*ln(x)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/4*e/d^2*ln(e*x
+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/4*e/d^2*ln(e*x+d)*Pi^2*b^2*csg
n(I*c)^2*csgn(I*c*x^n)^4+1/2*e/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^
n)^5+1/2*e/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/2*e/d^2*ln(
x)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/2/d/x*Pi^2*b^2*csgn(I*c)*csgn(I*x
^n)^2*csgn(I*c*x^n)^3-2*b^2*e/d^2*n^2*polylog(3,-e*x/d)-1/3*b^2*e/d^2*ln(x)
^3*n^2-1/2*e/d^2*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/4
*e/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/2*I*n
*e/d^2*ln(x)^2*b^2*Pi*csgn(I*c*x^n)^3-2*b/d*n/x*a-1/2/d/x*Pi^2*b^2*csgn(I*x
```

```
^n)*csgn(I*c*x^n)^5+1/4*e/d^2*ln(x)*Pi^2*b^2*csgn(I*c*x^n)^6-1/2/d/x*Pi^2*b
^2*csgn(I*c)*csgn(I*c*x^n)^5+1/4/d/x*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4
+b^2*ln(x^n)^2*e/d^2*ln(e*x+d)+1/2*e/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(
I*x^n)^2*csgn(I*c*x^n)^3-e/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4-I/d/x*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+1/2*e/d^2*ln(e*x+d)*Pi^
2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/4*e/d^2*ln(x)*Pi^2*b^2*csgn
(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/2*e/d^2*ln(x)*Pi^2*b^2*csgn(I*c)^2*
csgn(I*x^n)*csgn(I*c*x^n)^3-I/d/x*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+e/d^2*
ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I*e/d^2*ln(e*x+d)*ln(c
)*Pi*b^2*csgn(I*c*x^n)^3-I*e/d^2*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-1/4*e/d^2
*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6+2*b^2*e/d^2*ln(x)*dilog(-e*x/d)*n^2-1/d
/x*ln(c)^2*b^2+1/4/d/x*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-2*b^2*n*e/d^2*l
n(x^n)*dilog(-e*x/d)+b^2*n*e/d^2*ln(x)^2*ln(x^n)-2*b*n*e/d^2*dilog(-e*x/d)*
a+b*n*e/d^2*ln(x)^2*a-2*n*e/d^2*dilog(-e*x/d)*b^2*ln(c)+n*e/d^2*ln(x)^2*b^2
*ln(c)+2*e/d^2*ln(e*x+d)*ln(c)*a*b-2*e/d^2*ln(x)*ln(c)*a*b-I*ln(x^n)*e/d^2*
ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-I/d/x*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^
n)^2-I/d/x*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*n*e/d^2*ln(x)^2
*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*ln(x^n)*e/d^2*ln(x)*b^2*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2+I*e/d^2*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I*ln
(x^n)*e/d^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/d/x*Pi*a*b*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+I*e/d^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(
I*c*x^n)^2-I*n*e/d^2*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*n*e/d
^2*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*n*e/d^2*ln(e*x+d)*ln(
-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+1/d/x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)^4-2/d/x*ln(x^n)*b^2*ln(c)-2*b/d/x*ln(x^n)*a-I*ln(x^n)*e/d^2*ln(x)*b^
2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*e/d^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*c
sgn(I*c*x^n)^2+I*e/d^2*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-I*e/d^2*l
n(x)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-I*e/d^2*ln(x)*ln(c)*Pi*b^2*csgn
(I*x^n)*csgn(I*c*x^n)^2-1/2*I*n*e/d^2*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-2*b^2*n^2/d/x+I*e/d^2*ln(x)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+I/d/x*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*
ln(x^n)*e/d^2*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/d*n/x*b^2*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/d/x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)-I*e/d^2*ln(x)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-I*e/d^2*ln(x)
*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*ln(x^n)*e/d^2*ln(e*x+d)*b^2*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*e/d^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)-I*e/d^2*ln(e*x+d)*Pi*a*b*...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="maxima")
```

```
[Out] a^2*(e*log(x*e + d)/d^2 - e*log(x)/d^2 - 1/(d*x)) + integrate((b^2*log(c)^2
 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^3*e +
d*x^2), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="fricas")
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^3*e + d*x^2), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))^2}{x^2(d + ex)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d),x)
[Out] Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)*x^2), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a + b\,\ln(c\,x^n))^2}{x^2\,(d + e\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)),x)
[Out] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)), x)
```

3.98 $\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$

Optimal. Leaf size=204

$$-\frac{b^2n^2}{4dx^2}+\frac{2b^2en^2}{d^2x}-\frac{bn(a+b\log(cx^n))}{2dx^2}+\frac{2ben(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{2dx^2}+\frac{e(a+b\log(cx^n))^2}{d^2x}-\frac{e^2\log$$

```
[Out] -1/4*b^2*n^2/d/x^2+2*b^2*e*n^2/d^2/x-1/2*b*n*(a+b*ln(c*x^n))/d/x^2+2*b*e*n*
(a+b*ln(c*x^n))/d^2/x-1/2*(a+b*ln(c*x^n))^2/d/x^2+e*(a+b*ln(c*x^n))^2/d^2/x
-e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^3+2*b*e^2*n*(a+b*ln(c*x^n))*polylog(2,
-d/e/x)/d^3+2*b^2*e^2*n^2*polylog(3,-d/e/x)/d^3
```

Rubi [A]
time = 0.24, antiderivative size = 204, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2380, 2342, 2341, 2379, 2421, 6724}

$$\frac{2be^2n\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}+\frac{2b^2e^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}-\frac{e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^3}+\frac{e(a+b\log(cx^n))^2}{d^2x}+\frac{2ben(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{2dx^2}-\frac{bn(a+b\log(cx^n))}{2dx^2}+\frac{2b^2en^2}{d^2x}-\frac{b^2n^2}{4dx^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)),x]
```

```
[Out] -1/4*(b^2*n^2)/(d*x^2) + (2*b^2*e*n^2)/(d^2*x) - (b*n*(a + b*Log[c*x^n]))/(
2*d*x^2) + (2*b*e*n*(a + b*Log[c*x^n]))/(d^2*x) - (a + b*Log[c*x^n])^2/(2*d
*x^2) + (e*(a + b*Log[c*x^n])^2)/(d^2*x) - (e^2*Log[1 + d/(e*x)]*(a + b*Log
[c*x^n])^2)/d^3 + (2*b*e^2*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^3
 + (2*b^2*e^2*n^2*PolyLog[3, -(d/(e*x))])/d^3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
```

```
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{dx^3} - \frac{e(a+b\log(cx^n))^2}{d^2x^2} + \frac{e^2(a+b\log(cx^n))^2}{d^3x} - \frac{e^3(a+b\log(\ldots}{d^3(d+e\ldots}\right.$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d^2} + \frac{e^2\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^3} - \frac{e^3\int \frac{(a+b\log(cx^n))^2}{d+ex}\ldots}{d^3}$$

$$= -\frac{(a+b\log(cx^n))^2}{2dx^2} + \frac{e(a+b\log(cx^n))^2}{d^2x} - \frac{e^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^3} + \frac{e^2\mathrm{S}\ldots}{}$$

$$= -\frac{b^2n^2}{4dx^2} + \frac{2b^2en^2}{d^2x} - \frac{bn(a+b\log(cx^n))}{2dx^2} + \frac{2ben(a+b\log(cx^n))}{d^2x} - \frac{(a+b\log(cx^n))\ldots}{2dx^2}$$

$$= -\frac{b^2n^2}{4dx^2} + \frac{2b^2en^2}{d^2x} - \frac{bn(a+b\log(cx^n))}{2dx^2} + \frac{2ben(a+b\log(cx^n))}{d^2x} - \frac{(a+b\log(cx^n))\ldots}{2dx^2}$$

Mathematica [A]
time = 0.09, size = 185, normalized size = 0.91

$$\frac{-\frac{6d^2(a+b\log(cx^n))^2}{x^2} + \frac{12de(a+b\log(cx^n))^2}{x} + \frac{4e^2(a+b\log(cx^n))^3}{bn} + \frac{24bden(a+bn+b\log(cx^n))}{x} - \frac{3bd^2n(2a+bn+2b\log(cx^n))}{x^2} - 12e^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) - 24be^2n\left((a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{ex}{d}\right) - bn\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)}{12d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)),x]
```

```
[Out] ((-6*d^2*(a + b*Log[c*x^n])^2)/x^2 + (12*d*e*(a + b*Log[c*x^n])^2)/x + (4*e
^2*(a + b*Log[c*x^n])^3)/(b*n) + (24*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x -
(3*b*d^2*n*(2*a + b*n + 2*b*Log[c*x^n]))/x^2 - 12*e^2*(a + b*Log[c*x^n])^2*
Log[1 + (e*x)/d] - 24*b*e^2*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] -
b*n*PolyLog[3, -((e*x)/d)]))/(12*d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 4413, normalized size = 21.63

method	result	size
risch	Expression too large to display	4413

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*I/d/x^2*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4/d/x^2*Pi^2*b^2*csgn(I*x
^n)*csgn(I*c*x^n)^5-1/4*e/d^2/x*Pi^2*b^2*csgn(I*c*x^n)^6+1/4*e^2/d^3*ln(e*x
+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/4*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c*x^n)^6-1/4
/d/x^2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+1/8/d/x^2*Pi^2*b^2*csgn(I*c)^2*cs
gn(I*c*x^n)^4+e^2/d^3*ln(x)*ln(c)^2*b^2-1/2/d*n/x^2*b^2*ln(c)-1/d/x^2*ln(c)
*a*b+e/d^2/x*ln(c)^2*b^2-e^2/d^3*ln(e*x+d)*ln(c)^2*b^2-I/d^2*n*e/x*b^2*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2/d/x^2*ln(c)^2*b^2+2*b^2*n/d^2*ln(x^n
)*e/x-b^2*n*e^2/d^3*ln(x)^2*ln(x^n)+1/2*e/d^2/x*Pi^2*b^2*csgn(I*c)^2*csgn(I
*x^n)*csgn(I*c*x^n)^3-2*b^2*e^2/d^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+b^2*e^2/
d^3*n^2*ln(x)^2*ln(e*x+d)-b^2*e^2/d^3*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2*e^2/d^3
*n^2*ln(x)*polylog(2,-e*x/d)-1/2*a^2/d/x^2-I*e^2/d^3*ln(e*x+d)*Pi*a*b*csgn(
I*x^n)*csgn(I*c*x^n)^2+1/2*I/d/x^2*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)-I*e^2/d^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I*n
*e^2/d^3*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/d^2*ln(x^n)*e/x*b^2*Pi*
csgn(I*c*x^n)^3+I*ln(x^n)*e^2/d^3*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*
ln(x^n)*e^2/d^3*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/d^2*ln(x^n)*e/x*
b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/4*I/d*n/x^2*b^2*Pi*csgn(I*c*x^n)^3+1/2*I
/d*ln(x^n)/x^2*b^2*Pi*csgn(I*c*x^n)^3-1/4*e/d^2/x*Pi^2*b^2*csgn(I*c)^2*csgn
(I*c*x^n)^4+1/2*I/d/x^2*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+2*b^2*n*e^2/d^3*ln(x^n
)*dilog(-e*x/d)-1/4*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-2*
b^2*e^2/d^3*ln(x)*dilog(-e*x/d)*n^2-I*e^2/d^3*ln(x)*Pi*a*b*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)-I*e/d^2/x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+2*e^2/d^3*ln(x)*ln(c)*a*b+2*e/d^2/x*ln(c)*a*b-2*e^2/d^3*ln(e*x+d)*ln(c)
*a*b+2/d^2*n*e/x*b^2*ln(c)-n*e^2/d^3*ln(x)^2*b^2*ln(c)+2*n*e^2/d^3*dilog(-e
*x/d)*b^2*ln(c)+I*e^2/d^3*ln(x)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I*e/d^2/
x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I*e/d^2/x*ln(c)*Pi*b^2*csgn(I*x^n)
*csgn(I*c*x^n)^2+1/3*b^2*e^2/d^3*ln(x)^3*n^2+2*n*e^2/d^3*ln(e*x+d)*ln(-e*x/
```

```
d)*b^2*ln(c)+2*b^2*e^2/d^3*n^2*polylog(3,-e*x/d)+1/8/d/x^2*Pi^2*b^2*csgn(I*
x^n)^2*csgn(I*c*x^n)^4-a^2*e^2/d^3*ln(e*x+d)+a^2*e^2/d^3*ln(x)+a^2*e/d^2/x+
2*b*n*e^2/d^3*ln(e*x+d)*ln(-e*x/d)*a-1/2*b/d*n/x^2*a-1/2*I/d*ln(x^n)/x^2*b^
2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*ln(x^n)*e^2/d^3*ln(x)*b^2*Pi*csgn(I*c*x^
n)^3-1/2*I/d*ln(x^n)/x^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/d*ln(x^n)/x^2*b
^2*ln(c)-1/2*b^2*ln(x^n)^2/d/x^2-2*b*ln(x^n)*e^2/d^3*ln(e*x+d)*a+2*b*ln(x^n
)*e^2/d^3*ln(x)*a+2*b/d^2*ln(x^n)*e/x*a-e/d^2/x*Pi^2*b^2*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)^4+1/2*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn
(I*c*x^n)^3+1/2*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n
)^3+1/2*I/d/x^2*Pi*a*b*csgn(I*c*x^n)^3-1/4*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c)
^2*csgn(I*c*x^n)^4+1/2*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-I*n
*e^2/d^3*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*
e^2/d^3*ln(x)*Pi*a*b*csgn(I*c*x^n)^3-I*e^2/d^3*ln(x)*ln(c)*Pi*b^2*csgn(I*c*
x^n)^3-I*e/d^2/x*Pi*a*b*csgn(I*c*x^n)^3+2/d^2*ln(x^n)*e/x*b^2*ln(c)-2*ln(x^
n)*e^2/d^3*ln(e*x+d)*b^2*ln(c)+2*ln(x^n)*e^2/d^3*ln(x)*b^2*ln(c)-I*e^2/d^3*
ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*e^2/d^3*ln(e*x+d)*Pi*a
*b*csgn(I*c)*csgn(I*c*x^n)^2-I*n*e^2/d^3*dilog(-e*x/d)*b^2*Pi*csgn(I*c*x^n)
^3-1/2*I/d/x^2*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-1/4*e/d^2/x*Pi^2*b^2*csgn(I
*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)^4-1/4*e^2/d^3*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*
csgn(I*c*x^n)^2+1/2*e/d^2/x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^
3+e^2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I*e/d^2/
x*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+2*b/d^2*n*e/x*a-b*n*e^2/d^3*ln(x)^2*a+2*b*n*
e^2/d^3*dilog(-e*x/d)*a-I/d^2*n*e/x*b^2*Pi*csgn(I*c*x^n)^3-1/2*I/d/x^2*ln(c
)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I/d/x^2*ln(c)*Pi*b^2*csgn(I*x^n)*csg
n(I*c*x^n)^2-1/2*e^2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*
c*x^n)^3+I*ln(x^n)*e^2/d^3*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+I*e^2/d^3*ln(e*
x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+I*e^2/d^3*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^
3+1/4*e^2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-
1/2*e^2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2*
I*n*e^2/d^3*ln(x)^2*b^2*Pi*csgn(I*c*x^n)^3-1/4*I/d*n/x^2*b^2*Pi*csgn(I*c)*c
sgn(I*c*x^n)^2-1/4*I/d*n/x^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+b^2*ln(x^n)
^2*e^2/d^3*ln(x)+b^2*ln(x^n)^2*e/d^2/x-1/2*b^2*n/d*ln(x^n)/x^2+1/8/d/x^2*Pi
^2*b^2*csgn(I*c*x^n)^6+I/d^2*ln(x^n)*e/x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
-1/4/d/x^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/2*e^2/d^3*ln(
e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+1/2*e^2/d^3*ln(x)*Pi^2*b^2*csgn
(I*x^n)*csgn(I*c*x^n)^5+I*e^2/d^3*ln(x)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n
)^2+I/d^2*n*e/x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/d*ln(x^n)/x^2*b^2*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*n*e^2/d^3*ln(x)^2*b^2*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2-I*n*e^2/d^3*ln(e*x+d)*ln(-...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="maxima")
```

```
[Out] -1/2*a^2*(2*e^2*log(x*e + d)/d^3 - 2*e^2*log(x)/d^3 - (2*x*e - d)/(d^2*x^2)
) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c)
 + a*b)*log(x^n))/(x^4*e + d*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^4*e + d*x^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b \log{(cx^n)})^2}{x^3 (d + ex)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**3/(e*x+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x**3*(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\,\ln(c\,x^n))^2}{x^3\,(d + e\,x)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^3*(d + e*x)),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x^3*(d + e*x)), x)
```

3.99 $\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$

Optimal. Leaf size=273

$$-\frac{2b^2n^2}{27dx^3}+\frac{b^2en^2}{4d^2x^2}-\frac{2b^2e^2n^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{9dx^3}+\frac{ben(a+b\log(cx^n))}{2d^2x^2}-\frac{2be^2n(a+b\log(cx^n))}{d^3x}-\frac{(a+b\log(cx^n))^2}{3dx^3}$$

```
[Out] -2/27*b^2*n^2/d/x^3+1/4*b^2*e*n^2/d^2/x^2-2*b^2*e^2*n^2/d^3/x-2/9*b*n*(a+b*
ln(c*x^n))/d/x^3+1/2*b*e*n*(a+b*ln(c*x^n))/d^2/x^2-2*b*e^2*n*(a+b*ln(c*x^n)
)/d^3/x-1/3*(a+b*ln(c*x^n))^2/d/x^3+1/2*e*(a+b*ln(c*x^n))^2/d^2/x^2-e^2*(a+
b*ln(c*x^n))^2/d^3/x+e^3*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^4-2*b*e^3*n*(a+b*l
n(c*x^n))*polylog(2,-d/e/x)/d^4-2*b^2*e^3*n^2*polylog(3,-d/e/x)/d^4
```

Rubi [A]
time = 0.34, antiderivative size = 273, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2380, 2342, 2341, 2379, 2421, 6724}

$$-\frac{2be^3n\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{2b^2e^3n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}+\frac{e^3\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}-\frac{e^2(a+b\log(cx^n))^2}{d^3x}-\frac{2be^2n(a+b\log(cx^n))}{d^3x}+\frac{e(a+b\log(cx^n))^2}{2d^2x^2}+\frac{ben(a+b\log(cx^n))}{2d^2x^2}-\frac{(a+b\log(cx^n))^2}{3dx^3}-\frac{2bn(a+b\log(cx^n))}{9dx^3}-\frac{2b^2e^2n^2}{d^3x}+\frac{b^2en^2}{4d^2x^2}-\frac{2b^2n^2}{27dx^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^4*(d + e*x)),x]
```

```
[Out] (-2*b^2*n^2)/(27*d*x^3) + (b^2*e*n^2)/(4*d^2*x^2) - (2*b^2*e^2*n^2)/(d^3*x)
 - (2*b*n*(a + b*Log[c*x^n]))/(9*d*x^3) + (b*e*n*(a + b*Log[c*x^n]))/(2*d^2
*x^2) - (2*b*e^2*n*(a + b*Log[c*x^n]))/(d^3*x) - (a + b*Log[c*x^n])^2/(3*d*
x^3) + (e*(a + b*Log[c*x^n])^2)/(2*d^2*x^2) - (e^2*(a + b*Log[c*x^n])^2)/(d
^3*x) + (e^3*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^4 - (2*b*e^3*n*(a + b
*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 - (2*b^2*e^3*n^2*PolyLog[3, -(d/(e
*x))])/d^4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{dx^4} - \frac{e(a+b\log(cx^n))^2}{d^2x^3} + \frac{e^2(a+b\log(cx^n))^2}{d^3x^2} - \frac{e^3(a+b\log}{d^4x}\right.$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{x^4}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx}{d^2} + \frac{e^2\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d^3} - \frac{e^3\int \frac{(a+b\log(cx^n))}{x}}{d^4}$$

$$= -\frac{(a+b\log(cx^n))^2}{3dx^3} + \frac{e(a+b\log(cx^n))^2}{2d^2x^2} - \frac{e^2(a+b\log(cx^n))^2}{d^3x} + \frac{e^3(a+b\log(c}{}$$

$$= -\frac{2b^2n^2}{27dx^3} + \frac{b^2en^2}{4d^2x^2} - \frac{2b^2e^2n^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{9dx^3} + \frac{ben(a+b\log(cx^n))}{2d^2x^2} - \frac{2be}{}$$

$$= -\frac{2b^2n^2}{27dx^3} + \frac{b^2en^2}{4d^2x^2} - \frac{2b^2e^2n^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{9dx^3} + \frac{ben(a+b\log(cx^n))}{2d^2x^2} - \frac{2be}{}$$

Mathematica [A]

time = 0.09, size = 237, normalized size = 0.87

$$\frac{-\frac{36d^3(a+b\log(cx^n))^2}{x^3} + \frac{54d^2e(a+b\log(cx^n))^2}{x^2} - \frac{108de^2(a+b\log(cx^n))^2}{x} - \frac{36e^3(a+b\log(cx^n))^3}{bn} - \frac{216bde^2n(a+bn+b\log(cx^n))}{x} + \frac{27bd^2en(2a+bn+2b\log(cx^n))}{x^2} - \frac{8bd^3n(3a+bn+3b\log(cx^n))}{x^3} + 108e^3(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 216be^3n\left((a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right) - bn\operatorname{Li}_3\left(-\frac{ex}{d}\right)\right)}{108d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^4*(d + e*x)),x]
```

```
[Out] ((-36*d^3*(a + b*Log[c*x^n])^2)/x^3 + (54*d^2*e*(a + b*Log[c*x^n])^2)/x^2 -
 (108*d*e^2*(a + b*Log[c*x^n])^2)/x - (36*e^3*(a + b*Log[c*x^n])^3)/(b*n) -
 (216*b*d*e^2*n*(a + b*n + b*Log[c*x^n]))/x + (27*b*d^2*e*n*(2*a + b*n + 2*
b*Log[c*x^n]))/x^2 - (8*b*d^3*n*(3*a + b*n + 3*b*Log[c*x^n]))/x^3 + 108*e^3
*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 216*b*e^3*n*((a + b*Log[c*x^n])*Po
lyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(108*d^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.22, size = 5435, normalized size = 19.91

method	result	size
risch	Expression too large to display	5435

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="maxima")
```

```
[Out] 1/6*a^2*(6*e^3*log(x*e + d)/d^4 - 6*e^3*log(x)/d^4 - (6*x^2*e^2 - 3*d*x*e +
 2*d^2)/(d^3*x^3)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c
) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^5*e + d*x^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^5*e + d*x^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b \log{\left(cx^{n} \right)}\right)^{2}}{x^{4} \left(d + ex\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**4/(e*x+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x**4*(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a+b\,\ln(c\,x^n))^2}{x^4\,(d+e\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^4*(d + e*x)),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x^4*(d + e*x)), x)
```

3.100 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal. Leaf size=281

$$\frac{4abdnx}{e^3}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}+\frac{4b^2dnx\log\left(cx^n\right)}{e^3}-\frac{bnx^2\left(a+b\log\left(cx^n\right)\right)}{2e^2}-\frac{2dx\left(a+b\log\left(cx^n\right)\right)^2}{e^3}+\frac{x^2\left(a+b\log\left(c\right.\right.}{2e^2}$$

```
[Out] 4*a*b*d*n*x/e^3-4*b^2*d*n^2*x/e^3+1/4*b^2*n^2*x^2/e^2+4*b^2*d*n*x*ln(c*x^n)
/e^3-1/2*b*n*x^2*(a+b*ln(c*x^n))/e^2-2*d*x*(a+b*ln(c*x^n))^2/e^3+1/2*x^2*(a
+b*ln(c*x^n))^2/e^2-d^2*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)+2*b*d^2*n*(a+b*ln(c
*x^n))*ln(1+e*x/d)/e^4+3*d^2*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4+2*b^2*d^2*n^
2*polylog(2,-e*x/d)/e^4+6*b*d^2*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^4-6*b
^2*d^2*n^2*polylog(3,-e*x/d)/e^4
```

Rubi [A]
time = 0.22, antiderivative size = 281, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2395, 2333, 2332, 2342, 2341, 2355, 2354, 2438, 2421, 6724}

$$\frac{6bd^2n\text{PolyLog}\left(2,-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{e^4}+\frac{2b^2d^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{6b^2d^2n^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{2bd^2n\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e^4}+\frac{3d^2\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2}{e^4}-\frac{d^2x\left(a+b\log\left(cx^n\right)\right)^2}{e^3(d+ex)}-\frac{2dx\left(a+b\log\left(cx^n\right)\right)^2}{e^3}-\frac{bnx^2\left(a+b\log\left(cx^n\right)\right)}{2e^2}+\frac{x^2\left(a+b\log\left(cx^n\right)\right)^2}{2e^2}+\frac{4abdnx}{e^3}+\frac{4b^2dnx\log\left(cx^n\right)}{e^3}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

```
[Out] (4*a*b*d*n*x)/e^3 - (4*b^2*d*n^2*x)/e^3 + (b^2*n^2*x^2)/(4*e^2) + (4*b^2*d*
n*x*Log[c*x^n])/e^3 - (b*n*x^2*(a + b*Log[c*x^n]))/(2*e^2) - (2*d*x*(a + b*
Log[c*x^n])^2)/e^3 + (x^2*(a + b*Log[c*x^n])^2)/(2*e^2) - (d^2*x*(a + b*Log
[c*x^n])^2)/(e^3*(d + e*x)) + (2*b*d^2*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d
])/e^4 + (3*d^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 + (2*b^2*d^2*n^2
*PolyLog[2, -((e*x)/d)])/e^4 + (6*b*d^2*n*(a + b*Log[c*x^n])*PolyLog[2, -((
e*x)/d)])/e^4 - (6*b^2*d^2*n^2*PolyLog[3, -((e*x)/d)])/e^4
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx &= \int \left(-\frac{2d(a+b\log(cx^n))^2}{e^3}+\frac{x(a+b\log(cx^n))^2}{e^2}-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^2}+\frac{3d^2(a\right.\\ &= -\frac{(2d)\int(a+b\log(cx^n))^2\,dx}{e^3}+\frac{(3d^2)\int\frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^3}-\frac{d^3\int\frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^3}\\ &= -\frac{2dx(a+b\log(cx^n))^2}{e^3}+\frac{x^2(a+b\log(cx^n))^2}{2e^2}-\frac{d^2x(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{3d^2(a}{}\\ &= \frac{4abdnx}{e^3}+\frac{b^2n^2x^2}{4e^2}-\frac{bnx^2(a+b\log(cx^n))}{2e^2}-\frac{2dx(a+b\log(cx^n))^2}{e^3}+\frac{x^2(a+b\log}{2e}\\ &= \frac{4abdnx}{e^3}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}+\frac{4b^2dnx\log(cx^n)}{e^3}-\frac{bnx^2(a+b\log(cx^n))}{2e^2}-\frac{2dx}{}\end{aligned}$$

Mathematica [A]
time = 0.14, size = 240, normalized size = 0.85

$$\frac{-8dex(a+b\log(cx^n))^2+2e^2x^2(a+b\log(cx^n))^2+\frac{4d^3(a+b\log(cx^n))^2}{d+ex}+16bdenx(a-bn+b\log(cx^n))+be^2nx^2(bn-2(a+b\log(cx^n)))+12d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)+4d^2\left(-\left((a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{ex}{d}\right)\right)\right)+2b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)\right)+24bd^2n\left((a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{ex}{d}\right)-bn\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)}{4e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

```
[Out] (-8*d*e*x*(a + b*Log[c*x^n])^2 + 2*e^2*x^2*(a + b*Log[c*x^n])^2 + (4*d^3*(a
 + b*Log[c*x^n])^2)/(d + e*x) + 16*b*d*e*n*x*(a - b*n + b*Log[c*x^n]) + b*e
^2*n*x^2*(b*n - 2*(a + b*Log[c*x^n])) + 12*d^2*(a + b*Log[c*x^n])^2*Log[1 +
 (e*x)/d] + 4*d^2*(-((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (
e*x)/d])) + 2*b^2*n^2*PolyLog[2, -((e*x)/d)]) + 24*b*d^2*n*((a + b*Log[c*x^
n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*e^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.21, size = 4871, normalized size = 17.33

method	result	size
risch	Expression too large to display	4871

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)

[Out] 1/e^2*x^2*ln(c)*a*b-2/e^3*d*x*ln(c)^2*b^2+3*I/e^4*n*ln(e*x+d)*ln(-e*x/d)*d^
2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*d^3/e^4/(e*x+d)*ln(c)*Pi*b^2
*csgn(I*x^n)*csgn(I*c*x^n)^2+I*d^3/e^4/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^
n)^2+I*d^3/e^4/(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e^2*x^2*Pi*
a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I/e^2*n*x^2*b^2*Pi*csgn(I*c*x^n
)^3+b^2/e^4*n^2*d^2*ln(x)^2-1/4*d^3/e^4/(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn
(I*c*x^n)^4-6*b^2*n/e^4*d^2*ln(e*x+d)*ln(x^n)*ln(-e*x/d)-1/e^3*d*x*Pi^2*b^2
*csgn(I*x^n)*csgn(I*c*x^n)^5+1/4/e^2*x^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*c
sgn(I*c*x^n)^3+1/2*d^3/e^4/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*
c*x^n)^3+1/2/e^3*d*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/e
^3*d*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+3/2/e^4*d^2*ln(e*x+
d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+I*n/e^4*d^2*ln(e*x)*b^2
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/e^2*x^2*ln(c)*Pi*b^2*csgn(I*c
)*csgn(I*c*x^n)^2+1/2*I/e^2*x^2*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+9/
4*I/e^4*d^2*n*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/4*d^3/e^4/(e*x+d)*Pi^2*b^2
*csgn(I*c*x^n)^6+1/4/e^2*x^2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/8/e^2*x
^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/4/e^2*x^2*Pi^2*b^2*csgn(I*c)*csgn
(I*c*x^n)^5-4/e^3*d*x*ln(c)*a*b+2*d^3/e^4/(e*x+d)*ln(c)*a*b+6/e^4*d^2*ln(e*
x+d)*ln(c)*a*b-1/2*I/e^2*x^2*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+1/2*a^2/e^2*x^2-2*a^2/e^3*d*x+3*a^2/e^4*d^2*ln(e*x+d)+a^2*d^3/e^4/(e*x+d
)-1/2*b/e^2*n*x^2*a-6*b/e^4*n*dilog(-e*x/d)*d^2*a-I*ln(x^n)*d^3/e^4/(e*x+d)
*b^2*Pi*csgn(I*c*x^n)^3-6*b^2*n/e^4*d^2*ln(x^n)*dilog(-e*x/d)+4*b^2*n/e^3*l
n(x^n)*x*d-2*b^2*n/e^4*ln(x^n)*d^2*ln(x)+1/2*I/e^2*ln(x^n)*x^2*b^2*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+1/2*I/e^2*ln(x^n)*x^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-6/e^4*n*ln(e*x+d)*ln(-e*x/d)*d^2*b^2*ln(c)+1/2/e^2*x^2*ln(c)^2*b^2+I*n/e
^4*d^2*ln(e*x)*b^2*Pi*csgn(I*c*x^n)^3+1/2*I/e^2*x^2*Pi*a*b*csgn(I*x^n)*csgn
(I*c*x^n)^2+1/2*I/e^2*x^2*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-2*I/e^3*n*x*d*b^
2*Pi*csgn(I*c*x^n)^3+9/2*b/e^4*d^2*n*a+2*ln(x^n)*ln(e*x+d)*d^2/e^4*b^2*n-4*
b/e^3*ln(x^n)*x*d*a+6*b^2/e^4*d^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-1/4*d^3/e^
4/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/2*d^3/e^4/(e
*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-6*b/e^4*n*ln(e*x+d)*
ln(-e*x/d)*d^2*a+3/2/e^4*d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csg
n(I*c*x^n)^3-1/e^3*d*x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+2/e
^3*d*x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-3/4/e^4*d^2*ln(e*x+d)
*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-3/e^4*d^2*ln(e*x+d)*Pi^
2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-d^3/e^4/(e*x+d)*Pi^2*b^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+3*I/e^4*n*dilog(-e*x/d)*d^2*b^2*Pi*csgn(I*c
*x^n)^3-1/4*I/e^2*n*x^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/4*I/e^2*n*x^2*b^
2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I/e^3*d*x*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+2
*I/e^3*d*x*Pi*a*b*csgn(I*c*x^n)^3-4*b^2*d*n^2*x/e^3-6*b^2*d^2*n^2*polylog(3
,-e*x/d)/e^4+2*I/e^3*ln(x^n)*x*d*b^2*Pi*csgn(I*c*x^n)^3-3*I/e^4*d^2*ln(x^n)
*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+6/e^4*d^2*ln(x^n)*ln(e*x+d)*b^2*ln(c)+2*l
n(x^n)*d^3/e^4/(e*x+d)*b^2*ln(c)-4/e^3*ln(x^n)*x*d*b^2*ln(c)+4*a*b*d*n*x/e^
```

```
3-3*I/e^4*d^2*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-3*I/e^4*d^2*ln(e*x+d)*ln(c)*
Pi*b^2*csgn(I*c*x^n)^3+6*b/e^4*d^2*ln(x^n)*ln(e*x+d)*a+2*b*ln(x^n)*d^3/e^4/
(e*x+d)*a-1/2*I/e^2*x^2*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-2*b^2/e^4*n^2*dilog(-e
*x/d)*d^2-6/e^4*n*dilog(-e*x/d)*d^2*b^2*ln(c)-2*n/e^4*d^2*ln(e*x)*b^2*ln(c)
+2*n/e^4*d^2*ln(e*x+d)*b^2*ln(c)+4/e^3*n*x*d*b^2*ln(c)-2*b*n/e^4*d^2*ln(e*x
)*a+2*b*n/e^4*d^2*ln(e*x+d)*a+1/2*b^2*ln(x^n)^2/e^2*x^2+6*b^2/e^4*d^2*ln(x)
*dilog(-e*x/d)*n^2+1/2/e^3*d*x*Pi^2*b^2*csgn(I*c*x^n)^6-3/4/e^4*d^2*ln(e*x+
d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/8/e^2*x^2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n
)^4-3*b^2/e^4*d^2*n^2*ln(x)^2*ln(e*x+d)+3*b^2/e^4*d^2*n^2*ln(x)^2*ln(1+e*x/
d)+6*b^2/e^4*d^2*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2/e^4*n^2*ln(e*x+d)*ln(-e*
x/d)*d^2-I*n/e^4*d^2*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-I*d^3/e^4/(e*x+d)*Pi*
a*b*csgn(I*c*x^n)^3-I*d^3/e^4/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+9/4*I/e^
4*d^2*n*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+3/2/e^4*d^2*ln(e*x+d)*Pi^2*b^2*c
sgn(I*x^n)*csgn(I*c*x^n)^5+d^3/e^4/(e*x+d)*ln(c)^2*b^2+3/e^4*d^2*ln(e*x+d)*
ln(c)^2*b^2+9/2/e^4*d^2*n*b^2*ln(c)-1/2/e^2*n*x^2*b^2*ln(c)+3*I/e^4*d^2*ln(
x^n)*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-3*I/e^4*n*dilog(-e*x/d)*d^2
*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3*I/e^4*d^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I
*c)*csgn(I*c*x^n)^2-1/8/e^2*x^2*Pi^2*b^2*csgn(I*c*x^n)^6+1/2/e^3*d*x*Pi^2*b
^2*csgn(I*c)^2*csgn(I*c*x^n)^4+I*n/e^4*d^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(
I*c*x^n)^2+I*d^3/e^4/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-I*n/e^4
*d^2*ln(e*x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-9/4*I/e^4*d^2*n*b^2*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I/e^2*ln(x^n)*x^2*b^2*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+3*I/e^4*n*ln(e*x+d)*ln(-e*x/d)*d^2*b^2*Pi*csgn(I*c*x^n)
^3-2*I/e^3*ln(x^n)*x*d*b^2*Pi*csgn(I*x^n)*csgn(...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*(6*d^2*e^(-4)*log(x*e + d) + 2*d^3/(x*e^5 + d*e^4) + (x^2*e - 4*d*x)*e^
(-3))*a^2 + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^3*log(x^
n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(x^2*e^2 +
 2*d*x*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^3/(x*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^3\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

```
[Out] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

3.101 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal. Leaf size=203

$$-\frac{2abnx}{e^2}+\frac{2b^2n^2x}{e^2}-\frac{2b^2nx\log(cx^n)}{e^2}+\frac{x(a+b\log(cx^n))^2}{e^2}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{2bdn(a+b\log(cx^n))\log(1+$$

```
[Out] -2*a*b*n*x/e^2+2*b^2*n^2*x/e^2-2*b^2*n*x*ln(c*x^n)/e^2+x*(a+b*ln(c*x^n))^2/
e^2+d*x*(a+b*ln(c*x^n))^2/e^2/(e*x+d)-2*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e
^3-2*d*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^3-2*b^2*d*n^2*polylog(2,-e*x/d)/e^3-
4*b*d*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^3+4*b^2*d*n^2*polylog(3,-e*x/d)
/e^3
```

Rubi [A]
time = 0.19, antiderivative size = 203, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2395, 2333, 2332, 2355, 2354, 2438, 2421, 6724}

$$-\frac{4bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}-\frac{2b^2dn^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{4b^2dn^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}-\frac{2bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}-\frac{2d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^2}-\frac{2abnx}{e^2}-\frac{2b^2nx\log(cx^n)}{e^2}+\frac{2b^2n^2x}{e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

```
[Out] (-2*a*b*n*x)/e^2 + (2*b^2*n^2*x)/e^2 - (2*b^2*n*x*Log[c*x^n])/e^2 + (x*(a +
 b*Log[c*x^n])^2)/e^2 + (d*x*(a + b*Log[c*x^n])^2)/(e^2*(d + e*x)) - (2*b*d
*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 - (2*d*(a + b*Log[c*x^n])^2*Log
[1 + (e*x)/d])/e^3 - (2*b^2*d*n^2*PolyLog[2, -((e*x)/d)])/e^3 - (4*b*d*n*(a
 + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^3 + (4*b^2*d*n^2*PolyLog[3, -((e
*x)/d)])/e^3
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
```

```
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx &= \int \left(\frac{(a+b\log(cx^n))^2}{e^2}+\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^2}-\frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)}\right)dx \\
&= \frac{\int (a+b\log(cx^n))^2\,dx}{e^2}-\frac{(2d)\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^2}+\frac{d^2\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^2} \\
&= \frac{x(a+b\log(cx^n))^2}{e^2}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{2d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3}+ \\
&= -\frac{2abnx}{e^2}+\frac{x(a+b\log(cx^n))^2}{e^2}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{2bdn(a+b\log(cx^n))\,\mathrm{lo}}{e^3} \\
&= -\frac{2abnx}{e^2}+\frac{2b^2n^2x}{e^2}-\frac{2b^2nx\log(cx^n)}{e^2}+\frac{x(a+b\log(cx^n))^2}{e^2}+\frac{dx(a+b\log(cx^n)}{e^2(d+ex)}
\end{aligned}
$$

Mathematica [A]
time = 0.12, size = 186, normalized size = 0.92

$$
\frac{d(a+b\log(cx^n))^2+ex(a+b\log(cx^n))^2-\frac{d^2(a+b\log(cx^n))^2}{d+ex}-2benx(a-bn+b\log(cx^n))-2bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-2d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)-2b^2dn^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)-4bdn(a+b\log(cx^n))\mathrm{Li}_2\left(-\frac{ex}{d}\right)+4b^2dn^2\mathrm{Li}_3\left(-\frac{ex}{d}\right)}{e^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

```
[Out] (d*(a + b*Log[c*x^n])^2 + e*x*(a + b*Log[c*x^n])^2 - (d^2*(a + b*Log[c*x^n]
)^2)/(d + e*x) - 2*b*e*n*x*(a - b*n + b*Log[c*x^n]) - 2*b*d*n*(a + b*Log[c*
x^n])*Log[1 + (e*x)/d] - 2*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] - 2*b^2*
d*n^2*PolyLog[2, -((e*x)/d)] - 4*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x
)/d)] + 4*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 3778, normalized size = 18.61

method	result	size
risch	Expression too large to display	3778

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2*b^2*ln(x^n)^2/e^3*d*ln(e*x+d)-2/e^2*n*x*b^2*ln(c)+1/4*d^2/e^3/(e*x+d)*Pi
^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+I/e^3*n*d*b^2*Pi*csgn(I*c*x^n)^3-I/e^3
*n*d*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2*I/e^3*d*ln(e*x+d)*ln(c)*Pi*b^2*csgn
(I*c*x^n)^3-I/e^2*n*x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4*d^2/e^3/(e*x+d
)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/2*d^2/e^3/(e*x+d)*Pi
```

^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/e^3*d*ln(e*x+d)*Pi^2*b^2*c
sgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/e^3*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)
*csgn(I*x^n)^2*csgn(I*c*x^n)^3-x/e^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)^4+1/2/e^3*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/4*x/e^2*Pi^2*b^2*cs
gn(I*x^n)^2*csgn(I*c*x^n)^4+1/2*x/e^2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+
2*b^2/e^3*n^2*dilog(-e*x/d)*d-b^2/e^3*n^2*d*ln(x)^2+4*b/e^3*n*ln(e*x+d)*ln(
-e*x/d)*d*a+2*I/e^3*n*dilog(-e*x/d)*d*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*ln
(x^n)*d^2/e^3/(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-4*b^2/e^3*d*ln(x)*
ln(e*x+d)*ln(-e*x/d)*n^2+a^2*x/e^2-1/2*d^2/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)^2
*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2/e^3*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(
I*x^n)^2*csgn(I*c*x^n)^2+2/e^3*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)^4+I*x/e^2*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2*a^2/e^3*d
*ln(e*x+d)-a^2*d^2/e^3/(e*x+d)+2*b^2/e^3*n^2*ln(e*x+d)*ln(-e*x/d)*d-4*b^2/e
^3*d*ln(x)*dilog(-e*x/d)*n^2+I/e^2*ln(x^n)*x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2+I*x/e^2*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-2/e^3*n*d*b^2*ln(c)-2*n/e^3*d
*ln(e*x+d)*b^2*ln(c)+2*n/e^3*d*ln(e*x)*b^2*ln(c)+4/e^3*n*dilog(-e*x/d)*d*b^
2*ln(c)+d^2/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+2*I/
e^3*ln(e*x+d)*ln(x^n)*d*b^2*Pi*csgn(I*c*x^n)^3+2*I/e^3*d*ln(e*x+d)*Pi*a*b*c
sgn(I*c*x^n)^3-2*I/e^3*n*dilog(-e*x/d)*d*b^2*Pi*csgn(I*c*x^n)^3-I*n/e^3*d*l
n(e*x)*b^2*Pi*csgn(I*c*x^n)^3-I/e^2*n*x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2*
b^2*n/e^3*ln(x)*ln(x^n)*d-2*b^2*n/e^3*ln(e*x+d)*ln(x^n)*d-4/e^3*ln(e*x+d)*l
n(x^n)*d*b^2*ln(c)-2*ln(x^n)*d^2/e^3/(e*x+d)*b^2*ln(c)+I*x/e^2*Pi*a*b*csgn(
I*x^n)*csgn(I*c*x^n)^2-I*x/e^2*Pi*a*b*csgn(I*c*x^n)^3-2*I/e^3*n*ln(e*x+d)*l
n(-e*x/d)*d*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*d^2/e^3/(e*x+d)*ln
(c)*Pi*b^2*csgn(I*c*x^n)^3+I*x/e^2*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I
*d^2/e^3/(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-I/e^3*n*d*b^2*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2+I*ln(x^n)*d^2/e^3/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+I*n/e^3*d*ln(e*x
+d)*b^2*Pi*csgn(I*c*x^n)^3-2*a*b*n*x/e^2+4*b^2*d*n^2*polylog(3,-e*x/d)/e^3+
2*I/e^3*n*ln(e*x+d)*ln(-e*x/d)*d*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*n/e^3
*d*ln(e*x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/e^3*d*ln(e*x+d)*Pi^
2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+b^2*ln(x^n)^2*x/e^2+x/e^2*ln(c)^2*b^2-2*b
/e^3*n*d*a-4/e^3*d*ln(e*x+d)*ln(c)*a*b+1/4*d^2/e^3/(e*x+d)*Pi^2*b^2*csgn(I*
c*x^n)^6-1/4*x/e^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*x/e^2*Pi^2*b^2*
csgn(I*c)*csgn(I*c*x^n)^5+4/e^3*n*ln(e*x+d)*ln(-e*x/d)*d*b^2*ln(c)+2*b/e^2*
ln(x^n)*x*a-2*b*n/e^3*d*ln(e*x+d)*a+2*b*n/e^3*d*ln(e*x)*a+4*b/e^3*n*dilog(-
e*x/d)*d*a-2*d^2/e^3/(e*x+d)*ln(c)*a*b-2*b^2/e^3*d*n^2*ln(x)^2*ln(1+e*x/d)-
4*b^2/e^3*d*n^2*ln(x)*polylog(2,-e*x/d)+2*b^2/e^3*d*n^2*ln(x)^2*ln(e*x+d)-4
*b/e^3*ln(e*x+d)*ln(x^n)*d*a-2*b*ln(x^n)*d^2/e^3/(e*x+d)*a+4*b^2*n/e^3*d*ln
(x^n)*dilog(-e*x/d)-d^2/e^3/(e*x+d)*ln(c)^2*b^2-2/e^3*d*ln(e*x+d)*ln(c)^2*b
^2+I/e^2*ln(x^n)*x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-2*I/e^3*d*ln(e*x+d)*ln(
c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2*b^2*n/e^2*ln(x^n)*x+2*x/e^2*ln(c)*a
*b-I*x/e^2*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-1/4*x/e^2*Pi^2*b^2*csgn(I*c*x^n)^6+
I/e^2*n*x*b^2*Pi*csgn(I*c*x^n)^3-I*d^2/e^3/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*
c*x^n)^2+I/e^2*n*x*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2/e^3*d*ln(
e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/2*d^2/e^3/(e*x+d)*Pi^2*b^2*

```
csgn(I*c)*csgn(I*c*x^n)^5+1/4*d^2/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c
*x^n)^4-I/e^2*ln(x^n)*x*b^2*Pi*csgn(I*c*x^n)^3+1/2/e^3*d*ln(e*x+d)*Pi^2*b^2
*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2*x/e^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csg
n(I*c*x^n)^3+2*I/e^3*n*dilog(-e*x/d)*d*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I
/e^2*ln(x^n)*x*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*I/e^3*d*ln(e*x+
d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-2*I/e^3*d*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*
csgn(I*c*x^n)^2-I*x/e^2*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*
n/e^3*d*ln(e*x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*n/e^3*d*ln(e*x)*b^2*Pi
*csgn(I*c)*csgn(I*c*x^n)^2-2*I/e^3*d*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(
I*c*x^n)^2-I*d^2/e^3/(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I/e
^3*ln(e*x+d)*ln(x^n)*d*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+2/e^2*ln(x^n)*x*b
^2*ln(c)-2*I/e^3*n*ln(e*x+d)*ln(-e*x/d)*d*b^2*Pi*csgn(I*c*x^n)^3-2*I/e^3*ln
(e*x+d)*ln(x^n)*d*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2*b^2*n^2*x/e^2-b^2*ln(x
^n)^2*d^2/e^3/(e*x+d)-I*x/e^2*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/
e^3*n*d*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*d^2/e^3/(e*x+d)*Pi*a*b
*csgn(I*x^n)*csgn(I*c*x^n)^2-I*n/e^3*d*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*
x^n)^2-I*n/e^3*d*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*c...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] -(2*d*e^(-3)*log(x*e + d) - x*e^(-2) + d^2/(x*e^4 + d*e^3))*a^2 + integrate
((b^2*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n) + (b^2*log(c)^2 +
2*a*b*log(c))*x^2)/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(x^2*e^2 +
 2*d*x*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\log{(cx^n)})^2}{(d+ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^2/(x*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^2\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

```
[Out] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

3.102 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal. Leaf size=143

$$-\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{2b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right)}{e^2}+\frac{2b}{}$$

```
[Out] -x*(a+b*ln(c*x^n))^2/e/(e*x+d)+2*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^2+(a+b*l
n(c*x^n))^2*ln(1+e*x/d)/e^2+2*b^2*n^2*polylog(2,-e*x/d)/e^2+2*b*n*(a+b*ln(c
*x^n))*polylog(2,-e*x/d)/e^2-2*b^2*n^2*polylog(3,-e*x/d)/e^2
```

Rubi [A]
time = 0.15, antiderivative size = 143, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2395, 2355, 2354, 2438, 2421, 6724}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^2}+\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}+\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^2}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^2}-\frac{x(a+b\log(cx^n))^2}{e(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

```
[Out] -((x*(a + b*Log[c*x^n])^2)/(e*(d + e*x))) + (2*b*n*(a + b*Log[c*x^n])*Log[1
 + (e*x)/d])/e^2 + ((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^2 + (2*b^2*n^2
*PolyLog[2, -((e*x)/d)])/e^2 + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)
/d)])/e^2 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^2
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
```

```
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}
\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx &= \int \left(-\frac{d(a+b\log(cx^n))^2}{e(d+ex)^2}+\frac{(a+b\log(cx^n))^2}{e(d+ex)}\right)dx \\
&= \frac{\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e}-\frac{d\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e} \\
&= -\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{(2bn)\int \frac{(a+b\log(cx^n))\log(1}{x}}{e^2} \\
&= -\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{(a+b\log(cx^n))^2\log}{e^2} \\
&= -\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{(a+b\log(cx^n))^2\log}{e^2}
\end{aligned}$$

Mathematica [A]
time = 0.09, size = 142, normalized size = 0.99

$$\frac{-(a+b\log(cx^n))^2+\frac{d(a+b\log(cx^n))^2}{d+ex}+2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)+2b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right)+2bn(a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right)-2b^2n^2\text{Li}_3\left(-\frac{ex}{d}\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

```
[Out] (-(a + b*Log[c*x^n])^2 + (d*(a + b*Log[c*x^n])^2)/(d + e*x) + 2*b*n*(a + b*
Log[c*x^n])*Log[1 + (e*x)/d] + (a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 2*b^
2*n^2*PolyLog[2, -((e*x)/d)] + 2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/
d)] - 2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 2674, normalized size = 18.70

method	result	size
risch	Expression too large to display	2674

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/e^2*n*dilog(-e*x/d)*b^2*ln(c)-2*n/e^2*ln(e*x)*b^2*ln(c)+2*n/e^2*ln(e*x+d
)*b^2*ln(c)-1/4*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-2*b/e^
2*n*dilog(-e*x/d)*a+a^2/e^2*ln(e*x+d)+a^2*d/e^2/(e*x+d)-I*d/e^2/(e*x+d)*Pi*
a*b*csgn(I*c*x^n)^3-I*d/e^2/(e*x+d)*ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3+1/2/e^2*
ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+2*b*d/e^2/(e*x+d)*ln(x^n)*a-
1/4/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/4/e^2*ln(e*x+d)*
Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/e^2*ln(e*x+d)*ln(c)^2*
b^2+d/e^2/(e*x+d)*ln(c)^2*b^2+2/e^2*ln(e*x+d)*ln(c)*a*b+I*d/e^2/(e*x+d)*ln(
c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I/e^2*n*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+I*n/e^2*ln(e*x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+I*d/e^2/(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I*d/e^2/
(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I/e^2*ln(e*x+d)*Pi*a*b*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)-I/e^2*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)^4-I/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*b/e^
2*n*ln(e*x+d)*ln(-e*x/d)*a+2*b^2/e^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-I/e^2*l
n(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-2*b*n/e^2*ln(e*x)*a+2*b*n/e^2*ln(e*x+d)*a+1
/2/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+2*d/e^2/(
e*x+d)*ln(x^n)*b^2*ln(c)-2*b^2*n/e^2*ln(e*x+d)*ln(x^n)*ln(-e*x/d)-I*d/e^2/(
e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+I*n/e^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn
(I*c*x^n)^2+I/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+b^2/e^
2*n^2*ln(x)^2-2*b^2/e^2*n^2*dilog(-e*x/d)-I/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn
(I*c*x^n)^3+b^2*ln(x^n)^2/e^2*ln(e*x+d)+1/2/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c
)*csgn(I*c*x^n)^5-1/4*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-I*n/e^2*ln(e*x
)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*n/e^2*ln(e*x)*b^2*Pi*csgn(I*x^n)*csgn(
I*c*x^n)^2-d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/4
*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-I/e^2*n*d
ilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I/e^2*n*dilog(-e*x/d)*b^2*P
i*csgn(I*c)*csgn(I*c*x^n)^2-2/e^2*n*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)+2*d/e^2/
(e*x+d)*ln(c)*a*b-1/4/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/
```

```
2*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+I/e^2*ln(x
^n)*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/e^2*ln(x^n)*ln(e*x+d)*b^2*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/e^2*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c
*x^n)^3-2*b^2/e^2*n^2*ln(e*x+d)*ln(-e*x/d)+I*n/e^2*ln(e*x+d)*b^2*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2+I/e^2*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b
^2/e^2*ln(x)*dilog(-e*x/d)*n^2-b^2/e^2*n^2*ln(x)^2*ln(e*x+d)+b^2/e^2*n^2*ln
(x)^2*ln(1+e*x/d)+2*b^2/e^2*n^2*ln(x)*polylog(2,-e*x/d)+I/e^2*ln(e*x+d)*Pi*
a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/e^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I
*c*x^n)^2+1/2*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^
3+2*b/e^2*ln(x^n)*ln(e*x+d)*a+2/e^2*ln(x^n)*ln(e*x+d)*b^2*ln(c)+I/e^2*n*dil
og(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+1/2*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*x^n)*cs
gn(I*c*x^n)^5-I/e^2*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2
+I*d/e^2/(e*x+d)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*d/e^2/(e*x+d)*l
n(x^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/e^2*ln(x^n)*ln(e*x+d)*b
^2*Pi*csgn(I*c*x^n)^3-I/e^2*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-2*b^2*n/e^2*ln(x^n)*ln(x)-1/4/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c
*x^n)^6-I*d/e^2/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*d/e^
2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+I*n/e^2*ln(e*x)*b^2*Pi*csgn(
I*c*x^n)^3+1/2/e^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)
^3-I*n/e^2*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-2*b^2*n/e^2*ln(x^n)*dilog(-e*x/
d)+I*d/e^2/(e*x+d)*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*d/e^2/(e*x+
d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-2*b^2*n^2*polylog(3,-e*x/d)/e^2+2*ln(x^
n)*ln(e*x+d)/e^2*b^2*n+b^2*ln(x^n)^2*d/e^2/(e*x+d)-I*d/e^2/(e*x+d)*ln(c)*Pi
*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/e^2*n*ln(e*x+d)*ln(-e*x/d)*b^2*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*d/e^2/(e*x+d)*Pi^2*b^2*csgn(I*c)*
csgn(I*c*x^n)^5-I*n/e^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] (e^(-2)*log(x*e + d) + d/(x*e^3 + d*e^2))*a^2 + integrate((b^2*x*log(x^n)^2
 + 2*(b^2*log(c) + a*b)*x*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x)/(x^2*
e^2 + 2*d*x*e + d^2), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(x^2*e^2 + 2*d*x
*e + d^2), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a + b\log(cx^n))^2}{(d + ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x/(x*e + d)^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,(a + b\,\ln(c\,x^n))^2}{(d + e\,x)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

```
[Out] int((x*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

3.103 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

Optimal. Leaf size=77

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de}-\frac{2b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right)}{de}$$

```
[Out] x*(a+b*ln(c*x^n))^2/d/(e*x+d)-2*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d/e-2*b^2*n
^2*polylog(2,-e*x/d)/d/e
```

Rubi [A]
time = 0.04, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}=0.150$, Rules used = {2355, 2354, 2438}

$$-\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{de}-\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{de}+\frac{x(a+b\log(cx^n))^2}{d(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d + e*x)^2,x]
```

```
[Out] (x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 +
(e*x)/d])/(d*e) - (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/(d*e)
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{(2bn)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d}$$
$$= \frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de} + \frac{(2b^2n^2)\int \frac{\log\left(1+\frac{ex}{d}\right)}{x}\,dx}{de}$$
$$= \frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de} - \frac{2b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{de}$$

Mathematica [A]
time = 0.04, size = 81, normalized size = 1.05

$$\frac{(a+b\log(cx^n))\left(aex+bex\log(cx^n)-2bn(d+ex)\log\left(1+\frac{ex}{d}\right)\right)-2b^2n^2(d+ex)\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{de(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^2,x]
```

```
[Out] ((a + b*Log[c*x^n])*(a*e*x + b*e*x*Log[c*x^n] - 2*b*n*(d + e*x)*Log[1 + (e*
x)/d]) - 2*b^2*n^2*(d + e*x)*PolyLog[2, -((e*x)/d)])/(d*e*(d + e*x))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 755, normalized size = 9.81

method	result
risch	$\frac{i\ln(x^n)b^2\pi\mathrm{csgn}(icx^n)^3}{(ex+d)e} + \frac{in\ln(x)b^2\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2}{ed} + \frac{i\ln(x^n)b^2\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)}{(ex+d)e} - \frac{in\ln(ex+d)b^2\pi\,\mathrm{csgn}(ic}{ed}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -I/(e*x+d)/e*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/e*n/d*ln(x)*b^2*Pi*
csgn(I*c*x^n)^3-2*b/e*n/d*ln(e*x+d)*a+2*b/e*n/d*ln(x)*a-2/e*n/d*ln(e*x+d)*b
^2*ln(c)+2/e*n/d*ln(x)*b^2*ln(c)-2*b^2/e*n/d*ln(e*x+d)*ln(x^n)+2*b^2/e*n*ln
(x^n)/d*ln(x)-1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n
)^3+2*b*ln(c)+2*a)^2/(e*x+d)/e-b^2/e*n^2/d*ln(x)^2+I/e*n/d*ln(e*x+d)*b^2*Pi
*csgn(I*c*x^n)^3-I/(e*x+d)/e*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b
^2/e*n^2/d*ln(e*x+d)*ln(-e*x/d)+2*b^2/e*n^2/d*dilog(-e*x/d)+I/(e*x+d)/e*ln(
x^n)*b^2*Pi*csgn(I*c*x^n)^3-2*b/(e*x+d)/e*ln(x^n)*a-2/(e*x+d)/e*ln(x^n)*b^2
*ln(c)-b^2/(e*x+d)/e*ln(x^n)^2+I/e*n/d*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)
^2+I/e*n/d*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/e*n/d*ln(
```

```
x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/(e*x+d)/e*ln(x^n)*b^2*Pi*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/e*n/d*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I
*c*x^n)^2-I/e*n/d*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/e*n/d*ln(x
)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
[Out] -2*a*b*n*(e^(-1)*log(x*e + d)/d - e^(-1)*log(x)/d) - b^2*(log(x^n)^2/(x*e^2
 + d*e) - integrate((x*e*log(c)^2 + 2*((n + log(c))*x*e + d*n)*log(x^n))/(x
^3*e^3 + 2*d*x^2*e^2 + d^2*x*e), x)) - 2*a*b*log(c*x^n)/(x*e^2 + d*e) - a^2
/(x*e^2 + d*e)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^2*e^2 + 2*d*x*e + d
^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log{(cx^n)})^2}{(d+ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(e*x+d)**2,x)
[Out] Integral((a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/(x*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{\left(d+e\,x\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d + e*x)^2,x)
```

```
[Out] int((a + b*log(c*x^n))^2/(d + e*x)^2, x)
```

3.104 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$

Optimal. Leaf size=151

$$-\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2}+\frac{2bn(a+b\log(cx^{n}}{d^2}$$

```
[Out] -e*x*(a+b*ln(c*x^n))^2/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^2+2*b*n*
(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d^2
+2*b^2*n^2*polylog(2,-e*x/d)/d^2+2*b^2*n^2*polylog(3,-d/e/x)/d^2
```

Rubi [A]
time = 0.17, antiderivative size = 151, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2389, 2379, 2421, 6724, 2355, 2354, 2438}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2}+\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2}+\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2}+\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^2}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^2}-\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^2),x]
```

```
[Out] -((e*x*(a + b*Log[c*x^n])^2)/(d^2*(d + e*x))) - (Log[1 + d/(e*x)]*(a + b*Lo
g[c*x^n])^2)/d^2 + (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^2 + (2*b*n
*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^2 + (2*b^2*n^2*PolyLog[2, -((
e*x)/d)])/d^2 + (2*b^2*n^2*PolyLog[3, -(d/(e*x))])/d^2
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
```

```
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{d}$$

$$= -\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)} + \frac{\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^2} - \frac{e\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{d^2} + \frac{(2ben)\int \frac{a+b\log}{d+e}}{d^2}$$

$$= -\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} - \frac{(a+b\log(cx^n))^2\log(}{d^2}$$

$$= -\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^3}{3bd^2n} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} - \frac{(}{}$$

$$= -\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^3}{3bd^2n} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} - \frac{(}{}$$

Mathematica [A]
time = 0.12, size = 166, normalized size = 1.10

$$\frac{-3(a+b\log(cx^n))^2+\frac{3d(a+b\log(cx^n))^2}{d+ex}+\frac{(a+b\log(cx^n))^3}{bn}+6bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-3(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)+6b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right)-6bn(a+b\log(cx^n))\,\text{Li}_2\left(-\frac{ex}{d}\right)+6b^2n^2\text{Li}_3\left(-\frac{ex}{d}\right)}{3d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^2),x]
```

```
[Out] (-3*(a + b*Log[c*x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/(d + e*x) + (a + b*Lo
g[c*x^n])^3/(b*n) + 6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 3*(a + b*Lo
g[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*n^2*PolyLog[2, -((e*x)/d)] - 6*b*n*(a
+ b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 6*b^2*n^2*PolyLog[3, -((e*x)/d)])/
(3*d^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 3536, normalized size = 23.42

method	result	size
risch	Expression too large to display	3536

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I/d^2*n*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*n/d^2*ln(e
*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/d^2*ln(e*x+d)*Pi^2*b^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I/d/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-I/d^2*n*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+I/d^2*ln(x)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I/d/(e*x+d)*ln(c)*Pi*
b^2*csgn(I*c)*csgn(I*c*x^n)^2+I/d/(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c
*x^n)^2+1/2/d^2*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-b^2*ln(x^n)^2/d^2*
ln(e*x+d)+b^2*ln(x^n)^2/d/(e*x+d)+b^2*ln(x^n)^2/d^2*ln(x)+I/d/(e*x+d)*ln(x^
n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/4/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^
2*csgn(I*c*x^n)^4+1/4/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+
2*n/d^2*ln(e*x+d)*b^2*ln(c)+2/d^2*n*dilog(-e*x/d)*b^2*ln(c)-2/d^2*ln(e*x+d)
*ln(c)*a*b+2/d^2*ln(x)*ln(c)*a*b-a^2/d^2*ln(e*x+d)+a^2/d/(e*x+d)+a^2/d^2*ln
(x)+I/d^2*ln(x^n)*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2/d^2*n*ln(e*x+d)*
ln(-e*x/d)*b^2*ln(c)+2*b^2*n/d^2*ln(x^n)*dilog(-e*x/d)+I/d^2*ln(x^n)*ln(x)*
b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*n/d^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(
I*c*x^n)^2-1/d/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-b^2/d
^2*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^2*n^2*ln(x)*polylog(2,-e*x/d)+2*b/d^2*n*
ln(e*x+d)*ln(-e*x/d)*a+1/2/d/(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1
/4/d^2*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-1/4/d/(e*x+d)*Pi^2*b^2*cs
gn(I*c)^2*csgn(I*c*x^n)^4-1/4/d^2*ln(x)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n
)^4-2*b^2/d^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+I/d^2*n*dilog(-e*x/d)*b^2*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-2*b^2/d^2*n^2*ln(e*x+d)*ln(-e*x/d)-2*b^2/d^2*ln(
```

x)*dilog(-e*x/d)*n^2+b^2/d^2*n^2*ln(x)^2*ln(e*x+d)-1/2/d^2*ln(e*x+d)*Pi^2*b
^2*csgn(I*c)*csgn(I*c*x^n)^5+1/2/d^2*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2
*csgn(I*c*x^n)^3-2*b*n/d^2*ln(x)*a+2*b/d^2*n*dilog(-e*x/d)*a-b/d^2*n*ln(x)^
2*a+1/d/(e*x+d)*ln(c)^2*b^2-1/d^2*ln(e*x+d)*ln(c)^2*b^2+1/d^2*ln(x)*ln(c)^2
*b^2+2*b^2/d^2*n^2*polylog(3,-e*x/d)+1/4/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2
*csgn(I*x^n)^2*csgn(I*c*x^n)^2+I/d/(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)
^2+I/d^2*ln(x)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/d^2*n*dilog(-e*x/d)*b^2*P
i*csgn(I*c)*csgn(I*c*x^n)^2+I/d/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-I/
d^2*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I/d^2*ln(e*x+d)*ln(c
)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-I/d^2*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(
I*c*x^n)^2-1/2*I/d^2*n*ln(x)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/d^2
*n*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*n/d^2*ln(x)*b^2*Pi*csgn(I*c)*
csgn(I*c*x^n)^2-I/d^2*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+
1/2/d^2*ln(x)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+2*b^2*n/d^2*ln(e*x+d)*ln
(x^n)*ln(-e*x/d)+1/3*b^2/d^2*ln(x)^3*n^2+b^2/d^2*n^2*ln(x)^2-2*b^2/d^2*n^2*
dilog(-e*x/d)-I*n/d^2*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I/d^2*n*ln(e
*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3-I/d^2*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn
(I*c)*csgn(I*c*x^n)^2-1/4/d/(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+
1/2/d/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+1/4/d^2*ln(e*x+d)*Pi^2*b^2
*csgn(I*c*x^n)^6-1/4/d/(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/2/d^2*ln(e*x+d)*P
i^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+2*b*n/d^2*ln(e*x+d)*a+I/d^2*ln(x)*ln(c)
*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I/d^2*ln(x)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn
(I*c*x^n)^2-b^2*n/d^2*ln(x)^2*ln(x^n)+I*n/d^2*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-I/d^2*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/d/(e*x+d
)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-2*n/d^2*ln(x)*b^2*ln(c)+2/d/(e*x
+d)*ln(c)*a*b-1/d^2*n*ln(x)^2*b^2*ln(c)-2/d^2*ln(x^n)*ln(e*x+d)*b^2*ln(c)+2
/d/(e*x+d)*ln(x^n)*b^2*ln(c)+2/d^2*ln(x^n)*ln(x)*b^2*ln(c)-1/4/d/(e*x+d)*Pi
^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-I/d/(e*x+d)*Pi*a*b*csgn(I*
c*x^n)^3+2*ln(x^n)*ln(e*x+d)/d^2*b^2*n-1/2/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)
*csgn(I*x^n)^2*csgn(I*c*x^n)^3-I/d^2*ln(x)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-2*b
^2*n/d^2*ln(x^n)*ln(x)+2*b/d/(e*x+d)*ln(x^n)*a+2*b/d^2*ln(x^n)*ln(x)*a-I/d/
(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/d^2*ln(e*x+d)*ln
(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/d/(e*x+d)*ln(x^n)*b^2*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/d^2*ln(x^n)*ln(x)*b^2*Pi*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)-I/d^2*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+I/d^2*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3+I/d^2*ln(e*x+d)*
ln(c)*Pi*b^2*csgn(I*c*x^n)^3-I/d^2*ln(x)*Pi*a*b*csgn(I*c*x^n)^3-I/d^2*n*dil
og(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3+1/2/d/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x
^n)^2*csgn(I*c*x^n)^3-1/4/d^2*ln(x)*Pi^2*b^2*csgn(I*c*x^n)^6-2*b/d^2*ln(x^n
)*ln(e*x+d)*a-1/2/d^2*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^3-I/d/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-I*n/d^2*ln(e*x+d)*b^2*Pi*csg
n(I*c*x^n)^3+1/2/d^2*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3
-1/4/d^2*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-I/d/(e*x+
d)*ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3+I/d^2*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn(I*c*x
^n)^3+I*n/d^2*ln(x)*b^2*Pi*csgn(I*c*x^n)^3-1/d^...

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] a^2*(1/(d*x*e + d^2) - log(x*e + d)/d^2 + log(x)/d^2) + integrate((b^2*log(
c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^3*
e^2 + 2*d*x^2*e + d^2*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^3*e^2 + 2*d*x^2*e +
 d^2*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})^2}{x(d + ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^2*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a + b\,\ln(c\,x^n))^2}{x\,(d + e\,x)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x)^2),x)
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x)^2), x)
```

3.105 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$

Optimal. Leaf size=211

$$-\frac{2b^2n^2}{d^2x}-\frac{2bn(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{d^2x}+\frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)}+\frac{2e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^3}-$$

```
[Out] -2*b^2*n^2/d^2/x-2*b*n*(a+b*ln(c*x^n))/d^2/x-(a+b*ln(c*x^n))^2/d^2/x+e^2*x*
(a+b*ln(c*x^n))^2/d^3/(e*x+d)+2*e*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^3-2*b*e*n
*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3-4*b*e*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/
d^3-2*b^2*e*n^2*polylog(2,-e*x/d)/d^3-4*b^2*e*n^2*polylog(3,-d/e/x)/d^3
```

Rubi [A]
time = 0.22, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {2395, 2342, 2341, 2355, 2354, 2438, 2379, 2421, 6724}

$$-\frac{4ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}-\frac{2b^2en^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{4b^2en^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}+\frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)}-\frac{2ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^3}+\frac{2e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^3}-\frac{2bn(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{d^2x}-\frac{2b^2n^2}{d^2x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^2),x]
```

```
[Out] (-2*b^2*n^2)/(d^2*x) - (2*b*n*(a + b*Log[c*x^n]))/(d^2*x) - (a + b*Log[c*x^
n])^2/(d^2*x) + (e^2*x*(a + b*Log[c*x^n])^2)/(d^3*(d + e*x)) + (2*e*Log[1 +
 d/(e*x)]*(a + b*Log[c*x^n])^2)/d^3 - (2*b*e*n*(a + b*Log[c*x^n])*Log[1 + (
e*x)/d])/d^3 - (4*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^3 - (2
*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^3 - (4*b^2*e*n^2*PolyLog[3, -(d/(e*x))
])/d^3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
```

```
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{d^2x^2} - \frac{2e(a+b\log(cx^n))^2}{d^3x} + \frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^2} + \right.$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d^2} - \frac{(2e)\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^3} + \frac{(2e^2)\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{d^3} +$$

$$= -\frac{(a+b\log(cx^n))^2}{d^2x} + \frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)} + \frac{2e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^3} -$$

$$= -\frac{2b^2n^2}{d^2x} - \frac{2bn(a+b\log(cx^n))}{d^2x} - \frac{(a+b\log(cx^n))^2}{d^2x} + \frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)} -$$

$$= -\frac{2b^2n^2}{d^2x} - \frac{2bn(a+b\log(cx^n))}{d^2x} - \frac{(a+b\log(cx^n))^2}{d^2x} + \frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)} -$$

<u>Mathematica</u> [A]
time = 0.21, size = 223, normalized size = 1.06

$$-\frac{\frac{6b^2dn^2}{x} + \frac{6bdn(a+b\log(cx^n))}{x} - 3e(a+b\log(cx^n))^2 + \frac{3d(a+b\log(cx^n))^2}{x} + \frac{3de(a+b\log(cx^n))^2}{d+ex} + \frac{2e(a+b\log(cx^n))^3}{bn} + 6ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 6e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 6b^2en^2\mathrm{Li}_2\left(-\frac{ex}{d}\right) - 12ben(a+b\log(cx^n))\mathrm{Li}_2\left(-\frac{ex}{d}\right) + 12b^2en^2\mathrm{Li}_3\left(-\frac{ex}{d}\right)}{3d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^2),x]
```

```
[Out] -1/3*((6*b^2*d*n^2)/x + (6*b*d*n*(a + b*Log[c*x^n]))/x - 3*e*(a + b*Log[c*x
^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/x + (3*d*e*(a + b*Log[c*x^n])^2)/(d + e
*x) + (2*e*(a + b*Log[c*x^n])^3)/(b*n) + 6*b*e*n*(a + b*Log[c*x^n])*Log[1 +
 (e*x)/d] - 6*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*e*n^2*PolyLog
[2, -((e*x)/d)] - 12*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b
^2*e*n^2*PolyLog[3, -((e*x)/d)])/d^3
```

<u>Maple</u> [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.22, size = 4586, normalized size = 21.73

method	result	size
risch	Expression too large to display	4586

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 4*b^2/d^3*e*ln(x)*dilog(-e*x/d)*n^2-2*b^2/d^3*e*n^2*ln(x)^2*ln(e*x+d)+2*b^2
/d^3*e*n^2*ln(x)^2*ln(1+e*x/d)+4*b^2/d^3*e*n^2*ln(x)*polylog(2,-e*x/d)-2/3*
b^2/d^3*e*ln(x)^3*n^2-4*b^2/d^3*e*n^2*polylog(3,-e*x/d)-b^2/d^3*n^2*e*ln(x)
^2+2*b^2/d^3*n^2*e*dilog(-e*x/d)+2*I/d^3*n*e*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*cs
```

gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I/d^3*e*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x
^n)*csgn(I*c*x^n)^2-I*e/d^2/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-1/2/d^
3*e*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/4/d^2/x*Pi^2*b^2*csg
n(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/4*e/d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)
^2*csgn(I*c*x^n)^4+1/2/d^3*e*ln(x)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2
*b^2/d^3*n^2*e*ln(e*x+d)*ln(-e*x/d)-2/d^2*ln(x^n)/x*b^2*ln(c)-I/d^3*n*e*ln(
x)^2*b^2*Pi*csgn(I*c*x^n)^3+2*I/d^3*n*e*dilog(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^
3-I/d^2*n/x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-a^2/d^2/x-1/d^2/x*ln(c)^2*b^2-
1/2/d^2/x*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+1/4/d^2/x*Pi^2*b^2*csgn(I*x^n)
^2*csgn(I*c*x^n)^4-1/2/d^2/x*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/2*e/d^2
/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-1/2/d^2/x*Pi^2*b^2*csgn(I*c)^2*
csgn(I*x^n)*csgn(I*c*x^n)^3+1/d^2/x*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)^4+1/d^3*e*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-2*ln(x^n)*e/d^
2/(e*x+d)*b^2*ln(c)+2*b^2*n/d^3*ln(x^n)*e*ln(x)-2*b*ln(x^n)*e/d^2/(e*x+d)*a
+4*b/d^3*ln(x^n)*e*ln(e*x+d)*a-4*b/d^3*ln(x^n)*e*ln(x)*a+2*I/d^3*e*ln(x)*ln
(c)*Pi*b^2*csgn(I*c*x^n)^3+2*I/d^3*e*ln(x)*Pi*a*b*csgn(I*c*x^n)^3+e/d^2/(e*
x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I/d^2/x*ln(c)*Pi*b^2*cs
gn(I*c)*csgn(I*c*x^n)^2+2*b^2*n/d^3*e*ln(x)^2*ln(x^n)-4*b^2*n/d^3*e*ln(x^n)
*dilog(-e*x/d)-2*b^2*n/d^3*ln(x^n)*e*ln(e*x+d)+2*b^2*ln(x^n)^2/d^3*e*ln(e*x
+d)+4*b^2/d^3*e*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*e/d^2/(e*x+d)*ln(c)*a*b+4/
d^3*e*ln(e*x+d)*ln(c)*a*b-4/d^3*e*ln(x)*ln(c)*a*b+2/d^3*n*e*ln(x)^2*b^2*ln(
c)-4/d^3*n*e*dilog(-e*x/d)*b^2*ln(c)-2*n/d^3*e*ln(e*x+d)*b^2*ln(c)+2*n/d^3*
e*ln(x)*b^2*ln(c)+1/2/d^3*e*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I
*c*x^n)^2-1/2/d^3*e*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x
^n)^2+2/d^3*e*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-4*b/d^3*
n*e*dilog(-e*x/d)*a-2*b*n/d^3*e*ln(e*x+d)*a+2*b*n/d^3*e*ln(x)*a+2*b/d^3*n*e
*ln(x)^2*a-a^2*e/d^2/(e*x+d)+2*a^2/d^3*e*ln(e*x+d)-2*a^2/d^3*e*ln(x)+1/4*e/
d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/2*e/d^2/(e
*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/2*e/d^2/(e*x+d)*Pi
^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+I*e/d^2/(e*x+d)*ln(c)*Pi*b^2
*csgn(I*c*x^n)^3+I*e/d^2/(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-2/d^3*e*ln(e*x+d)*P
i^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+1/d^3*e*ln(e*x+d)*Pi^2*b^2*cs
gn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/d^3*e*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*
csgn(I*x^n)^2*csgn(I*c*x^n)^3-I/d^2*n/x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-
I*n/d^3*e*ln(x)*b^2*Pi*csgn(I*c*x^n)^3+1/4*e/d^2/(e*x+d)*Pi^2*b^2*csgn(I*c*
x^n)^6-4*b/d^3*n*e*ln(e*x+d)*ln(-e*x/d)*a-4/d^3*n*e*ln(e*x+d)*ln(-e*x/d)*b^
2*ln(c)-b^2*ln(x^n)^2/d^2/x-I/d^2/x*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I/
d^3*e*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-2*I/d^3*e*ln(e*x+d)*Pi*a*b*csg
n(I*c*x^n)^3-I/d^2*ln(x^n)/x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I/d^2/x*ln(
c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I/d^2/x*Pi*a*b*csgn(I*c)*csgn(I*c*x^n
)^2-2*b/d^2*n/x*a-2/d^2*n/x*b^2*ln(c)+1/d^3*e*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n
)*csgn(I*c*x^n)^5+1/2/d^3*e*ln(x)*Pi^2*b^2*csgn(I*c*x^n)^6+4/d^3*ln(x^n)*e*
ln(e*x+d)*b^2*ln(c)-4/d^3*ln(x^n)*e*ln(x)*b^2*ln(c)-b^2*ln(x^n)^2*e/d^2/(e*
x+d)+I*ln(x^n)*e/d^2/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+I*n/d^3*e*ln(e*x+d)*b^2
*Pi*csgn(I*c*x^n)^3-1/d^3*e*ln(x)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c

```
*x^n)^3-1/d^3*e*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-2*I/
d^3*ln(x^n)*e*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-I/d^2*ln(x^n)/x*b^2*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+2*I/d^3*ln(x^n)*e*ln(x)*b^2*Pi*csgn(I*c*x^n)^3-1/2/d^3
*e*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6+1/4/d^2/x*Pi^2*b^2*csgn(I*c)^2*csgn(I
*c*x^n)^4+I/d^2*n/x*b^2*Pi*csgn(I*c*x^n)^3-I*e/d^2/(e*x+d)*ln(c)*Pi*b^2*csg
n(I*x^n)*csgn(I*c*x^n)^2-I*ln(x^n)*e/d^2/(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2-2*b^2*ln(x^n)^2/d^3*e*ln(x)-2*b^2*n/d^2*ln(x^n)/x-I*e/d^2/(e*x+d)*
ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+2*I/d^3*e*ln(x)*ln(c)*Pi*b^2*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I/d^3*e*ln(x)*Pi*a*b*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+2*I/d^3*e*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+2*I/d^3*e
*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I*e/d^2/(e*x+d)*Pi*a*b*csgn(I
*x^n)*csgn(I*c*x^n)^2-2*I/d^3*n*e*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2+I/d^3*n*e*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/d^2*n/x*b^2*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/d^2/x*Pi*a*b*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+I/d^2/x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*n/d
^3*e*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/d^3*n*e*ln(x)^2*b^2*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-2*I/d^3*ln(x^n)*e*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2+2*I/d^3*ln(x^n)*e*ln(e*x+d)*b^2*Pi*csgn...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] -a^2*((2*x*e + d)/(d^2*x^2*e + d^3*x) - 2*e*log(x*e + d)/d^3 + 2*e*log(x)/d
^3) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(
c) + a*b)*log(x^n))/(x^4*e^2 + 2*d*x^3*e + d^2*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^4*e^2 + 2*d*x^3*e +
 d^2*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b \log{\left(c x^{n} \right)}\right)^{2}}{x^{2} \left(d + e x\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^2*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{x^2\,\left(d+e\,x\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^2),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^2), x)
```

3.106 $\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$

Optimal. Leaf size=285

$$-\frac{b^2n^2}{4d^2x^2}+\frac{4b^2en^2}{d^3x}-\frac{bn(a+b\log(cx^n))}{2d^2x^2}+\frac{4ben(a+b\log(cx^n))}{d^3x}-\frac{(a+b\log(cx^n))^2}{2d^2x^2}+\frac{2e(a+b\log(cx^n))^2}{d^3x}-\frac{e^3x}{}$$

```
[Out] -1/4*b^2*n^2/d^2/x^2+4*b^2*e*n^2/d^3/x-1/2*b*n*(a+b*ln(c*x^n))/d^2/x^2+4*b*
e*n*(a+b*ln(c*x^n))/d^3/x-1/2*(a+b*ln(c*x^n))^2/d^2/x^2+2*e*(a+b*ln(c*x^n))
^2/d^3/x-e^3*x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)-3*e^2*ln(1+d/e/x)*(a+b*ln(c*x^
n))^2/d^4+2*b*e^2*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^4+6*b*e^2*n*(a+b*ln(c*x^n
))*polylog(2,-d/e/x)/d^4+2*b^2*e^2*n^2*polylog(2,-e*x/d)/d^4+6*b^2*e^2*n^2*
polylog(3,-d/e/x)/d^4
```

Rubi [A]
time = 0.26, antiderivative size = 285, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {2395, 2342, 2341, 2355, 2354, 2438, 2379, 2421, 6724}

$$\frac{6be^2n\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}+\frac{2b^2e^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{6b^2e^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}-\frac{e^3x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{3e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}+\frac{2be^2n\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4}+\frac{2e(a+b\log(cx^n))^2}{d^3x}+\frac{4ben(a+b\log(cx^n))}{d^3x}-\frac{(a+b\log(cx^n))^2}{2d^2x^2}-\frac{bn(a+b\log(cx^n))}{2d^2x^2}+\frac{4b^2en^2}{d^3x}-\frac{b^2n^2}{4d^2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)^2),x]
```

```
[Out] -1/4*(b^2*n^2)/(d^2*x^2) + (4*b^2*e*n^2)/(d^3*x) - (b*n*(a + b*Log[c*x^n]))
/(2*d^2*x^2) + (4*b*e*n*(a + b*Log[c*x^n]))/(d^3*x) - (a + b*Log[c*x^n])^2/
(2*d^2*x^2) + (2*e*(a + b*Log[c*x^n])^2)/(d^3*x) - (e^3*x*(a + b*Log[c*x^n]
)^2)/(d^4*(d + e*x)) - (3*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^4 +
(2*b*e^2*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^4 + (6*b*e^2*n*(a + b*Log
[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 + (2*b^2*e^2*n^2*PolyLog[2, -((e*x)/d)
])/d^4 + (6*b^2*e^2*n^2*PolyLog[3, -(d/(e*x))])/d^4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
```

```
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx &= \int \left(\frac{(a+b\log(cx^n))^2}{d^2x^3} - \frac{2e(a+b\log(cx^n))^2}{d^3x^2} + \frac{3e^2(a+b\log(cx^n))^2}{d^4x} - \frac{e^3(a+b\log
}{d^3(d
}\right.\\
&= \frac{\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx}{d^2} - \frac{(2e)\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d^3} + \frac{(3e^2)\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^4} - \frac{(3e^3)\int \frac{(a
}{}\\
&= -\frac{(a+b\log(cx^n))^2}{2d^2x^2} + \frac{2e(a+b\log(cx^n))^2}{d^3x} - \frac{e^3x(a+b\log(cx^n))^2}{d^4(d+ex)} - \frac{3e^2(a+b\log
}{}\\
&= -\frac{b^2n^2}{4d^2x^2} + \frac{4b^2en^2}{d^3x} - \frac{bn(a+b\log(cx^n))}{2d^2x^2} + \frac{4ben(a+b\log(cx^n))}{d^3x} - \frac{(a+b\log(cx
}{2d^2x^2}\\
&= -\frac{b^2n^2}{4d^2x^2} + \frac{4b^2en^2}{d^3x} - \frac{bn(a+b\log(cx^n))}{2d^2x^2} + \frac{4ben(a+b\log(cx^n))}{d^3x} - \frac{(a+b\log(cx
}{2d^2x^2}
\end{aligned}
$$

Mathematica [A]
time = 0.12, size = 268, normalized size = 0.94

$$
\frac{-\frac{2d^2(a+b\log(cx^n))^2}{x^2} + \frac{8de(a+b\log(cx^n))^2}{x} + \frac{4de^2(a+b\log(cx^n))^2}{d+ex} + \frac{4e^2(a+b\log(cx^n))^3}{bn} + \frac{16bden(a+bn+b\log(cx^n))}{x} - \frac{bd^2n(2a+bn+2b\log(cx^n))}{x^2} - 12e^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 4e^2\left(-\left((a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{ex}{d}\right)\right)\right) + 2b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)\right) - 24be^2n\left((a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{ex}{d}\right) - bn\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)}{4d^4}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)^2),x]
```

```
[Out] ((-2*d^2*(a + b*Log[c*x^n])^2)/x^2 + (8*d*e*(a + b*Log[c*x^n])^2)/x + (4*d*
e^2*(a + b*Log[c*x^n])^2)/(d + e*x) + (4*e^2*(a + b*Log[c*x^n])^3)/(b*n) +
(16*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x - (b*d^2*n*(2*a + b*n + 2*b*Log[c*x
^n]))/x^2 - 12*e^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 4*e^2*(-((a + b*
Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (e*x)/d])) + 2*b^2*n^2*PolyLo
g[2, -((e*x)/d)]) - 24*b*e^2*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] -
 b*n*PolyLog[3, -((e*x)/d)]))/(4*d^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.26, size = 5791, normalized size = 20.32

method	result	size
risch	Expression too large to display	5791

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*a^2*((6*x^2*e^2 + 3*d*x*e - d^2)/(d^3*x^3*e + d^4*x^2) - 6*e^2*log(x*e
+ d)/d^4 + 6*e^2*log(x)/d^4) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2
*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^5*e^2 + 2*d*x^4*e + d^2*x^3
), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^5*e^2 + 2*d*x^4*e +
 d^2*x^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))^2}{x^3 (d + ex)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**3/(e*x+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x**3*(d + e*x)**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^2*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b \ln(c x^n))^2}{x^3 (d + e x)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^3*(d + e*x)^2),x)
[Out] int((a + b*log(c*x^n))^2/(x^3*(d + e*x)^2), x)
```

3.107 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal. Leaf size=296

$$-\frac{2abnx}{e^3}+\frac{2b^2n^2x}{e^3}-\frac{2b^2nx\log\left(cx^n\right)}{e^3}+\frac{bdnx(a+b\log\left(cx^n\right))}{e^3(d+ex)}-\frac{d(a+b\log\left(cx^n\right))^2}{2e^4}+\frac{x(a+b\log\left(cx^n\right))^2}{e^3}+\frac{d^3(a+$$

```
[Out] -2*a*b*n*x/e^3+2*b^2*n^2*x/e^3-2*b^2*n*x*ln(c*x^n)/e^3+b*d*n*x*(a+b*ln(c*x^
n))/e^3/(e*x+d)-1/2*d*(a+b*ln(c*x^n))^2/e^4+x*(a+b*ln(c*x^n))^2/e^3+1/2*d^3
*(a+b*ln(c*x^n))^2/e^4/(e*x+d)^2+3*d*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)-b^2*d*
n^2*ln(e*x+d)/e^4-5*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^4-3*d*(a+b*ln(c*x^n
))^2*ln(1+e*x/d)/e^4-5*b^2*d*n^2*polylog(2,-e*x/d)/e^4-6*b*d*n*(a+b*ln(c*x^
n))*polylog(2,-e*x/d)/e^4+6*b^2*d*n^2*polylog(3,-e*x/d)/e^4
```

Rubi [A]
time = 0.31, antiderivative size = 327, normalized size of antiderivative = 1.10, number of steps used = 17, number of rules used = 13, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.565$, Rules used = {2395, 2333, 2332, 2356, 2389, 2379, 2438, 2351, 31, 2355, 2354, 2421, 6724}

$$-\frac{6bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{e^4}-\frac{b^2dn^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{e^4}-\frac{6b^2dn^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{6b^2dn^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{d^3(a+b\log\left(cx^n\right))^2}{2e^4(d+ex)^2}+\frac{bdn\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e^4}-\frac{3d\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2}{e^4}-\frac{6bdn\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e^4}+\frac{3dx(a+b\log\left(cx^n\right))^2}{e^3(d+ex)}+\frac{bdnx(a+b\log\left(cx^n\right))}{e^3(d+ex)}+\frac{x(a+b\log\left(cx^n\right))^2}{e^3}-\frac{2abnx}{e^3}-\frac{2b^2nx\log\left(cx^n\right)}{e^3}-\frac{b^2dn^2\log(d+ex)}{e^4}+\frac{2b^2n^2x}{e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] (-2*a*b*n*x)/e^3 + (2*b^2*n^2*x)/e^3 - (2*b^2*n*x*Log[c*x^n])/e^3 + (b*d*n*
x*(a + b*Log[c*x^n]))/(e^3*(d + e*x)) + (b*d*n*Log[1 + d/(e*x)]*(a + b*Log[
c*x^n]))/e^4 + (x*(a + b*Log[c*x^n])^2)/e^3 + (d^3*(a + b*Log[c*x^n])^2)/(2
*e^4*(d + e*x)^2) + (3*d*x*(a + b*Log[c*x^n])^2)/(e^3*(d + e*x)) - (b^2*d*n
^2*Log[d + e*x])/e^4 - (6*b*d*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 -
(3*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 - (b^2*d*n^2*PolyLog[2, -(d
/(e*x))])/e^4 - (6*b^2*d*n^2*PolyLog[2, -((e*x)/d)])/e^4 - (6*b*d*n*(a + b*
Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^4 + (6*b^2*d*n^2*PolyLog[3, -((e*x)/d
)])/e^4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
```

```
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{e^3} - \frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^3} + \frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)^2} - \frac{3d(a+}{e^3}\right.$$

$$= \frac{\int (a+b\log(cx^n))^2\,dx}{e^3} - \frac{(3d)\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^3} + \frac{(3d^2)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^3} - \frac{d}{}$$

$$= \frac{x(a+b\log(cx^n))^2}{e^3} + \frac{d^3(a+b\log(cx^n))^2}{2e^4(d+ex)^2} + \frac{3dx(a+b\log(cx^n))^2}{e^3(d+ex)} - \frac{3d(a+b\,l}{}$$

$$= -\frac{2abnx}{e^3} + \frac{x(a+b\log(cx^n))^2}{e^3} + \frac{d^3(a+b\log(cx^n))^2}{2e^4(d+ex)^2} + \frac{3dx(a+b\log(cx^n))^2}{e^3(d+ex)} -$$

$$= -\frac{2abnx}{e^3} + \frac{2b^2n^2x}{e^3} - \frac{2b^2nx\log(cx^n)}{e^3} + \frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)} + \frac{x(a+b\log(c}{e^3}$$

$$= -\frac{2abnx}{e^3} + \frac{2b^2n^2x}{e^3} - \frac{2b^2nx\log(cx^n)}{e^3} + \frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)} - \frac{d(a+b\log(c}{2e^4}$$

$$= -\frac{2abnx}{e^3} + \frac{2b^2n^2x}{e^3} - \frac{2b^2nx\log(cx^n)}{e^3} + \frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)} - \frac{d(a+b\log(c}{2e^4}$$

Mathematica [A]
time = 0.18, size = 258, normalized size = 0.87

$$\frac{-\frac{2bd^2n(a+b\log(cx^n))}{d+ex} + 5d(a+b\log(cx^n))^2 + 2ex(a+b\log(cx^n))^2 + \frac{d^3(a+b\log(cx^n))^2}{(d+ex)^2} - \frac{6d^2(a+b\log(cx^n))^2}{d+ex} - 4benx(a-bn+b\log(cx^n)) + 2b^2dn^2(\log(x)-\log(d+ex)) - 10bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 6d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) - 10b^2dn^2\text{Li}_2\left(-\frac{ex}{d}\right) - 12bdn(a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right) + 12b^2dn^2\text{Li}_3\left(-\frac{ex}{d}\right)}{2e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] ((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x) + 5*d*(a + b*Log[c*x^n])^2 + 2*e
*x*(a + b*Log[c*x^n])^2 + (d^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2 - (6*d^2*(
a + b*Log[c*x^n])^2)/(d + e*x) - 4*b*e*n*x*(a - b*n + b*Log[c*x^n]) + 2*b^2
*d*n^2*(Log[x] - Log[d + e*x]) - 10*b*d*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/
d] - 6*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] - 10*b^2*d*n^2*PolyLog[2, -(
(e*x)/d)] - 12*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*d*n
^2*PolyLog[3, -((e*x)/d)])/(2*e^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.22, size = 4952, normalized size = 16.73

method	result	size
risch	Expression too large to display	4952

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 2*b/e^3*ln(x^n)*x*a+6*b^2*n/e^4*d*ln(e*x+d)*ln(x^n)*ln(-e*x/d)+I/e^4*n*d*b^
2*Pi*csgn(I*c*x^n)^3+I/e^3*n*x*b^2*Pi*csgn(I*c*x^n)^3+3/4/e^4*d*ln(e*x+d)*P
i^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-5/2*b^2/e^4*n^2*d*ln(x)^2+1/2/e^3*x*Pi^
2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+1/2/e^3*x*Pi^2*b^2*csgn(I*c)^
2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/4*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*x^n)*cs
gn(I*c*x^n)^5-1/8*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+6/
e^4*n*ln(e*x+d)*ln(-e*x/d)*d*b^2*ln(c)-6/e^4*d*ln(e*x+d)*ln(c)*a*b-6/e^4*d^
2/(e*x+d)*ln(c)*a*b+5*n/e^4*d*ln(e*x)*b^2*ln(c)-5/e^4*n*d*ln(e*x+d)*b^2*ln(
c)+d^3/e^4/(e*x+d)^2*ln(c)*a*b-3*I/e^4*n*ln(e*x+d)*ln(-e*x/d)*d*b^2*Pi*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/e^3*x*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+1/
4*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/4*d^
3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-3*b^2*ln(x
^n)^2/e^4*d*ln(e*x+d)+a^2/e^3*x+6*b/e^4*n*ln(e*x+d)*ln(-e*x/d)*d*a-5*ln(x^n
)*ln(e*x+d)*d/e^4*b^2*n-b*n/e^4*d^2/(e*x+d)*a+5*b*n/e^4*d*ln(e*x)*a-5*b/e^4
*n*d*ln(e*x+d)*a+1/2/e^3*x*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-1/4/e^3*x*Pi^
2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/4/e^3*x*Pi^2*b^2*csgn(I*c)^2*csgn(I*c
*x^n)^4+3*I/e^4*d^2/(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-I/e^4*n*d*b^2*Pi*csgn(I*
c)*csgn(I*c*x^n)^2+3*I/e^4*d*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3+3*I/e^4*d*ln(
e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I/e^4*d*ln(e*x+d)*ln(c)
*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I/e^4*d^2/(e*x+d)*ln(c)*Pi*b^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I/e^4*d^2/(e*x+d)*Pi*a*b*csgn(I*x^n
)*csgn(I*c*x^n)^2-I/e^3*x*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I/e^
4*ln(x^n)*d^2/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-1/2*I*d^3/e^4/(e*x+d)^2*ln(c)*
Pi*b^2*csgn(I*c*x^n)^3-I/e^4*n*d*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-6*b^2/e
^4*d*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-1/8*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*c
)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+3/4/e^4*d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*
csgn(I*x^n)^2*csgn(I*c*x^n)^2+ln(x^n)*d^3/e^4/(e*x+d)^2*b^2*ln(c)-6/e^4*ln(
x^n)*d^2/(e*x+d)*b^2*ln(c)+3/4/e^4*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-6*b
/e^4*ln(x^n)*d*ln(e*x+d)*a-6*b/e^4*ln(x^n)*d^2/(e*x+d)*a+b*ln(x^n)*d^3/e^4/
(e*x+d)^2*a+I/e^3*x*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I/e^3*x*Pi*a*b*c
sgn(I*x^n)*csgn(I*c*x^n)^2+I/e^3*ln(x^n)*x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2
+I/e^3*ln(x^n)*x*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*d^3/e^4/(e*x+d)^2*P
i^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-1/2*I*n/e^4*d^2/(e*x+d)*b^2*P
i*csgn(I*c)*csgn(I*c*x^n)^2+5/2*I*n/e^4*d*ln(e*x)*b^2*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2+3*I/e^4*ln(x^n)*d*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-1/2*I*d^3/e^4/
(e*x+d)^2*Pi*a*b*csgn(I*c*x^n)^3-1/2*I*ln(x^n)*d^3/e^4/(e*x+d)^2*b^2*Pi*csg
n(I*c*x^n)^3+b^2*ln(x^n)^2/e^3*x-3*b^2*ln(x^n)^2/e^4*d^2/(e*x+d)+1/2*b^2*ln
(x^n)^2*d^3/e^4/(e*x+d)^2-2*b^2*n/e^3*ln(x^n)*x+3*I/e^4*d*ln(e*x+d)*ln(c)*P
i*b^2*csgn(I*c*x^n)^3-3*a^2/e^4*d*ln(e*x+d)-3*a^2/e^4*d^2/(e*x+d)+1/2*a^2*d
^3/e^4/(e*x+d)^2+1/2*I*d^3/e^4/(e*x+d)^2*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2
-3/2/e^4*d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-3/2/e
^4*d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+3/e^4*d^2/(
e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+I/e^3*x*ln(c)*Pi*b^2*
```

```
csgn(I*x^n)*csgn(I*c*x^n)^2+3/e^4*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)^4-3/2/e^4*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn
(I*c*x^n)^3-I/e^3*n*x*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/e^3*n*x*b^2*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2-3*I/e^4*d*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(
I*c*x^n)^2+6*b/e^4*n*dilog(-e*x/d)*d*a+1/e^3*x*ln(c)^2*b^2+1/2*I*n/e^4*d^2/
(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-3*I/e^4*n*dilog(-e*x/d)*d*b^2*Pi*csgn(I*c*x^
n)^3+6/e^4*n*dilog(-e*x/d)*d*b^2*ln(c)-n/e^4*d^2/(e*x+d)*b^2*ln(c)+3/4/e^4*
d^2/(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6-1/8*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*
c*x^n)^6-b^2*n/e^4*ln(x^n)*d^2/(e*x+d)+5*b^2*n/e^4*ln(x^n)*d*ln(x)-6*b^2/e^
4*d*ln(x)*dilog(-e*x/d)*n^2+3*b^2/e^4*d*n^2*ln(x)^2*ln(e*x+d)-3*b^2/e^4*d*n
^2*ln(x)^2*ln(1+e*x/d)-6*b^2/e^4*d*n^2*ln(x)*polylog(2,-e*x/d)+5*b^2/e^4*n^
2*ln(e*x+d)*ln(-e*x/d)*d-5/2*I*n/e^4*d*ln(e*x)*b^2*Pi*csgn(I*c*x^n)^3+5/2*I
/e^4*n*d*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+3/4/e^4*d*ln(e*x+d)*Pi^2*b^2*csgn
(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-3/2/e^4*d*ln(e*x+d)*Pi^2*b^2*csgn(I*c
)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+3*I/e^4*d^2/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x
^n)^3+1/2/e^3*x*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-6/e^4*ln(x^n)*d*ln(e*x
+d)*b^2*ln(c)+6*b^2*n/e^4*d*ln(x^n)*dilog(-e*x/d)+1/2*I*ln(x^n)*d^3/e^4/(e*
x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/e^4*n*d*b^2*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)-3*I/e^4*n*dilog(-e*x/d)*d*b^2*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+3*I/e^4*n*ln(e*x+d)*ln(-e*x/d)*d*b^2*Pi*csgn(I*c)*csgn(I*c*x^
n)^2+b^2/e^4*n^2*d*ln(x)+5*b^2/e^4*n^2*dilog(-e*x/d)*d-I/e^3*x*ln(c)*Pi*b^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*
c)*csgn(I*c*x^n)^5-1/8*d^3/e^4/(e*x+d)^2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^
n)^4+3/4/e^4*d*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -1/2*(6*d*e^(-4)*log(x*e + d) - 2*x*e^(-3) + (6*d^2*x*e + 5*d^3)/(x^2*e^6 +
 2*d*x*e^5 + d^2*e^4))*a^2 + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c)
+ a*b)*x^3*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(x^3*e^3 + 3*d*x^2
*e^2 + 3*d^2*x*e + d^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(x^3*e^3 +
 3*d*x^2*e^2 + 3*d^2*x*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^3/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^3\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

```
[Out] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.108 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal. Leaf size=232

$$-\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{2e^3}-\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2}-\frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{b^2n^2\log(d+ex)}{e^3}+3$$

```
[Out] -b*n*x*(a+b*ln(c*x^n))/e^2/(e*x+d)+1/2*(a+b*ln(c*x^n))^2/e^3-1/2*d^2*(a+b*l
n(c*x^n))^2/e^3/(e*x+d)^2-2*x*(a+b*ln(c*x^n))^2/e^2/(e*x+d)+b^2*n^2*ln(e*x+
d)/e^3+3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^3+(a+b*ln(c*x^n))^2*ln(1+e*x/d)/
e^3+3*b^2*n^2*polylog(2,-e*x/d)/e^3+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)
/e^3-2*b^2*n^2*polylog(3,-e*x/d)/e^3
```

Rubi [A]
time = 0.28, antiderivative size = 262, normalized size of antiderivative = 1.13, number of steps used = 14, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {2395, 2356, 2389, 2379, 2438, 2351, 31, 2355, 2354, 2421, 6724}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}+\frac{b^2n^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{e^3}+\frac{4b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}-\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2}-\frac{bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{e^3}+\frac{4bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}-\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)}-\frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{b^2n^2\log(d+ex)}{e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] -((b*n*x*(a + b*Log[c*x^n]))/(e^2*(d + e*x))) - (b*n*Log[1 + d/(e*x)]*(a +
b*Log[c*x^n]))/e^3 - (d^2*(a + b*Log[c*x^n])^2)/(2*e^3*(d + e*x)^2) - (2*x*
(a + b*Log[c*x^n])^2)/(e^2*(d + e*x)) + (b^2*n^2*Log[d + e*x])/e^3 + (4*b*n
*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 + ((a + b*Log[c*x^n])^2*Log[1 + (
e*x)/d])/e^3 + (b^2*n^2*PolyLog[2, -(d/(e*x))])/e^3 + (4*b^2*n^2*PolyLog[2,
 -((e*x)/d)])/e^3 + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^3 -
 (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
```

```
Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
```

```
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^3} - \frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)^2} + \frac{(a+b\log(cx^n))^2}{e^2(d+ex)}\right)dx$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^2} - \frac{(2d)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^2} + \frac{d^2\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{e^2}$$

$$= -\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2} - \frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)} + \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3}$$

$$= -\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2} - \frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)} + \frac{4bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}$$

$$= -\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)} - \frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2} - \frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)} + \frac{4bn(a+}{}$$

$$= -\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{2e^3} - \frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2} - \frac{2x(a+b\log}{e^2(d}$$

$$= -\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{2e^3} - \frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2} - \frac{2x(a+b\log}{e^2(d}$$

Mathematica [A]
time = 0.16, size = 212, normalized size = 0.91

$$\frac{\frac{2bdn(a+b\log(cx^n))}{d+ex} - 3(a+b\log(cx^n))^2 - \frac{d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{4d(a+b\log(cx^n))^2}{d+ex} - 2b^2n^2(\log(x)-\log(d+ex)) + 6bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 6b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right) + 4bn(a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right) - 4b^2n^2\text{Li}_3\left(-\frac{ex}{d}\right)}{2e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] ((2*b*d*n*(a + b*Log[c*x^n]))/(d + e*x) - 3*(a + b*Log[c*x^n])^2 - (d^2*(a
+ b*Log[c*x^n])^2)/(d + e*x)^2 + (4*d*(a + b*Log[c*x^n])^2)/(d + e*x) - 2*b
^2*n^2*(Log[x] - Log[d + e*x]) + 6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d]
+ 2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*n^2*PolyLog[2, -((e*x)/d)
] + 4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - 4*b^2*n^2*PolyLog[3,
-((e*x)/d)])/(2*e^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.18, size = 3831, normalized size = 16.51

method	result	size
risch	Expression too large to display	3831

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 3*b/e^3*n*ln(e*x+d)*a-2*b/e^3*n*dilog(-e*x/d)*a+2*b/e^3*ln(x^n)*ln(e*x+d)*a
+1/8*d^2/e^3/(e*x+d)^2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-1/4*d^2/e^3/(
e*x+d)^2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-3*n/e^3*ln(e*x)*b^2*ln(c)+I/e
^3*n*dilog(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3-1/4/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I
*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+a^2/e^3*ln(e*x+d)+1/2*I*ln(x^n)*d^2/e^3
/(e*x+d)^2*b^2*Pi*csgn(I*c*x^n)^3+d/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I
*x^n)*csgn(I*c*x^n)^3+d/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I
*c*x^n)^3+3/2*I/e^3*n*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+4*d/e^3/(e
*x+d)*ln(c)*a*b-d^2/e^3/(e*x+d)^2*ln(c)*a*b-2/e^3*n*ln(e*x+d)*ln(-e*x/d)*b^
2*ln(c)+n*d/e^3/(e*x+d)*b^2*ln(c)+4*b*d/e^3*ln(x^n)/(e*x+d)*a-2*b^2*n/e^3*l
n(e*x+d)*ln(x^n)*ln(-e*x/d)+b^2*n*d/e^3*ln(x^n)/(e*x+d)+2*a^2*d/e^3/(e*x+d)
-1/2*a^2*d^2/e^3/(e*x+d)^2-2*b/e^3*n*ln(e*x+d)*ln(-e*x/d)*a-ln(x^n)*d^2/e^3
/(e*x+d)^2*b^2*ln(c)+4*d/e^3*ln(x^n)/(e*x+d)*b^2*ln(c)+I/e^3*ln(e*x+d)*ln(c
)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I/e^3*ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(
I*c*x^n)^2-2*I*d/e^3/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-b*ln(x^n)*d^2/e^3
/(e*x+d)^2*a+I/e^3*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+I/e^3*n*ln(
e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3-1/2*d/e^3/(e*x+d)*Pi^2*b^2*csgn(I*
c*x^n)^6-1/4/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/2/e^3*l
n(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+1/8*d^2/e^3/(e*x+d)^2*Pi^2*b^
2*csgn(I*c*x^n)^6+1/2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+2/e^
3*ln(x^n)*ln(e*x+d)*b^2*ln(c)-2*I*d/e^3/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+I/e^3*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+1/e^3*ln(e*x+d)*ln(c)^2*b^2+b^2*ln(x^n)^2/e^3*ln(e*x+d)-
1/4*d^2/e^3/(e*x+d)^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-3*b*
n/e^3*ln(e*x)*a-1/2*d/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I
*c*x^n)^2+d/e^3/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+d/e^3/(e*x+d)*Pi
^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+1/2*I*d^2/e^3/(e*x+d)^2*Pi*a*b*csgn(I*c*
x^n)^3+1/2*I*d^2/e^3/(e*x+d)^2*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-2*I*d/e^3/(e*x+
d)*Pi*a*b*csgn(I*c*x^n)^3+b*n*d/e^3/(e*x+d)*a-3/2*I*n/e^3*ln(e*x)*b^2*Pi*cs
```

```
gn(I*x^n)*csgn(I*c*x^n)^2-I/e^3*n*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2-2*I*d/e^3*ln(x^n)/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-3/2*I*n/e^3*ln(e*x
)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2*b^2/e^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2
-1/4/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-I/e^3*n*dilog(-e*x/
d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3/2*I/e^3*n*ln(e*x+d)*b^2*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2+3/e^3*n*ln(e*x+d)*b^2*ln(c)-2/e^3*n*dilog(-e*x/d)*b^2*ln(
c)+2*d/e^3/(e*x+d)*ln(c)^2*b^2-1/2*d^2/e^3/(e*x+d)^2*ln(c)^2*b^2+2/e^3*ln(e
*x+d)*ln(c)*a*b-I/e^3*ln(e*x+d)*Pi*a*b*csgn(I*c*x^n)^3-I/e^3*ln(x^n)*ln(e*x
+d)*b^2*Pi*csgn(I*c*x^n)^3+3/2*I*n/e^3*ln(e*x)*b^2*Pi*csgn(I*c*x^n)^3+1/8*d
^2/e^3/(e*x+d)^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+I/e^3*ln(x^n)*ln(e*x+
d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/e^3*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn(I*x
^n)*csgn(I*c*x^n)^2-3*b^2/e^3*n^2*ln(e*x+d)*ln(-e*x/d)+2*b^2/e^3*ln(x)*dilo
g(-e*x/d)*n^2-b^2/e^3*n^2*ln(x)^2*ln(e*x+d)+b^2/e^3*n^2*ln(x)^2*ln(1+e*x/d)
+2*b^2/e^3*n^2*ln(x)*polylog(2,-e*x/d)-b^2/e^3*n^2*ln(x)+3/2*b^2/e^3*n^2*ln
(x)^2-3*b^2/e^3*n^2*dilog(-e*x/d)-1/2*I*n*d/e^3/(e*x+d)*b^2*Pi*csgn(I*c*x^n
)^3-1/4*d^2/e^3/(e*x+d)^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+
1/2*d^2/e^3/(e*x+d)^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-2*d/e^
3/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+1/8*d^2/e^3/(e*x+d
)^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+I/e^3*ln(e*x+d)*ln(c
)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-2*I*d/e^3/(e*x+d)*Pi*a*b*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+3*ln(x^n)*ln(e*x+d)/e^3*b^2*n+1/2*I*n*d/e^3/(e*x+d)*b^
2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/2*d/e^3/(e*x+d)*Pi^2*b^2*csgn(I*x^n)^2*csg
n(I*c*x^n)^4-I/e^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-3/2*I/e^3*n*ln(e*
x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*d^2/e^3/(e*x+d)^2*ln(
c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*b^2*ln(x^n)^2*d^2/e^3/(e*x+d)^2-3
*b^2*n/e^3*ln(x^n)*ln(x)+2*I*d/e^3/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*
x^n)^2-I/e^3*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/e^
3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I/e^3*ln(e*x+d)*
ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*d^2/e^3/(e*x+d)^2*Pi
*a*b*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I*d^2/e^3/(e*x+d)^2*Pi*a*b*csgn(I*x^n)*c
sgn(I*c*x^n)^2+2*I*d/e^3*ln(x^n)/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1
/2*I*d^2/e^3/(e*x+d)^2*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2-2*b^2*n/e^3*l
n(x^n)*dilog(-e*x/d)-I/e^3*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c
*x^n)^2-2*b^2*n^2*polylog(3,-e*x/d)/e^3+b^2*n^2*ln(e*x+d)/e^3+2*b^2*ln(x^n)
^2*d/e^3/(e*x+d)-1/4/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c*x^n)^6+1/2*I*n*d/e^3/(
e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*d^2/e^3/(e*x+d)^2*Pi^2*b^2*cs
gn(I*c)*csgn(I*c*x^n)^5+1/2/e^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*
csgn(I*c*x^n)^3+1/2*I*d^2/e^3/(e*x+d)^2*ln(c)*P...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*(2*e^(-3)*log(x*e + d) + (4*d*x*e + 3*d^2)/(x^2*e^5 + 2*d*x*e^4 + d^2*e
^3))*a^2 + integrate((b^2*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n
) + (b^2*log(c)^2 + 2*a*b*log(c))*x^2)/(x^3*e^3 + 3*d*x^2*e^2 + 3*d^2*x*e +
 d^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(x^3*e^3 +
 3*d*x^2*e^2 + 3*d^2*x*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^2/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^2\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

```
[Out] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.109 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3} dx$

Optimal. Leaf size=112

$$\frac{bnx(a+b\log(cx^n))}{de(d+ex)}+\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn(a+bn+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de^2}-\frac{b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{de^2}$$

```
[Out] b*n*x*(a+b*ln(c*x^n))/d/e/(e*x+d)+1/2*x^2*(a+b*ln(c*x^n))^2/d/(e*x+d)^2-b*n
*(a+b*n+b*ln(c*x^n))*ln(1+e*x/d)/d/e^2-b^2*n^2*polylog(2,-e*x/d)/d/e^2
```

Rubi [A]
time = 0.08, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2381, 2384, 2354, 2438}

$$-\frac{b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{de^2}-\frac{bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{de^2}+\frac{bnx(a+b\log(cx^n))}{de(d+ex)}+\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] (b*n*x*(a + b*Log[c*x^n]))/(d*e*(d + e*x)) + (x^2*(a + b*Log[c*x^n])^2)/(2*
d*(d + e*x)^2) - (b*n*(a + b*n + b*Log[c*x^n])*Log[1 + (e*x)/d])/(d*e^2) -
(b^2*n^2*PolyLog[2, -((e*x)/d)])/(d*e^2)
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2381

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Dist[b*n*(p/(d*(q + 1))), Int[(f*x)^
m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
```

```
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \left(-\frac{d(a+b\log(cx^n))^2}{e(d+ex)^3}+\frac{(a+b\log(cx^n))^2}{e(d+ex)^2}\right)dx$$
$$= \frac{\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e} - \frac{d\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{e}$$
$$= \frac{d(a+b\log(cx^n))^2}{2e^2(d+ex)^2}+\frac{x(a+b\log(cx^n))^2}{de(d+ex)}-\frac{(bdn)\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{e^2}-\frac{(2bn)\int \frac{a+b\log}{d+}}{de}$$
$$= \frac{d(a+b\log(cx^n))^2}{2e^2(d+ex)^2}+\frac{x(a+b\log(cx^n))^2}{de(d+ex)}-\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de^2}-\frac{(b}{}$$
$$= \frac{bnx(a+b\log(cx^n))}{de(d+ex)}+\frac{d(a+b\log(cx^n))^2}{2e^2(d+ex)^2}+\frac{x(a+b\log(cx^n))^2}{de(d+ex)}-\frac{2bn(a+b\log}{}$$
$$= \frac{bnx(a+b\log(cx^n))}{de(d+ex)}-\frac{(a+b\log(cx^n))^2}{2de^2}+\frac{d(a+b\log(cx^n))^2}{2e^2(d+ex)^2}+\frac{x(a+b\log(cx}{de(d+ex)}$$
$$= \frac{bnx(a+b\log(cx^n))}{de(d+ex)}-\frac{(a+b\log(cx^n))^2}{2de^2}+\frac{d(a+b\log(cx^n))^2}{2e^2(d+ex)^2}+\frac{x(a+b\log(cx}{de(d+ex)}$$

Mathematica [A]
time = 0.16, size = 155, normalized size = 1.38

$$\frac{-\frac{2bn(a+b\log(cx^n))}{d+ex}+\frac{(a+b\log(cx^n))^2}{d}+\frac{d(a+b\log(cx^n))^2}{(d+ex)^2}-\frac{2(a+b\log(cx^n))^2}{d+ex}+\frac{2b^2n^2(\log(x)-\log(d+ex))}{d}-\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d}-\frac{2b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{d}}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] ((-2*b*n*(a + b*Log[c*x^n]))/(d + e*x) + (a + b*Log[c*x^n])^2/d + (d*(a + b
*Log[c*x^n])^2)/(d + e*x)^2 - (2*(a + b*Log[c*x^n])^2)/(d + e*x) + (2*b^2*n
^2*(Log[x] - Log[d + e*x]))/d - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])
/d - (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d)/(2*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 1199, normalized size = 10.71

method	result	size
risch	Expression too large to display	1199

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -b/e^2*n/d*ln(e*x+d)*a+b/e^2*n/d*ln(x)*a-1/2*I/e^2*n/(e*x+d)*b^2*Pi*csgn(I*
c)*csgn(I*c*x^n)^2+b*ln(x^n)*d/e^2/(e*x+d)^2*a+1/2*I/e^2*n/(e*x+d)*b^2*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/e^2*n/(e*x+d)*b^2*ln(c)-I/e^2*ln(x^n)/
(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/e^2*ln(x^n)/(e*x+d)*b^2*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2-1/e^2*n/d*ln(e*x+d)*b^2*ln(c)+1/e^2*n/d*ln(x)*b^2*ln
(c)+b^2/e^2*n^2/d*ln(e*x+d)*ln(-e*x/d)-2*b/e^2*ln(x^n)/(e*x+d)*a+1/2*b^2*ln
(x^n)^2*d/e^2/(e*x+d)^2-1/2*I*ln(x^n)*d/e^2/(e*x+d)^2*b^2*Pi*csgn(I*c*x^n)^
3-1/2*I/e^2*n/(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+b^2/e^2*n^2/d*dilo
g(-e*x/d)+b^2*n/e^2*ln(x^n)/d*ln(x)+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/e^2/(e*x+d)+1/2*d/e^2/(e*x+d
)^2)-1/2*I/e^2*n/d*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e^2*n
/d*ln(x)*b^2*Pi*csgn(I*c*x^n)^3-b^2*ln(x^n)^2/e^2/(e*x+d)+1/2*I/e^2*n/d*ln(
e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+ln(x^n)*d/e^2/(e*x+d)^2*b^2*ln(c)-b^2*n/e^2*l
n(x^n)/d*ln(e*x+d)-2/e^2*ln(x^n)/(e*x+d)*b^2*ln(c)-b^2*n/e^2*ln(x^n)/(e*x+d
)+1/2*I/e^2*n/d*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I*ln(x^n)*d/e^
2/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I/e^2*n/d*ln(e*x+d)*b^2*Pi
*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/e^2*n/d*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^
n)^2-b/e^2*n/(e*x+d)*a+1/2*I/e^2*n/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+I/e^2*ln(
x^n)/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+1/2*I*ln(x^n)*d/e^2/(e*x+d)^2*b^2*Pi*cs
gn(I*x^n)*csgn(I*c*x^n)^2-1/2*b^2/e^2*n^2/d*ln(x)^2-b^2/e^2*n^2/d*ln(e*x+d)
+b^2/e^2*n^2/d*ln(x)+1/2*I/e^2*n/d*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-1/2*I/e^2*n/d*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-1/2*I*ln(x^n)*d/e^2/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I
/e^2*ln(x^n)/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -a*b*n*(e^(-2)*log(x*e + d)/d - e^(-2)*log(x)/d + 1/(x*e^3 + d*e^2)) - 1/2*
((2*x*e + d)*log(x^n)^2/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 2*integrate((x^2*
e^2*log(c)^2 + (2*(n + log(c))*x^2*e^2 + 3*d*n*x*e + d^2*n)*log(x^n))/(x^4*
e^5 + 3*d*x^3*e^4 + 3*d^2*x^2*e^3 + d^3*x*e^2), x))*b^2 - (2*x*e + d)*a*b*l
```

```
og(c*x^n)/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 1/2*(2*x*e + d)*a^2/(x^2*e^4 +
2*d*x*e^3 + d^2*e^2)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(x^3*e^3 + 3*d*x
^2*e^2 + 3*d^2*x*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a + b\log{(cx^n)})^2}{(d + ex)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

```
[Out] int((x*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.110 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal. Leaf size=126

$$-\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)}-\frac{bn\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}+\frac{b^2n^2\log(d+ex)}{d^2e}+\frac{b^2n^2\text{Li}_2\left(-\frac{d}{ex}\right)}{d^2e}$$

```
[Out] -b*n*x*(a+b*ln(c*x^n))/d^2/(e*x+d)-b*n*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2/e-1/
2*(a+b*ln(c*x^n))^2/e/(e*x+d)^2+b^2*n^2*ln(e*x+d)/d^2/e+b^2*n^2*polylog(2,-
d/e/x)/d^2/e
```

Rubi [A]
time = 0.11, antiderivative size = 126, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2356, 2389, 2379, 2438, 2351, 31}

$$\frac{b^2n^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2e}-\frac{bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^2e}-\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}+\frac{b^2n^2\log(d+ex)}{d^2e}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d + e*x)^3,x]
```

```
[Out] -((b*n*x*(a + b*Log[c*x^n]))/(d^2*(d + e*x))) - (b*n*Log[1 + d/(e*x)]*(a +
b*Log[c*x^n]))/(d^2*e) - (a + b*Log[c*x^n])^2/(2*e*(d + e*x)^2) + (b^2*n^2*
Log[d + e*x])/(d^2*e) + (b^2*n^2*PolyLog[2, -(d/(e*x))])/(d^2*e)
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx &= -\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}+\frac{(bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{e}\\
&= -\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}-\frac{(bn)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{d}+\frac{(bn)\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx}{de}\\
&= -\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}-\frac{(bn)\int \frac{a+b\log(cx^n)}{d+ex}\,dx}{d^2}+\frac{(bn)\int \frac{a+b\log(c}{x}}{d^2e}\\
&= -\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{2d^2e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}+\frac{b^2n^2\log(d+ex)}{d^2e}\\
&= -\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{2d^2e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}+\frac{b^2n^2\log(d+ex)}{d^2e}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 146, normalized size = 1.16

$$-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}+\frac{bn\left(\frac{a+b\log(cx^n)}{d(d+ex)}+\frac{(a+b\log(cx^n))^2}{2bd^2n}-\frac{bn\left(\frac{\log(x)}{d}-\frac{\log(d+ex)}{d}\right)}{d}-\frac{(a+b\log(cx^n))\log\left(\frac{d+ex}{d}\right)}{d^2}-\frac{bn\text{Li}_2\left(-\frac{ex}{d}\right)}{d^2}\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^3,x]
```

```
[Out] -1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*((a + b*Log[c*x^n])/(d*(d
+ e*x)) + (a + b*Log[c*x^n])^2/(2*b*d^2*n) - (b*n*(Log[x]/d - Log[d + e*x]/
d))/d - ((a + b*Log[c*x^n])*Log[(d + e*x)/d])/d^2 - (b*n*PolyLog[2, -((e*x)
/d)])/d^2))/e
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 990, normalized size = 7.86

method	result	size
risch	Expression too large to display	990

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I/e*n/d^2*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-1/8*(-I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2/(e*x+d)^2/e-1/(e*x+d)
^2/e*ln(x^n)*b^2*ln(c)-b/(e*x+d)^2/e*ln(x^n)*a-1/e*n/d^2*ln(e*x+d)*b^2*ln(c
)+1/e*n/d/(e*x+d)*b^2*ln(c)+1/e*n/d^2*ln(x)*b^2*ln(c)+1/2*I/(e*x+d)^2/e*ln(
x^n)*b^2*Pi*csgn(I*c*x^n)^3-1/2*b^2/(e*x+d)^2/e*ln(x^n)^2-1/2*I/e*n/d^2*ln(
x)*b^2*Pi*csgn(I*c*x^n)^3-b^2/e*n^2/d^2*ln(x)+b^2/e*n^2/d^2*dilog(-e*x/d)-b
^2/e*n/d^2*ln(x^n)*ln(e*x+d)+b^2/e*n*ln(x^n)/d/(e*x+d)+b^2/e*n*ln(x^n)/d^2*
ln(x)-1/2*I/(e*x+d)^2/e*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/e*n/
d/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+b^2/e*n^2/d^2*ln(e*x+d)*ln(-e*x/
d)-1/2*b^2/e*n^2/d^2*ln(x)^2-1/2*I/(e*x+d)^2/e*ln(x^n)*b^2*Pi*csgn(I*x^n)*c
sgn(I*c*x^n)^2-1/2*I/e*n/d/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-b/e*n/d^2*ln(e*x+
d)*a+b/e*n/d/(e*x+d)*a+b/e*n/d^2*ln(x)*a+1/2*I/e*n/d^2*ln(e*x+d)*b^2*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I/e*n/d/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+1/2*I/e*n/d/(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
+1/2*I/e*n/d^2*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+b^2*n^2*ln(e*x+d)/d^2
/e-1/2*I/e*n/d^2*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e*n/d^2
*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I/e*n/d^2*ln(e*x+d)*b
^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/(e*x+d)^2/e*ln(x^n)*b^2*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/e*n/d^2*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -a*b*n*(e^(-1)*log(x*e + d)/d^2 - e^(-1)*log(x)/d^2 - 1/(d*x*e^2 + d^2*e))
- 1/2*b^2*(log(x^n)^2/(x^2*e^3 + 2*d*x*e^2 + d^2*e) - 2*integrate((x*e*log(
```

```
c)^2 + ((n + 2*log(c))*x*e + d*n)*log(x^n))/(x^4*e^4 + 3*d*x^3*e^3 + 3*d^2*
x^2*e^2 + d^3*x*e), x)) - a*b*log(c*x^n)/(x^2*e^3 + 2*d*x*e^2 + d^2*e) - 1/
2*a^2/(x^2*e^3 + 2*d*x*e^2 + d^2*e)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^3*e^3 + 3*d*x^2*e^2
 + 3*d^2*x*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b \log (cx^n))^2}{(d + ex)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a + b\, \ln (c\, x^n))^2}{(d + e\, x)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d + e*x)^3,x)
```

```
[Out] int((a + b*log(c*x^n))^2/(d + e*x)^3, x)
```

3.111 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$

Optimal. Leaf size=257

$$\frac{benx(a+b\log(cx^n))}{d^3(d+ex)}-\frac{(a+b\log(cx^n))^2}{2d^3}+\frac{(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{ex(a+b\log(cx^n))^2}{d^3(d+ex)}+\frac{(a+b\log(cx^n))^3}{3bd^3n}-\frac{b^2n^2}{}$$

```
[Out] b*e*n*x*(a+b*ln(c*x^n))/d^3/(e*x+d)-1/2*(a+b*ln(c*x^n))^2/d^3+1/2*(a+b*ln(c
*x^n))^2/d/(e*x+d)^2-e*x*(a+b*ln(c*x^n))^2/d^3/(e*x+d)+1/3*(a+b*ln(c*x^n))^
3/b/d^3/n-b^2*n^2*ln(e*x+d)/d^3+3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3-(a+b*
ln(c*x^n))^2*ln(1+e*x/d)/d^3+3*b^2*n^2*polylog(2,-e*x/d)/d^3-2*b*n*(a+b*ln(
c*x^n))*polylog(2,-e*x/d)/d^3+2*b^2*n^2*polylog(3,-e*x/d)/d^3
```

Rubi [A]
time = 0.34, antiderivative size = 268, normalized size of antiderivative = 1.04, number of steps used = 14, number of rules used = 10, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2389, 2379, 2421, 6724, 2355, 2354, 2438, 2356, 2351, 31}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}-\frac{b^2n^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}+\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}+\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}+\frac{bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^3}+\frac{benx(a+b\log(cx^n))}{d^3(d+ex)}+\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^3}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^3}-\frac{ex(a+b\log(cx^n))^2}{d^3(d+ex)}+\frac{(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{b^2n^2\log(d+ex)}{d^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^3),x]
```

```
[Out] (b*e*n*x*(a + b*Log[c*x^n]))/(d^3*(d + e*x)) + (b*n*Log[1 + d/(e*x)]*(a + b
*Log[c*x^n]))/d^3 + (a + b*Log[c*x^n])^2/(2*d*(d + e*x)^2) - (e*x*(a + b*Lo
g[c*x^n])^2)/(d^3*(d + e*x)) - (Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^3
- (b^2*n^2*Log[d + e*x])/d^3 + (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/
d^3 - (b^2*n^2*PolyLog[2, -(d/(e*x))])/d^3 + (2*b*n*(a + b*Log[c*x^n])*Poly
Log[2, -(d/(e*x))])/d^3 + (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d^3 + (2*b^2*n
^2*PolyLog[3, -(d/(e*x))])/d^3
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
```

```
Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{d}$$

$$= \frac{(a+b\log(cx^n))^2}{2d(d+ex)^2} + \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx}{d^2} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{d^2} - \frac{(bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,d}{d}$$

$$= \frac{(a+b\log(cx^n))^2}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^2}{d^3(d+ex)} + \frac{\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^3} - \frac{e\int \frac{(a+b\log(cx^n))^2}{d+ex}\,d}{d^3}$$

$$= \frac{benx(a+b\log(cx^n))}{d^3(d+ex)} + \frac{(a+b\log(cx^n))^2}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^2}{d^3(d+ex)} + \frac{2bn(a+b\log}{}$$

$$= \frac{benx(a+b\log(cx^n))}{d^3(d+ex)} - \frac{(a+b\log(cx^n))^2}{2d^3} + \frac{(a+b\log(cx^n))^2}{2d(d+ex)^2} - \frac{ex(a+b\log(cx}{d^3(d+ex)}$$

$$= \frac{benx(a+b\log(cx^n))}{d^3(d+ex)} - \frac{(a+b\log(cx^n))^2}{2d^3} + \frac{(a+b\log(cx^n))^2}{2d(d+ex)^2} - \frac{ex(a+b\log(cx}{d^3(d+ex)}$$

Mathematica [A]
time = 0.17, size = 232, normalized size = 0.90

$$\frac{-\frac{6bdn(a+b\log(cx^n))}{d+ex} - 9(a+b\log(cx^n))^2 + \frac{3d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{6d(a+b\log(cx^n))^2}{d+ex} + \frac{2(a+b\log(cx^n))^3}{bn} + 6b^2n^2(\log(x)-\log(d+ex)) + 18bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 6(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 18b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right) - 12bn(a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right) + 12b^2n^2\text{Li}_3\left(-\frac{ex}{d}\right)}{6d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^3),x]
```

```
[Out] ((-6*b*d*n*(a + b*Log[c*x^n]))/(d + e*x) - 9*(a + b*Log[c*x^n])^2 + (3*d^2*
(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (6*d*(a + b*Log[c*x^n])^2)/(d + e*x) +
(2*(a + b*Log[c*x^n])^3)/(b*n) + 6*b^2*n^2*(Log[x] - Log[d + e*x]) + 18*b*n
*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*(a + b*Log[c*x^n])^2*Log[1 + (e*x)
/d] + 18*b^2*n^2*PolyLog[2, -((e*x)/d)] - 12*b*n*(a + b*Log[c*x^n])*PolyLog
[2, -((e*x)/d)] + 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.23, size = 4606, normalized size = 17.92

method	result	size
risch	Expression too large to display	4606

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] I/d^3*ln(x^n)*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I/d^3*ln(e*x+d)*ln(c
)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+3/2*I/d^3*n*ln(e*x+d)*b^2*Pi*csgn(I*c)*c
sgn(I*c*x^n)^2-I/d^3*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1
/2*I/d/(e*x+d)^2*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4/d^3*ln(x)*Pi^2*b^2*
csgn(I*c)^2*csgn(I*c*x^n)^4+3/2*I/d^3*n*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2-3/2*I/d^3*n*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/d^3*ln(x^n)*
ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/d^2*ln(x^n)/(e*x+d)*b^2*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2+I/d^3*n*dilog(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^
n)^2+I/d^3*n*dilog(-e*x/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+2*b/d^3*n*ln(
e*x+d)*ln(-e*x/d)*a-2*b^2/d^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+1/2*a^2/d/(e*x
+d)^2+a^2/d^3*ln(x)-a^2/d^3*ln(e*x+d)+a^2/d^2/(e*x+d)+1/4/d^3*ln(e*x+d)*Pi^
2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/4/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*
csgn(I*c*x^n)^4+1/2/d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+1/2/d^2/
(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-1/4/d^2/(e*x+d)*Pi^2*b^2*csgn(
I*c)^2*csgn(I*c*x^n)^4+I/d^2*ln(x^n)/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)
^2+I/d^3*ln(x)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/d/(e*x+d)^2*ln(
c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/d/(e*x+d)^2*ln(c)*Pi*b^2*csgn(I*x
^n)*csgn(I*c*x^n)^2+1/4/d/(e*x+d)^2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+3/2*
b^2/d^3*n^2*ln(x)^2-3*b^2/d^3*n^2*dilog(-e*x/d)+1/3*b^2/d^3*ln(x)^3*n^2+1/2
*I*ln(x^n)/d/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(x^n)/d/(e*
x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I/d/(e*x+d)^2*Pi*a*b*csgn(I*c
)*csgn(I*c*x^n)^2-1/8/d/(e*x+d)^2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+1/
4/d/(e*x+d)^2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+1/2/d^3*ln(x)*Pi^2*b^2*c
sgn(I*x^n)*csgn(I*c*x^n)^5-1/2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^
n)^5-I/d^3*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+2*b^2*n/d^3*ln(e*x+d)*ln(x^n)*ln(-e*x/d)-b^2*n/d^2*ln(x^n)/(e*x+d)-I/d^3*
ln(e*x+d)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/d^3*ln(x^n)*ln(x)*b^2*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+I/d^2/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I
/d^2/(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I/d^2/(e*x+d)*Pi*a*b*
csgn(I*c)*csgn(I*c*x^n)^2+2*b/d^2*ln(x^n)/(e*x+d)*a-3*b^2*n/d^3*ln(x^n)*ln(
x)-b^2*n/d^3*ln(x)^2*ln(x^n)+2*b^2*n/d^3*ln(x^n)*dilog(-e*x/d)+b*ln(x^n)/d/
(e*x+d)^2*a-2/d^3*ln(x^n)*ln(e*x+d)*b^2*ln(c)+2/d^2*ln(x^n)/(e*x+d)*b^2*ln(
c)+ln(x^n)/d/(e*x+d)^2*b^2*ln(c)+I/d^3*ln(x)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(
I*c*x^n)^2+3*ln(x^n)*ln(e*x+d)/d^3*b^2*n-1/4/d^2/(e*x+d)*Pi^2*b^2*csgn(I*c*
x^n)^6-1/8/d/(e*x+d)^2*Pi^2*b^2*csgn(I*c*x^n)^6+b^2/d^3*n^2*ln(x)-1/2*I/d^3
*n*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I/d^3*n*ln(x)^2*b^2*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-I/d^3*n*ln(e*x+d)*ln(-e*x/d)*b^2*Pi*csgn(I*c*x^n)^3
```

```
+I/d^3*ln(x)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/d^3*ln(x)*Pi*a*b*csgn(I*x^n
)*csgn(I*c*x^n)^2-I/d^3*ln(e*x+d)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*
n/d^2/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/2*I*n/d^2/(e*x+d)*b^2*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-3/2*I/d^3*n*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2-1/2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-b^2*ln(x^n)^2/d
^3*ln(e*x+d)+b^2*ln(x^n)^2/d^2/(e*x+d)+1/2*b^2*ln(x^n)^2/d/(e*x+d)^2+b^2*ln
(x^n)^2/d^3*ln(x)+2/d^3*n*ln(e*x+d)*ln(-e*x/d)*b^2*ln(c)+1/2/d^3*ln(x)*Pi^2
*b^2*csgn(I*c)*csgn(I*c*x^n)^5-1/4/d^3*ln(x)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*
c*x^n)^4-1/8/d/(e*x+d)^2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-1/4/d^2/(e*x+
d)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+I/d^2/(e*x+d)*Pi*a*b*csgn(I*x^n)*
csgn(I*c*x^n)^2-I/d^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/
d^2/(e*x+d)*ln(c)^2*b^2+1/2/d/(e*x+d)^2*ln(c)^2*b^2-1/d^3*ln(e*x+d)*ln(c)^2
*b^2+1/d^3*ln(x)*ln(c)^2*b^2+3*b/d^3*n*ln(e*x+d)*a-3*b/d^3*n*ln(x)*a-b/d^3*
n*ln(x)^2*a+2*b/d^3*n*dilog(-e*x/d)*a-3/2*I/d^3*n*ln(e*x+d)*b^2*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)-2*b/d^3*ln(x^n)*ln(e*x+d)*a-3*b^2/d^3*n^2*ln(e*
x+d)*ln(-e*x/d)-2*b^2/d^3*ln(x)*dilog(-e*x/d)*n^2+b^2/d^3*n^2*ln(x)^2*ln(e*
x+d)-b^2/d^3*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^3*n^2*ln(x)*polylog(2,-e*x/d)-
1/2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+1/2/d^3*
ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-I/d^3*ln(x)*Pi*a*b*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4/d^2/(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csg
n(I*x^n)^2*csgn(I*c*x^n)^2+I/d^3*ln(e*x+d)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3-1/2
/d/(e*x+d)^2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+1/4/d^3*ln(e*x+
d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/4/d^3*ln(e*x+d)*Pi^
2*b^2*csgn(I*c*x^n)^6+2/d^3*ln(x^n)*ln(x)*b^2*ln(c)-1/2*I/d/(e*x+d)^2*Pi*a*
b*csgn(I*c*x^n)^3-1/d^3*ln(x)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^
4-1/2/d^3*ln(e*x+d)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+3/d^3*
n*ln(e*x+d)*b^2*ln(c)-3/d^3*n*ln(x)*b^2*ln(c)+2/d^2/(e*x+d)*ln(c)*a*b+1/d/(
e*x+d)^2*ln(c)*a*b-2/d^3*ln(e*x+d)*ln(c)*a*b+2/d^3*ln(x)*ln(c)*a*b-b*n/d^2/
(e*x+d)*a-I/d^2/(e*x+d)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/
d^3*ln(x^n)*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+1/...
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*a^2*((2*x*e + 3*d)/(d^2*x^2*e^2 + 2*d^3*x*e + d^4) - 2*log(x*e + d)/d^3
 + 2*log(x)/d^3) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c)
+ 2*(b^2*log(c) + a*b)*log(x^n))/(x^4*e^3 + 3*d*x^3*e^2 + 3*d^2*x^2*e + d^3
*x), x)
```

Fricas [F]

time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^4*e^3 + 3*d*x^3*e^2
 + 3*d^2*x^2*e + d^3*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**3), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^3*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x)^3),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x)^3), x)
```

3.112 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$

Optimal. Leaf size=322

$$-\frac{2b^2n^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{d^3x}-\frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)}+\frac{e(a+b\log(cx^n))^2}{2d^4}-\frac{(a+b\log(cx^n))^2}{d^3x}-\frac{e(a+b\log}{2d^2(d+}$$

```
[Out] -2*b^2*n^2/d^3/x-2*b*n*(a+b*ln(c*x^n))/d^3/x-b*e^2*n*x*(a+b*ln(c*x^n))/d^4/
(e*x+d)+1/2*e*(a+b*ln(c*x^n))^2/d^4-(a+b*ln(c*x^n))^2/d^3/x-1/2*e*(a+b*ln(c
*x^n))^2/d^2/(e*x+d)^2+2*e^2*x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)-e*(a+b*ln(c*x^
n))^3/b/d^4/n+b^2*e*n^2*ln(e*x+d)/d^4-5*b*e*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d
^4+3*e*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^4-5*b^2*e*n^2*polylog(2,-e*x/d)/d^4+
6*b*e*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^4-6*b^2*e*n^2*polylog(3,-e*x/d)
/d^4
```

Rubi [A]
time = 0.34, antiderivative size = 335, normalized size of antiderivative = 1.04, number of steps used = 16, number of rules used = 13, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.565$, Rules used = {2395, 2342, 2341, 2356, 2389, 2379, 2438, 2351, 31, 2355, 2354, 2421, 6724}

$$-\frac{6benPolyLog\left(2,-\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d^4}+\frac{b^2en^2PolyLog\left(2,-\frac{d}{ex}\right)}{d^4}-\frac{4b^2en^2PolyLog\left(2,-\frac{ex}{d}\right)}{d^4}-\frac{6b^2en^2PolyLog\left(3,-\frac{d}{ex}\right)}{d^4}+\frac{2e^2x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)}+\frac{3e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}-\frac{ben\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}-\frac{4ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4}-\frac{(a+b\log(cx^n))^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{d^3x}-\frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2}+\frac{b^2en^2\log(d+ex)}{d^4}-\frac{2b^2n^2}{d^3x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^3),x]
```

```
[Out] (-2*b^2*n^2)/(d^3*x) - (2*b*n*(a + b*Log[c*x^n]))/(d^3*x) - (b*e^2*n*x*(a +
 b*Log[c*x^n]))/(d^4*(d + e*x)) - (b*e*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]
))/d^4 - (a + b*Log[c*x^n])^2/(d^3*x) - (e*(a + b*Log[c*x^n])^2)/(2*d^2*(d
+ e*x)^2) + (2*e^2*x*(a + b*Log[c*x^n])^2)/(d^4*(d + e*x)) + (3*e*Log[1 + d
/(e*x)]*(a + b*Log[c*x^n])^2)/d^4 + (b^2*e*n^2*Log[d + e*x])/d^4 - (4*b*e*n
*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^4 + (b^2*e*n^2*PolyLog[2, -(d/(e*x)
)])/d^4 - (6*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 - (4*b^2*
e*n^2*PolyLog[2, -((e*x)/d)])/d^4 - (6*b^2*e*n^2*PolyLog[3, -(d/(e*x))])/d^
4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{d^3x^2} - \frac{3e(a+b\log(cx^n))^2}{d^4x} + \frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^3} + \frac{2e^2(a+b\log\cdots}{d^3(d+\cdots} \right.$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d^3} - \frac{(3e)\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^4} + \frac{(3e^2)\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{d^4} + \frac{(2e^2)\int \frac{(a+\cdots}{\cdots}}{\cdots}$$

$$= -\frac{(a+b\log(cx^n))^2}{d^3x} - \frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2} + \frac{2e^2x(a+b\log(cx^n))^2}{d^4(d+ex)} + \frac{3e(a+b\log(\cdots}{\cdots}$$

$$= -\frac{2b^2n^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{d^3x} - \frac{(a+b\log(cx^n))^2}{d^3x} - \frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2} + \frac{2e^2x(\cdots}{\cdots}$$

$$= -\frac{2b^2n^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{d^3x} - \frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)} - \frac{(a+b\log(cx^n))^2}{d^3x} - \frac{e(\cdots}{\cdots}$$

$$= -\frac{2b^2n^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{d^3x} - \frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)} + \frac{e(a+b\log(cx^n))^2}{2d^4} - \frac{(\cdots}{\cdots}$$

$$= -\frac{2b^2n^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{d^3x} - \frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)} + \frac{e(a+b\log(cx^n))^2}{2d^4} - \frac{(\cdots}{\cdots}$$

Mathematica [A]
time = 0.28, size = 290, normalized size = 0.90

$$-\frac{\frac{4b^2dn^2}{x} + \frac{4bdn(a+b\log(cx^n))}{x} - \frac{2bden(a+b\log(cx^n))}{d+ex} - 5e(a+b\log(cx^n))^2 + \frac{2d(a+b\log(cx^n))^2}{x} + \frac{d^2e(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{4de(a+b\log(cx^n))^2}{d+ex} + \frac{2e(a+b\log(cx^n))^3}{bn} + 2b^2en^2(\log(x)-\log(d+ex)) + 10ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 6e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 10b^2en^2\operatorname{Li}_2\left(-\frac{ex}{d}\right) - 12ben(a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right) + 12b^2en^2\operatorname{Li}_3\left(-\frac{ex}{d}\right)}{2d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^3),x]
```

```
[Out] -1/2*((4*b^2*d*n^2)/x + (4*b*d*n*(a + b*Log[c*x^n]))/x - (2*b*d*e*n*(a + b*
Log[c*x^n]))/(d + e*x) - 5*e*(a + b*Log[c*x^n])^2 + (2*d*(a + b*Log[c*x^n])
^2)/x + (d^2*e*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (4*d*e*(a + b*Log[c*x^n]
)^2)/(d + e*x) + (2*e*(a + b*Log[c*x^n])^3)/(b*n) + 2*b^2*e*n^2*(Log[x] - L
og[d + e*x]) + 10*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*e*(a + b*Lo
g[c*x^n])^2*Log[1 + (e*x)/d] + 10*b^2*e*n^2*PolyLog[2, -((e*x)/d)] - 12*b*e
*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*e*n^2*PolyLog[3, -((e
*x)/d)])/d^4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.24, size = 5696, normalized size = 17.69

method	result	size
risch	Expression too large to display	5696

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -1/2*a^2*((6*x^2*e^2 + 9*d*x*e + 2*d^2)/(d^3*x^3*e^2 + 2*d^4*x^2*e + d^5*x)
 - 6*e*log(x*e + d)/d^4 + 6*e*log(x)/d^4) + integrate((b^2*log(c)^2 + b^2*l
og(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^5*e^3 + 3*d*x^
4*e^2 + 3*d^2*x^3*e + d^3*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^5*e^3 + 3*d*x^4*e^2
 + 3*d^2*x^3*e + d^3*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\log\left(cx^{n}\right)\right)^{2}}{x^{2}\left(d+ex\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**3), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^3*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{x^2\,\left(d+e\,x\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^3),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^3), x)
```

3.113 $\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal. Leaf size=398

$$-\frac{2abnx}{e^4}+\frac{2b^2n^2x}{e^4}-\frac{b^2d^2n^2}{3e^5(d+ex)}-\frac{b^2dn^2\log(x)}{3e^5}-\frac{2b^2nx\log\left(cx^n\right)}{e^4}+\frac{bd^3n(a+b\log\left(cx^n\right))}{3e^5(d+ex)^2}+\frac{10bdnx(a+b\log\left(c\right.}{3e^4(d+ex)}$$

```
[Out] -2*a*b*n*x/e^4+2*b^2*n^2*x/e^4-1/3*b^2*d^2*n^2/e^5/(e*x+d)-1/3*b^2*d*n^2*ln
(x)/e^5-2*b^2*n*x*ln(c*x^n)/e^4+1/3*b*d^3*n*(a+b*ln(c*x^n))/e^5/(e*x+d)^2+1
0/3*b*d*n*x*(a+b*ln(c*x^n))/e^4/(e*x+d)-5/3*d*(a+b*ln(c*x^n))^2/e^5+x*(a+b*
ln(c*x^n))^2/e^4-1/3*d^4*(a+b*ln(c*x^n))^2/e^5/(e*x+d)^3+2*d^3*(a+b*ln(c*x^
n))^2/e^5/(e*x+d)^2+6*d*x*(a+b*ln(c*x^n))^2/e^4/(e*x+d)-3*b^2*d*n^2*ln(e*x+
d)/e^5-26/3*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^5-4*d*(a+b*ln(c*x^n))^2*ln(
1+e*x/d)/e^5-26/3*b^2*d*n^2*polylog(2,-e*x/d)/e^5-8*b*d*n*(a+b*ln(c*x^n))*p
olylog(2,-e*x/d)/e^5+8*b^2*d*n^2*polylog(3,-e*x/d)/e^5
```

Rubi [A]
time = 0.51, antiderivative size = 430, normalized size of antiderivative = 1.08, number of steps used = 27, number of rules used = 14, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.609$, Rules used = {2395, 2333, 2332, 2356, 2389, 2379, 2438, 2351, 31, 46, 2355, 2354, 2421, 6724}

$$-\frac{8bdn\text{PolyLog}\left(2,-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{e^5}-\frac{10b^2dn^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3e^5}-\frac{12b^2dn^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}+\frac{8b^2dn^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^5}-\frac{d^4\left(a+b\log\left(cx^n\right)\right)^2}{3e^5(d+ex)^3}+\frac{2d^3\left(a+b\log\left(cx^n\right)\right)^2}{e^5(d+ex)^2}+\frac{bd^3n\left(a+b\log\left(cx^n\right)\right)}{3e^5(d+ex)^2}+\frac{10bdn\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{3e^5}-\frac{4d\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2}{e^5}-\frac{12bdn\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e^5}+\frac{6dx\left(a+b\log\left(cx^n\right)\right)^2}{e^4(d+ex)}+\frac{10bdnx\left(a+b\log\left(cx^n\right)\right)}{3e^4(d+ex)}+\frac{x\left(a+b\log\left(cx^n\right)\right)^2}{e^4}-\frac{2abnx}{e^4}-\frac{2b^2nx\log\left(cx^n\right)}{e^4}-\frac{b^2d^2n^2}{3e^5(d+ex)}-\frac{b^2dn^2\log(x)}{3e^5}-\frac{3b^2dn^2\log(d+ex)}{e^5}+\frac{2b^2n^2x}{e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] (-2*a*b*n*x)/e^4 + (2*b^2*n^2*x)/e^4 - (b^2*d^2*n^2)/(3*e^5*(d + e*x)) - (b
^2*d*n^2*Log[x])/(3*e^5) - (2*b^2*n*x*Log[c*x^n])/e^4 + (b*d^3*n*(a + b*Log
[c*x^n]))/(3*e^5*(d + e*x)^2) + (10*b*d*n*x*(a + b*Log[c*x^n]))/(3*e^4*(d +
 e*x)) + (10*b*d*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*e^5) + (x*(a + b
*Log[c*x^n])^2)/e^4 - (d^4*(a + b*Log[c*x^n])^2)/(3*e^5*(d + e*x)^3) + (2*d
^3*(a + b*Log[c*x^n])^2)/(e^5*(d + e*x)^2) + (6*d*x*(a + b*Log[c*x^n])^2)/(
e^4*(d + e*x)) - (3*b^2*d*n^2*Log[d + e*x])/e^5 - (12*b*d*n*(a + b*Log[c*x^
n])*Log[1 + (e*x)/d])/e^5 - (4*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^5
 - (10*b^2*d*n^2*PolyLog[2, -(d/(e*x))])/(3*e^5) - (12*b^2*d*n^2*PolyLog[2,
 -((e*x)/d)])/e^5 - (8*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^5
 + (8*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^5
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{e^4} + \frac{d^4(a+b\log(cx^n))^2}{e^4(d+ex)^4} - \frac{4d^3(a+b\log(cx^n))^2}{e^4(d+ex)^3} + \frac{6d^2(a+\cdots}{e^4(\cdots}\right.$$

$$= \frac{\int (a+b\log(cx^n))^2\,dx}{e^4} - \frac{(4d)\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^4} + \frac{(6d^2)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^4} - \frac{(4\cdots}{\cdots}$$

$$= \frac{x(a+b\log(cx^n))^2}{e^4} - \frac{d^4(a+b\log(cx^n))^2}{3e^5(d+ex)^3} + \frac{2d^3(a+b\log(cx^n))^2}{e^5(d+ex)^2} + \frac{6dx(a+b\log\cdots}{e^4(d+\cdots}$$

$$= -\frac{2abnx}{e^4} + \frac{x(a+b\log(cx^n))^2}{e^4} - \frac{d^4(a+b\log(cx^n))^2}{3e^5(d+ex)^3} + \frac{2d^3(a+b\log(cx^n))^2}{e^5(d+ex)^2} + \cdots$$

$$= -\frac{2abnx}{e^4} + \frac{2b^2n^2x}{e^4} - \frac{2b^2nx\log(cx^n)}{e^4} + \frac{bd^3n(a+b\log(cx^n))}{3e^5(d+ex)^2} + \frac{4bdnx(a+b\log\cdots}{e^4(d+ex\cdots}$$

$$= -\frac{2abnx}{e^4} + \frac{2b^2n^2x}{e^4} - \frac{2b^2nx\log(cx^n)}{e^4} + \frac{bd^3n(a+b\log(cx^n))}{3e^5(d+ex)^2} + \frac{10bdnx(a+b\log\cdots}{3e^4(d+e\cdots}$$

$$= -\frac{2abnx}{e^4} + \frac{2b^2n^2x}{e^4} - \frac{b^2d^2n^2}{3e^5(d+ex)} - \frac{b^2dn^2\log(x)}{3e^5} - \frac{2b^2nx\log(cx^n)}{e^4} + \frac{bd^3n(a+\cdots}{3e^5(\cdots}$$

$$= -\frac{2abnx}{e^4} + \frac{2b^2n^2x}{e^4} - \frac{b^2d^2n^2}{3e^5(d+ex)} - \frac{b^2dn^2\log(x)}{3e^5} - \frac{2b^2nx\log(cx^n)}{e^4} + \frac{bd^3n(a+\cdots}{3e^5(\cdots}$$

Mathematica [A]
time = 0.44, size = 344, normalized size = 0.86

$$-\frac{-\frac{bd^3n(a+b\log(cx^n))}{(d+ex)^2} + \frac{10bd^2n(a+b\log(cx^n))}{d+ex} - 13d(a+b\log(cx^n))^2 - 3ex(a+b\log(cx^n))^2 + \frac{d^4(a+b\log(cx^n))^2}{(d+ex)^3} - \frac{6d^3(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{18d^2(a+b\log(cx^n))^2}{d+ex} + 6benx(a-bn+b\log(cx^n)) - 10b^2dn^2(\log(x)-\log(d+ex)) + \frac{b^2dn^2(d+(d+ex)\log(x)-(d+ex)\log(d+ex))}{d+ex} + 26bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 12d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 26b^2dn^2\mathrm{Li}_2\left(-\frac{ex}{d}\right) + 24bdn(a+b\log(cx^n))\mathrm{Li}_2\left(-\frac{ex}{d}\right) - 24b^2dn^2\mathrm{Li}_3\left(-\frac{ex}{d}\right)}{3e^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] -1/3*(-((b*d^3*n*(a + b*Log[c*x^n]))/(d + e*x)^2) + (10*b*d^2*n*(a + b*Log[
c*x^n]))/(d + e*x) - 13*d*(a + b*Log[c*x^n])^2 - 3*e*x*(a + b*Log[c*x^n])^2
 + (d^4*(a + b*Log[c*x^n])^2)/(d + e*x)^3 - (6*d^3*(a + b*Log[c*x^n])^2)/(d
 + e*x)^2 + (18*d^2*(a + b*Log[c*x^n])^2)/(d + e*x) + 6*b*e*n*x*(a - b*n +
b*Log[c*x^n]) - 10*b^2*d*n^2*(Log[x] - Log[d + e*x]) + (b^2*d*n^2*(d + (d +
 e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 26*b*d*n*(a + b*Log[c*x
^n])*Log[1 + (e*x)/d] + 12*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 26*b^2
*d*n^2*PolyLog[2, -((e*x)/d)] + 24*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e
*x)/d)] - 24*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.23, size = 6114, normalized size = 15.36

method	result	size
risch	Expression too large to display	6114

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] -1/3*(12*d*e^(-5)*log(x*e + d) - 3*x*e^(-4) + (18*d^2*x^2*e^2 + 30*d^3*x*e
+ 13*d^4)/(x^3*e^8 + 3*d*x^2*e^7 + 3*d^2*x*e^6 + d^3*e^5))*a^2 + integrate(
(b^2*x^4*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^4*log(x^n) + (b^2*log(c)^2 + 2
*a*b*log(c))*x^4)/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4)
, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^4*log(c*x^n)^2 + 2*a*b*x^4*log(c*x^n) + a^2*x^4)/(x^4*e^4 +
 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

```
[Out] Integral(x**4*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^4/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^4\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

```
[Out] int((x^4*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.114 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4} \, dx$

Optimal. Leaf size=333

$$\frac{b^2dn^2}{3e^4(d+ex)}+\frac{b^2n^2\log(x)}{3e^4}-\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2}-\frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)}+\frac{7(a+b\log(cx^n))^2}{6e^4}+\frac{d^3(a+b\log(}{3e^4(d+e}$$

```
[Out] 1/3*b^2*d*n^2/e^4/(e*x+d)+1/3*b^2*n^2*ln(x)/e^4-1/3*b*d^2*n*(a+b*ln(c*x^n))
/e^4/(e*x+d)^2-7/3*b*n*x*(a+b*ln(c*x^n))/e^3/(e*x+d)+7/6*(a+b*ln(c*x^n))^2/
e^4+1/3*d^3*(a+b*ln(c*x^n))^2/e^4/(e*x+d)^3-3/2*d^2*(a+b*ln(c*x^n))^2/e^4/(
e*x+d)^2-3*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)+2*b^2*n^2*ln(e*x+d)/e^4+11/3*b*n
*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^4+(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4+11/3*b^2
*n^2*polylog(2,-e*x/d)/e^4+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^4-2*b^
2*n^2*polylog(3,-e*x/d)/e^4
```

Rubi [A]

time = 0.48, antiderivative size = 364, normalized size of antiderivative = 1.09, number of steps used = 24, number of rules used = 12, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.522$, Rules used = {2395, 2356, 2389, 2379, 2438, 2351, 31, 46, 2355, 2354, 2421, 6724}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}+\frac{7b^2n^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3e^4}+\frac{6b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3}-\frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2}-\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2}-\frac{7bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3e^4}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}+\frac{6bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}-\frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)}+\frac{b^2dn^2}{3e^4(d+ex)}+\frac{2b^2n^2\log(d+ex)}{e^4}+\frac{b^2n^2\log(x)}{3e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] (b^2*d*n^2)/(3*e^4*(d + e*x)) + (b^2*n^2*Log[x])/(3*e^4) - (b*d^2*n*(a + b*
Log[c*x^n]))/(3*e^4*(d + e*x)^2) - (7*b*n*x*(a + b*Log[c*x^n]))/(3*e^3*(d +
 e*x)) - (7*b*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*e^4) + (d^3*(a + b*
Log[c*x^n])^2)/(3*e^4*(d + e*x)^3) - (3*d^2*(a + b*Log[c*x^n])^2)/(2*e^4*(d
 + e*x)^2) - (3*x*(a + b*Log[c*x^n])^2)/(e^3*(d + e*x)) + (2*b^2*n^2*Log[d
+ e*x])/e^4 + (6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 + ((a + b*Log
[c*x^n])^2*Log[1 + (e*x)/d])/e^4 + (7*b^2*n^2*PolyLog[2, -(d/(e*x))])/(3*e^
4) + (6*b^2*n^2*PolyLog[2, -((e*x)/d)])/e^4 + (2*b*n*(a + b*Log[c*x^n])*Pol
yLog[2, -((e*x)/d)])/e^4 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] && !(IGtQ[n, 0] && LtQ[m +
```

```
n + 2, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^4} + \frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)^3} - \frac{3d(a+b\log(cx^n))^2}{e^3(d+ex)^2} + \frac{(a+\cdots}{e\cdots}\right.$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{e^3} - \frac{(3d)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^3} + \frac{(3d^2)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{e^3} - \frac{d^3\int \frac{(a+\cdots}{(\cdots}}{\cdots}$$

$$= \frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3} - \frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2} - \frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)} + \frac{(a+b\log\cdots}{\cdots}$$

$$= \frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3} - \frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2} - \frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)} + \frac{6bn(a+b\cdots}{\cdots}$$

$$= -\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2} - \frac{3bnx(a+b\log(cx^n))}{e^3(d+ex)} + \frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3} - \frac{3d^2(a\cdots}{2e\cdots}$$

$$= -\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2} - \frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)} + \frac{3(a+b\log(cx^n))^2}{2e^4} + \frac{d^3(a+\cdots}{3e^4(\cdots}$$

$$= \frac{b^2dn^2}{3e^4(d+ex)} + \frac{b^2n^2\log(x)}{3e^4} - \frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2} - \frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)} + \frac{7(\cdots}{\cdots}$$

$$= \frac{b^2dn^2}{3e^4(d+ex)} + \frac{b^2n^2\log(x)}{3e^4} - \frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2} - \frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)} + \frac{7(\cdots}{\cdots}$$

Mathematica [A]
time = 0.30, size = 298, normalized size = 0.89

$$\frac{-\frac{2bd^2n(a+b\log(cx^n))}{(d+ex)^2} + \frac{14bdn(a+b\log(cx^n))}{d+ex} - 11(a+b\log(cx^n))^2 + \frac{2d^3(a+b\log(cx^n))^2}{(d+ex)^3} - \frac{9d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{18d(a+b\log(cx^n))^2}{d+ex} - 14b^2n^2(\log(x)-\log(d+ex)) + \frac{2b^2n^2(d+(d+ex)\log(x)-(d+ex)\log(d+ex))}{d+ex} + 22bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) + 6(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 22b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right) + 12bn(a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right) - 12b^2n^2\text{Li}_3\left(-\frac{ex}{d}\right)}{6e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] ((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x)^2 + (14*b*d*n*(a + b*Log[c*x^n])
)/(d + e*x) - 11*(a + b*Log[c*x^n])^2 + (2*d^3*(a + b*Log[c*x^n])^2)/(d + e
*x)^3 - (9*d^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (18*d*(a + b*Log[c*x^n])
^2)/(d + e*x) - 14*b^2*n^2*(Log[x] - Log[d + e*x]) + (2*b^2*n^2*(d + (d + e
*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 22*b*n*(a + b*Log[c*x^n])
*Log[1 + (e*x)/d] + 6*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 22*b^2*n^2*Po
lyLog[2, -((e*x)/d)] + 12*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - 1
2*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*e^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.26, size = 5003, normalized size = 15.02

method	result	size
risch	Expression too large to display	5003

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*(6*e^(-4)*log(x*e + d) + (18*d*x^2*e^2 + 27*d^2*x*e + 11*d^3)/(x^3*e^7
+ 3*d*x^2*e^6 + 3*d^2*x*e^5 + d^3*e^4))*a^2 + integrate((b^2*x^3*log(x^n)^2
 + 2*(b^2*log(c) + a*b)*x^3*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(
x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(x^4*e^4 +
 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\log{(cx^n)})^2}{(d+ex)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x^3/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^3\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^4} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

```
[Out] int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.115 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal. Leaf size=161

$$\frac{bnx^2(a+b\log(cx^n))}{3de(d+ex)^2}+\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}+\frac{bnx(2a+bn+2b\log(cx^n))}{3de^2(d+ex)}-\frac{bn(2a+3bn+2b\log(cx^n))\log(}{3de^3}$$

```
[Out] 1/3*b*n*x^2*(a+b*ln(c*x^n))/d/e/(e*x+d)^2+1/3*x^3*(a+b*ln(c*x^n))^2/d/(e*x+
d)^3+1/3*b*n*x*(2*a+b*n+2*b*ln(c*x^n))/d/e^2/(e*x+d)-1/3*b*n*(2*a+3*b*n+2*b
*ln(c*x^n))*ln(1+e*x/d)/d/e^3-2/3*b^2*n^2*polylog(2,-e*x/d)/d/e^3
```

Rubi [A]
time = 0.15, antiderivative size = 161, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2381, 2384, 2354, 2438}

$$-\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{3de^3}-\frac{bn\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{3de^3}+\frac{bnx(2a+2b\log(cx^n)+bn)}{3de^2(d+ex)}+\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}+\frac{bnx^2(a+b\log(cx^n))}{3de(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] (b*n*x^2*(a + b*Log[c*x^n]))/(3*d*e*(d + e*x)^2) + (x^3*(a + b*Log[c*x^n])^
2)/(3*d*(d + e*x)^3) + (b*n*x*(2*a + b*n + 2*b*Log[c*x^n]))/(3*d*e^2*(d + e
*x)) - (b*n*(2*a + 3*b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)/d])/(3*d*e^3) - (2
*b^2*n^2*PolyLog[2, -((e*x)/d)])/(3*d*e^3)
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2381

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Dist[b*n*(p/(d*(q + 1))), Int[(f*x)^
m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
```

```
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx &= \int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^4} - \frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)^3} + \frac{(a+b\log(cx^n))^2}{e^2(d+ex)^2}\right)dx \\
&= \frac{\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e^2} - \frac{(2d)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{e^2} + \frac{d^2\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx}{e^2} \\
&= -\frac{d^2(a+b\log(cx^n))^2}{3e^3(d+ex)^3} + \frac{d(a+b\log(cx^n))^2}{e^3(d+ex)^2} + \frac{x(a+b\log(cx^n))^2}{de^2(d+ex)} - \frac{(2bdn)\int \frac{a+}{x}}{e^3} \\
&= -\frac{d^2(a+b\log(cx^n))^2}{3e^3(d+ex)^3} + \frac{d(a+b\log(cx^n))^2}{e^3(d+ex)^2} + \frac{x(a+b\log(cx^n))^2}{de^2(d+ex)} - \frac{2bn(a+b\,\mathrm{lo}}{} \\
&= \frac{bdn(a+b\log(cx^n))}{3e^3(d+ex)^2} + \frac{2bnx(a+b\log(cx^n))}{de^2(d+ex)} - \frac{d^2(a+b\log(cx^n))^2}{3e^3(d+ex)^3} + \frac{d(a+b\,\mathrm{lo}}{e^3(d+} \\
&= \frac{bdn(a+b\log(cx^n))}{3e^3(d+ex)^2} + \frac{4bnx(a+b\log(cx^n))}{3de^2(d+ex)} - \frac{(a+b\log(cx^n))^2}{de^3} - \frac{d^2(a+b\log}{3e^3(d+} \\
&= -\frac{b^2n^2}{3e^3(d+ex)} - \frac{b^2n^2\log(x)}{3de^3} + \frac{bdn(a+b\log(cx^n))}{3e^3(d+ex)^2} + \frac{4bnx(a+b\log(cx^n))}{3de^2(d+ex)} - \\
&= -\frac{b^2n^2}{3e^3(d+ex)} - \frac{b^2n^2\log(x)}{3de^3} + \frac{bdn(a+b\log(cx^n))}{3e^3(d+ex)^2} + \frac{4bnx(a+b\log(cx^n))}{3de^2(d+ex)} -
\end{aligned}
$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 371 vs. 2(161) = 322.
time = 0.32, size = 371, normalized size = 2.30

$$
-\frac{-\frac{a^2}{d}+\frac{a^2d^2}{(d+ex)^3}-\frac{3a^2d}{(d+ex)^2}-\frac{abdn}{(d+ex)^2}+\frac{3a^2}{d+ex}+\frac{4abn}{d+ex}+\frac{b^2n^2}{d+ex}-\frac{3b^2n^2\log(x)}{d}-\frac{2ab\log(cx^n)}{d}+\frac{2abd^2\log(cx^n)}{(d+ex)^3}-\frac{6abd\log(cx^n)}{(d+ex)^2}-\frac{b^2dn\log(cx^n)}{(d+ex)^2}+\frac{6ab\log(cx^n)}{d+ex}+\frac{4b^2n\log(cx^n)}{d+ex}-\frac{b^2\log^2(cx^n)}{d}+\frac{b^2d^2\log^2(cx^n)}{(d+ex)^3}-\frac{3b^2d\log^2(cx^n)}{(d+ex)^2}+\frac{3b^2\log^2(cx^n)}{d+ex}+\frac{3b^2n^2\log(d+ex)}{d}+\frac{2abn\log\left(1+\frac{ex}{d}\right)}{d}+\frac{2b^2n\log(cx^n)\log\left(1+\frac{ex}{d}\right)}{d}+\frac{2b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{d}}{3e^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] -1/3*(-(a^2/d) + (a^2*d^2)/(d + e*x)^3 - (3*a^2*d)/(d + e*x)^2 - (a*b*d*n)/
(d + e*x)^2 + (3*a^2)/(d + e*x) + (4*a*b*n)/(d + e*x) + (b^2*n^2)/(d + e*x)
 - (3*b^2*n^2*Log[x])/d - (2*a*b*Log[c*x^n])/d + (2*a*b*d^2*Log[c*x^n])/(d
+ e*x)^3 - (6*a*b*d*Log[c*x^n])/(d + e*x)^2 - (b^2*d*n*Log[c*x^n])/(d + e*x
)^2 + (6*a*b*Log[c*x^n])/(d + e*x) + (4*b^2*n*Log[c*x^n])/(d + e*x) - (b^2*
Log[c*x^n]^2)/d + (b^2*d^2*Log[c*x^n]^2)/(d + e*x)^3 - (3*b^2*d*Log[c*x^n]^
2)/(d + e*x)^2 + (3*b^2*Log[c*x^n]^2)/(d + e*x) + (3*b^2*n^2*Log[d + e*x])/
d + (2*a*b*n*Log[1 + (e*x)/d])/d + (2*b^2*n*Log[c*x^n]*Log[1 + (e*x)/d])/d
+ (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d)/e^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.16, size = 1658, normalized size = 10.30

method	result	size
risch	Expression too large to display	1658

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] -2/3/e^3*n/d*ln(e*x+d)*b^2*ln(c)+2/3/e^3*n/d*ln(x)*b^2*ln(c)-4/3/e^3*n/(e*x
+d)*b^2*ln(c)-2/3*ln(x^n)*d^2/e^3/(e*x+d)^3*b^2*ln(c)+2/e^3*ln(x^n)*d/(e*x+
d)^2*b^2*ln(c)-2/3*b*ln(x^n)*d^2/e^3/(e*x+d)^3*a+2*b/e^3*ln(x^n)*d/(e*x+d)^
2*a-1/3*b^2/e^3*n^2/(e*x+d)-1/3*b^2/e^3*n^2/d*ln(x)^2+2/3*b^2/e^3*n^2/d*dil
og(-e*x/d)-b^2/e^3*n^2/d*ln(e*x+d)+b^2/e^3*n^2/d*ln(x)+1/3*b/e^3*n*d/(e*x+d
)^2*a+2/3*b/e^3*n/d*ln(x)*a-2/3*b/e^3*n/d*ln(e*x+d)*a+1/3/e^3*n*d/(e*x+d)^2
*b^2*ln(c)-b^2*ln(x^n)^2/e^3/(e*x+d)-I/e^3*ln(x^n)/(e*x+d)*b^2*Pi*csgn(I*c)
*csgn(I*c*x^n)^2-I/e^3*ln(x^n)*d/(e*x+d)^2*b^2*Pi*csgn(I*c*x^n)^3-2/3*I/e^3
*n/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(
I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/3*d^2/e^3/(e*x+d)^3-
1/e^3/(e*x+d)+d/e^3/(e*x+d)^2)+1/3*I/e^3*n/d*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)
^3-1/6*I/e^3*n*d/(e*x+d)^2*b^2*Pi*csgn(I*c*x^n)^3-2/3*I/e^3*n/(e*x+d)*b^2*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-1/3*I/e^3*n/d*ln(x)*b^2*Pi*csgn(I*c*x^n)^3-I/
e^3*ln(x^n)/(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*I*ln(x^n)*d^2/e^
3/(e*x+d)^3*b^2*Pi*csgn(I*c*x^n)^3+1/3*I/e^3*n/d*ln(e*x+d)*b^2*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+1/3*I*ln(x^n)*d^2/e^3/(e*x+d)^3*b^2*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+2/3*b^2*n/e^3*ln(x^n)/d*ln(x)+1/3*I/e^3*n/d*ln(x
)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/3*I/e^3*n/d*ln(x)*b^2*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)-1/3*I*ln(x^n)*d^2/e^3/(e*x+d)^3*b^2*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2+1/6*I/e^3*n*d/(e*x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
+2/3*I/e^3*n/(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/3*b^2/e^3
*n^2/d*ln(e*x+d)*ln(-e*x/d)+b^2*ln(x^n)^2*d/e^3/(e*x+d)^2-4/3*b^2*n/e^3*ln(
x^n)/(e*x+d)+I/e^3*ln(x^n)*d/(e*x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I
/e^3*ln(x^n)*d/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/e^3*ln(x^n)/(e*
x+d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*I/e^3*n/d*ln(e*x+d)*b^2
```

```
*Pi*csgn(I*c)*csgn(I*c*x^n)^2-4/3*b/e^3*n/(e*x+d)*a-1/3*I*ln(x^n)*d^2/e^3/(
e*x+d)^3*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-2/3*b^2*n/e^3*ln(x^n)/d*ln(e*x+d)
+1/3*b^2*n/e^3*ln(x^n)*d/(e*x+d)^2-2*b/e^3*ln(x^n)/(e*x+d)*a-1/3*b^2*ln(x^n
)^2*d^2/e^3/(e*x+d)^3-2/e^3*ln(x^n)/(e*x+d)*b^2*ln(c)+1/6*I/e^3*n*d/(e*x+d)
^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/e^3*ln(x^n)*d/(e*x+d)^2*b^2*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/6*I/e^3*n*d/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+2/3*I/e^3*n/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+I/e^3*ln(x
^n)/(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3+1/3*I/e^3*n/d*ln(x)*b^2*Pi*csgn(I*c)*csg
n(I*c*x^n)^2-1/3*I/e^3*n/d*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] -1/3*a*b*n*(2*e^(-3)*log(x*e + d)/d - 2*e^(-3)*log(x)/d + (4*x*e + 3*d)/(x^
2*e^5 + 2*d*x*e^4 + d^2*e^3)) - 1/3*((3*x^2*e^2 + 3*d*x*e + d^2)*log(x^n)^2
/(x^3*e^6 + 3*d*x^2*e^5 + 3*d^2*x*e^4 + d^3*e^3) - 3*integrate(1/3*(3*x^3*e
^3*log(c)^2 + 2*(3*(n + log(c))*x^3*e^3 + 6*d*n*x^2*e^2 + 4*d^2*n*x*e + d^3
*n)*log(x^n))/(x^5*e^7 + 4*d*x^4*e^6 + 6*d^2*x^3*e^5 + 4*d^3*x^2*e^4 + d^4*
x*e^3), x))*b^2 - 2/3*(3*x^2*e^2 + 3*d*x*e + d^2)*a*b*log(c*x^n)/(x^3*e^6 +
 3*d*x^2*e^5 + 3*d^2*x*e^4 + d^3*e^3) - 1/3*(3*x^2*e^2 + 3*d*x*e + d^2)*a^2
/(x^3*e^6 + 3*d*x^2*e^5 + 3*d^2*x*e^4 + d^3*e^3)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(x^4*e^4 +
 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log{(cx^n)})^2}{(d + ex)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2*x^2/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^4} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
[Out] int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.116 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal. Leaf size=210

$$\frac{b^2n^2}{3de^2(d+ex)}-\frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2}+\frac{bn(a+b\log(cx^n))}{3de^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{6d^2e^2}+\frac{d(a+b\log(cx^n))^2}{3e^2(d+ex)^3}-\frac{(a+b\log(c}{2e^2(d+e}$$

```
[Out] 1/3*b^2*n^2/d/e^2/(e*x+d)-1/3*b*n*(a+b*ln(c*x^n))/e^2/(e*x+d)^2+1/3*b*n*(a+
b*ln(c*x^n))/d/e^2/(e*x+d)+1/6*(a+b*ln(c*x^n))^2/d^2/e^2+1/3*d*(a+b*ln(c*x^
n))^2/e^2/(e*x+d)^3-1/2*(a+b*ln(c*x^n))^2/e^2/(e*x+d)^2-1/3*b*n*(a+b*ln(c*x
^n))*ln(1+e*x/d)/d^2/e^2-1/3*b^2*n^2*polylog(2,-e*x/d)/d^2/e^2
```

Rubi [A]
time = 0.16, antiderivative size = 222, normalized size of antiderivative = 1.06, number of steps used = 8, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2383, 2381, 2384, 2354, 2438, 2373, 45}

$$-\frac{b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^2e^2}-\frac{bn\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)+bn\right)}{3d^2e^2}+\frac{bnx\left(a+b\log\left(cx^n\right)\right)}{3d^2e(d+ex)}-\frac{bnx^2\left(a+b\log\left(cx^n\right)\right)}{3d^2(d+ex)^2}+\frac{x^2\left(a+b\log\left(cx^n\right)\right)^2}{6d^2(d+ex)^2}+\frac{x^2\left(a+b\log\left(cx^n\right)\right)^2}{3d(d+ex)^3}+\frac{b^2n^2\log(d+ex)}{3d^2e^2}+\frac{b^2n^2}{3de^2(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] (b^2*n^2)/(3*d*e^2*(d + e*x)) - (b*n*x^2*(a + b*Log[c*x^n]))/(3*d^2*(d + e*
x)^2) + (b*n*x*(a + b*Log[c*x^n]))/(3*d^2*e*(d + e*x)) + (x^2*(a + b*Log[c*
x^n])^2)/(3*d*(d + e*x)^3) + (x^2*(a + b*Log[c*x^n])^2)/(6*d^2*(d + e*x)^2)
 + (b^2*n^2*Log[d + e*x])/(3*d^2*e^2) - (b*n*(a + b*n + b*Log[c*x^n])*Log[1
 + (e*x)/d])/(3*d^2*e^2) - (b^2*n^2*PolyLog[2, -((e*x)/d)])/(3*d^2*e^2)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
```

```
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2381

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Dist[b*n*(p/(d*(q + 1))), Int[(f*x)^
m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2383

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + (Dist[(m + q + 2)/(d*(q + 1)), Int[(
f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^p, x], x] + Dist[b*n*(p/(d*(q +
 1))), Int[(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x]) /;
 FreeQ[{a, b, c, d, e, f, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ
[q, -1] && GtQ[m, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \left(-\frac{d(a+b\log(cx^n))^2}{e(d+ex)^4}+\frac{(a+b\log(cx^n))^2}{e(d+ex)^3}\right)dx$$
$$= \frac{\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{e} - \frac{d\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx}{e}$$
$$= \frac{d(a+b\log(cx^n))^2}{3e^2(d+ex)^3} - \frac{(a+b\log(cx^n))^2}{2e^2(d+ex)^2} + \frac{(bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{e^2} - \frac{(2bdn)\int \frac{a+b\log(}{x(d+e}}{3e^2}$$
$$= \frac{d(a+b\log(cx^n))^2}{3e^2(d+ex)^3} - \frac{(a+b\log(cx^n))^2}{2e^2(d+ex)^2} - \frac{(2bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{3e^2} + \frac{(bn)\int \frac{a+b\log(cx}{x(d+ex}}{de^2}$$
$$= -\frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2} - \frac{bnx(a+b\log(cx^n))}{d^2e(d+ex)} + \frac{d(a+b\log(cx^n))^2}{3e^2(d+ex)^3} - \frac{(a+b\log(c}{2e^2(d+e}$$
$$= -\frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2} - \frac{bnx(a+b\log(cx^n))}{3d^2e(d+ex)} + \frac{(a+b\log(cx^n))^2}{2d^2e^2} + \frac{d(a+b\log(c}{3e^2(d+ex}$$
$$= \frac{b^2n^2}{3de^2(d+ex)} + \frac{b^2n^2\log(x)}{3d^2e^2} - \frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2} - \frac{bnx(a+b\log(cx^n))}{3d^2e(d+ex)} + \frac{(a+}{}$$
$$= \frac{b^2n^2}{3de^2(d+ex)} + \frac{b^2n^2\log(x)}{3d^2e^2} - \frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2} - \frac{bnx(a+b\log(cx^n))}{3d^2e(d+ex)} + \frac{(a+}{}$$

Mathematica [A]
time = 0.16, size = 281, normalized size = 1.34

$$\frac{2b^2d^3n^2+2abd^2enx+4b^2d^2en^2x+3a^2de^2x^2+2abde^2nx^2+2b^2de^2n^2x^2+a^2e^3x^3+b^2e^2x^2(3d+ex)\log^2(cx^n)-2abd^3n\log\left(1+\frac{ex}{d}\right)-6abd^2enx\log\left(1+\frac{ex}{d}\right)-6abde^2nx^2\log\left(1+\frac{ex}{d}\right)-2abe^3nx^3\log\left(1+\frac{ex}{d}\right)-2b\log(cx^n)\left(-ex(bdn(d+ex)+aex(3d+ex))+bn(d+ex)^3\log\left(1+\frac{ex}{d}\right)\right)-2b^2n^2(d+ex)^3\text{Li}_2\left(-\frac{ex}{d}\right)}{6d^2e^2(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

```
[Out] (2*b^2*d^3*n^2 + 2*a*b*d^2*e*n*x + 4*b^2*d^2*e*n^2*x + 3*a^2*d*e^2*x^2 + 2*
a*b*d*e^2*n*x^2 + 2*b^2*d*e^2*n^2*x^2 + a^2*e^3*x^3 + b^2*e^2*x^2*(3*d + e*
x)*Log[c*x^n]^2 - 2*a*b*d^3*n*Log[1 + (e*x)/d] - 6*a*b*d^2*e*n*x*Log[1 + (e
*x)/d] - 6*a*b*d*e^2*n*x^2*Log[1 + (e*x)/d] - 2*a*b*e^3*n*x^3*Log[1 + (e*x)
/d] - 2*b*Log[c*x^n]*(-(e*x*(b*d*n*(d + e*x) + a*e*x*(3*d + e*x))) + b*n*(d
 + e*x)^3*Log[1 + (e*x)/d]) - 2*b^2*n^2*(d + e*x)^3*PolyLog[2, -((e*x)/d)])
/(6*d^2*e^2*(d + e*x)^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.16, size = 1400, normalized size = 6.67

method	result	size

risch	Expression too large to display	1400

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] 2/3*b*ln(x^n)*d/e^2/(e*x+d)^3*a+1/2*I/e^2*ln(x^n)/(e*x+d)^2*b^2*Pi*csgn(I*c
*x^n)^3+1/6*I/e^2*n/(e*x+d)^2*b^2*Pi*csgn(I*c*x^n)^3-1/6*I/e^2*n/d^2*ln(x)*
b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/3*ln(x^n)*d/e^2/(e*x+d)^3*b^2*
ln(c)-1/6*I/e^2*n/(e*x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/3*I*ln(x^n
)*d/e^2/(e*x+d)^3*b^2*Pi*csgn(I*c*x^n)^3+1/3*b/e^2*n/d/(e*x+d)*a-1/3*b/e^2*
n/d^2*ln(e*x+d)*a+1/3*b/e^2*n/d^2*ln(x)*a-1/3*b^2*n/e^2*ln(x^n)/(e*x+d)^2-1
/6*b^2/e^2*n^2/d^2*ln(x)^2+1/3*b^2/e^2*n^2/d^2*dilog(-e*x/d)+1/6*I/e^2*n/d^
2*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-1/2*b^2*ln(x^n)^2/e^2/(e*x+d)^2-1/2*I/e^
2*ln(x^n)/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/6*I/e^2*n/d/(e*x+d)*
b^2*Pi*csgn(I*c*x^n)^3-1/6*I/e^2*n/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)
^2-1/2*I/e^2*ln(x^n)/(e*x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3/e^2*n
/d/(e*x+d)*b^2*ln(c)+1/3/e^2*n/d^2*ln(x)*b^2*ln(c)-1/3/e^2*n/d^2*ln(e*x+d)*
b^2*ln(c)-1/e^2*ln(x^n)/(e*x+d)^2*b^2*ln(c)+1/3*b^2*ln(x^n)^2*d/e^2/(e*x+d)
^3+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I
*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(
c)+2*a)^2*(1/3*d/e^2/(e*x+d)^3-1/2/e^2/(e*x+d)^2)-1/6*I/e^2*n/d^2*ln(x)*b^2
*Pi*csgn(I*c*x^n)^3-1/3/e^2*n/(e*x+d)^2*b^2*ln(c)+1/3*I*ln(x^n)*d/e^2/(e*x+
d)^3*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/3*b^2*n^2/d/e^2/(e*x+d)-b/e^2*ln(x^
n)/(e*x+d)^2*a+1/3*b^2/e^2*n^2/d^2*ln(e*x+d)*ln(-e*x/d)+1/6*I/e^2*n/d/(e*x+
d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/6*I/e^2*n/d/(e*x+d)*b^2*Pi*csgn(I*c
)*csgn(I*c*x^n)^2-1/3*b/e^2*n/(e*x+d)^2*a+1/6*I/e^2*n/d^2*ln(x)*b^2*Pi*csgn
(I*c)*csgn(I*c*x^n)^2-1/6*I/e^2*n/d^2*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x
^n)^2-1/6*I/e^2*n/d^2*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*I*ln
(x^n)*d/e^2/(e*x+d)^3*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I/e^2*ln(x^n)/
(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*b^2*n/e^2*ln(x^n)/
d^2*ln(e*x+d)+1/3*b^2*n/e^2*ln(x^n)/d/(e*x+d)+1/3*b^2*n/e^2*ln(x^n)/d^2*ln(
x)+1/6*I/e^2*n/(e*x+d)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/6*I/e
^2*n/d^2*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/3*I*ln(x^n)*d/e^2/(e*x+
d)^3*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/6*I/e^2*n/d^2*ln(e*x+d)*b
^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/6*I/e^2*n/d/(e*x+d)*b^2*Pi*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/3*a*b*n*(x/(d*x^2*e^3 + 2*d^2*x*e^2 + d^3*e) - e^(-2)*log(x*e + d)/d^2 +
e^(-2)*log(x)/d^2) - 1/6*((3*x*e + d)*log(x^n)^2/(x^3*e^5 + 3*d*x^2*e^4 + 3
*d^2*x*e^3 + d^3*e^2) - 6*integrate(1/3*(3*x^2*e^2*log(c)^2 + (3*(n + 2*log
(c))*x^2*e^2 + 4*d*n*x*e + d^2*n)*log(x^n))/(x^5*e^6 + 4*d*x^4*e^5 + 6*d^2*
x^3*e^4 + 4*d^3*x^2*e^3 + d^4*x*e^2), x))*b^2 - 1/3*(3*x*e + d)*a*b*log(c*x
^n)/(x^3*e^5 + 3*d*x^2*e^4 + 3*d^2*x*e^3 + d^3*e^2) - 1/6*(3*x*e + d)*a^2/(
x^3*e^5 + 3*d*x^2*e^4 + 3*d^2*x*e^3 + d^3*e^2)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(x^4*e^4 + 4*d*x
^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\log{(cx^n)})^2}{(d+ex)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2*x/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x\right)}^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

```
[Out] int((x*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.117 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

Optimal. Leaf size=203

$$-\frac{b^2n^2}{3d^2e(d+ex)}-\frac{b^2n^2\log(x)}{3d^3e}+\frac{bn(a+b\log(cx^n))}{3de(d+ex)^2}-\frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)}-\frac{2bn\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{3d^3e}$$

```
[Out] -1/3*b^2*n^2/d^2/e/(e*x+d)-1/3*b^2*n^2*ln(x)/d^3/e+1/3*b*n*(a+b*ln(c*x^n))/
d/e/(e*x+d)^2-2/3*b*n*x*(a+b*ln(c*x^n))/d^3/(e*x+d)-2/3*b*n*ln(1+d/e/x)*(a+
b*ln(c*x^n))/d^3/e-1/3*(a+b*ln(c*x^n))^2/e/(e*x+d)^3+b^2*n^2*ln(e*x+d)/d^3/
e+2/3*b^2*n^2*polylog(2,-d/e/x)/d^3/e
```

Rubi [A]
time = 0.18, antiderivative size = 203, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.350$, Rules used = {2356, 2389, 2379, 2438, 2351, 31, 46}

$$\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^3e}-\frac{2bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3d^3e}-\frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)}+\frac{bn(a+b\log(cx^n))}{3de(d+ex)^2}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}-\frac{b^2n^2\log(x)}{3d^3e}+\frac{b^2n^2\log(d+ex)}{d^3e}-\frac{b^2n^2}{3d^2e(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d + e*x)^4,x]
```

```
[Out] -1/3*(b^2*n^2)/(d^2*e*(d + e*x)) - (b^2*n^2*Log[x])/(3*d^3*e) + (b*n*(a + b
*Log[c*x^n]))/(3*d*e*(d + e*x)^2) - (2*b*n*x*(a + b*Log[c*x^n]))/(3*d^3*(d
+ e*x)) - (2*b*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*d^3*e) - (a + b*Lo
g[c*x^n])^2/(3*e*(d + e*x)^3) + (b^2*n^2*Log[d + e*x])/(d^3*e) + (2*b^2*n^2
*PolyLog[2, -(d/(e*x))])/(3*d^3*e)
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
```

```
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = -\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} + \frac{(2bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx}{3e}$$

$$= -\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} - \frac{(2bn)\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{3d} + \frac{(2bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx}{3de}$$

$$= \frac{bn(a+b\log(cx^n))}{3de(d+ex)^2} - \frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} - \frac{(2bn)\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{3d^2} + \frac{(2bn)\int \frac{a+b\log(\ldots}{x(d+e\ldots}}{3d^2e}$$

$$= \frac{bn(a+b\log(cx^n))}{3de(d+ex)^2} - \frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)} - \frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} - \frac{(2bn)\int \frac{a+b\log\ldots}{d+e\ldots}}{3d^3}$$

$$= -\frac{b^2n^2}{3d^2e(d+ex)} - \frac{b^2n^2\log(x)}{3d^3e} + \frac{bn(a+b\log(cx^n))}{3de(d+ex)^2} - \frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)} + \ldots$$

$$= -\frac{b^2n^2}{3d^2e(d+ex)} - \frac{b^2n^2\log(x)}{3d^3e} + \frac{bn(a+b\log(cx^n))}{3de(d+ex)^2} - \frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)} + \ldots$$

Mathematica [A]
time = 0.11, size = 211, normalized size = 1.04

$$-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} + \frac{2bn\left(\frac{a+b\log(cx^n)}{2d(d+ex)^2} + \frac{a+b\log(cx^n)}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{2bd^3n} - \frac{bn\left(\frac{1}{d(d+ex)} + \frac{\log(x)}{d^2} - \frac{\log(d+ex)}{d^2}\right)}{2d} - \frac{bn\left(\frac{\log(x)}{d} - \frac{\log(d+ex)}{d}\right)}{d^2} - \frac{(a+b\log(cx^n))\log\left(\frac{d+ex}{d}\right)}{d^3} - \frac{bn\operatorname{Li}_2\left(-\frac{ex}{d}\right)}{d^3}\right)}{3e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^4,x]
```

```
[Out] -1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*((a + b*Log[c*x^n])/(2*d
*(d + e*x)^2) + (a + b*Log[c*x^n])/(d^2*(d + e*x)) + (a + b*Log[c*x^n])^2/(
2*b*d^3*n) - (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x]/d^2))/(2*d)
- (b*n*(Log[x]/d - Log[d + e*x]/d))/d^2 - ((a + b*Log[c*x^n])*Log[(d + e*x)
/d])/d^3 - (b*n*PolyLog[2, -((e*x)/d)])/d^3))/(3*e)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.16, size = 1227, normalized size = 6.04

method	result	size
risch	Expression too large to display	1227

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*I/e*n/d^3*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-2/3*b/(e*x+d)^3/e*ln
(x^n)*a+1/3*I/(e*x+d)^3/e*ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3+1/3*I/(e*x+d)^3/e*
```

```
ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/3/e*n/d^2/(e*x+d)*b^2*
ln(c)+2/3/e*n/d^3*ln(x)*b^2*ln(c)-2/3/e*n/d^3*ln(e*x+d)*b^2*ln(c)-2/3*b^2/e
*n/d^3*ln(x^n)*ln(e*x+d)+2/3*b^2/e*n*ln(x^n)/d^2/(e*x+d)+1/3*b^2/e*n*ln(x^n
)/d/(e*x+d)^2+2/3*b^2/e*n*ln(x^n)/d^3*ln(x)+1/3/e*n/d/(e*x+d)^2*b^2*ln(c)+1
/3*b/e*n/d/(e*x+d)^2*a+2/3*b/e*n/d^2/(e*x+d)*a+2/3*b/e*n/d^3*ln(x)*a-2/3*b/
e*n/d^3*ln(e*x+d)*a-1/3*b^2/e*n^2/d^3*ln(x)^2+2/3*b^2/e*n^2/d^3*dilog(-e*x/
d)-1/6*I/e*n/d/(e*x+d)^2*b^2*Pi*csgn(I*c*x^n)^3-1/3*I/e*n/d^3*ln(x)*b^2*Pi*
csgn(I*c*x^n)^3-1/12*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*
x^n)^3+2*b*ln(c)+2*a)^2/(e*x+d)^3/e+2/3*b^2/e*n^2/d^3*ln(e*x+d)*ln(-e*x/d)-
1/3*I/(e*x+d)^3/e*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/3*I/(e*x+d)^
3/e*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/3*b^2/(e*x+d)^3/e*ln(x^n)^2+
1/3*I/e*n/d^3*ln(e*x+d)*b^2*Pi*csgn(I*c*x^n)^3-1/3*I/e*n/d^2/(e*x+d)*b^2*Pi
*csgn(I*c*x^n)^3+1/6*I/e*n/d/(e*x+d)^2*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1
/3*I/e*n/d^3*ln(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*I/e*n/d^2/(e*
x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-2/3/(e*x+d)^3/e*ln(x^n)*b^2*ln(c)-1/3
*I/e*n/d^3*ln(e*x+d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-b^2*n^2*ln(x)/d^3/e+b
^2*n^2*ln(e*x+d)/d^3/e-1/3*b^2*n^2/d^2/e/(e*x+d)-1/6*I/e*n/d/(e*x+d)^2*b^2*
Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/6*I/e*n/d/(e*x+d)^2*b^2*Pi*csgn(I*
c)*csgn(I*c*x^n)^2+1/3*I/e*n/d^3*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/3
*I/e*n/d^2/(e*x+d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/3*I/e*n/d^3*ln(e*x+
d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*I/e*n/d^2/(e*x+d)*b^2*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/3*I/e*n/d^3*ln(x)*b^2*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/3*a*b*n*((2*x*e + 3*d)/(d^2*x^2*e^3 + 2*d^3*x*e^2 + d^4*e) - 2*e^(-1)*log
(x*e + d)/d^3 + 2*e^(-1)*log(x)/d^3) - 1/3*b^2*(log(x^n)^2/(x^3*e^4 + 3*d*x
^2*e^3 + 3*d^2*x*e^2 + d^3*e) - 3*integrate(1/3*(3*x*e*log(c)^2 + 2*((n + 3
*log(c))*x*e + d*n)*log(x^n))/(x^5*e^5 + 4*d*x^4*e^4 + 6*d^2*x^3*e^3 + 4*d^
3*x^2*e^2 + d^4*x*e), x)) - 2/3*a*b*log(c*x^n)/(x^3*e^4 + 3*d*x^2*e^3 + 3*d
^2*x*e^2 + d^3*e) - 1/3*a^2/(x^3*e^4 + 3*d*x^2*e^3 + 3*d^2*x*e^2 + d^3*e)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^4*e^4 + 4*d*x^3*e^3
 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})^2}{(d + ex)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/(x*e + d)^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\,\ln{(c\,x^n)})^2}{(d + e\,x)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d + e*x)^4,x)
```

```
[Out] int((a + b*log(c*x^n))^2/(d + e*x)^4, x)
```

3.118 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

Optimal. Leaf size=351

$$\frac{b^2n^2}{3d^3(d+ex)}+\frac{b^2n^2\log(x)}{3d^4}-\frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2}+\frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)}-\frac{5(a+b\log(cx^n))^2}{6d^4}+\frac{(a+b\log(cx^n)}{3d(d+ex)^3}$$

```
[Out] 1/3*b^2*n^2/d^3/(e*x+d)+1/3*b^2*n^2*ln(x)/d^4-1/3*b*n*(a+b*ln(c*x^n))/d^2/(
e*x+d)^2+5/3*b*e*n*x*(a+b*ln(c*x^n))/d^4/(e*x+d)-5/6*(a+b*ln(c*x^n))^2/d^4+
1/3*(a+b*ln(c*x^n))^2/d/(e*x+d)^3+1/2*(a+b*ln(c*x^n))^2/d^2/(e*x+d)^2-e*x*(
a+b*ln(c*x^n))^2/d^4/(e*x+d)+1/3*(a+b*ln(c*x^n))^3/b/d^4/n-2*b^2*n^2*ln(e*x
+d)/d^4+11/3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^4-(a+b*ln(c*x^n))^2*ln(1+e*x
/d)/d^4+11/3*b^2*n^2*polylog(2,-e*x/d)/d^4-2*b*n*(a+b*ln(c*x^n))*polylog(2,
-e*x/d)/d^4+2*b^2*n^2*polylog(3,-e*x/d)/d^4
```

Rubi [A]
time = 0.58, antiderivative size = 363, normalized size of antiderivative = 1.03, number of steps used = 25, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {2389, 2379, 2421, 6724, 2355, 2354, 2438, 2356, 2351, 31, 46}

$$\frac{2bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{5b^2n^2\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^4}+\frac{2b^2n^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{2b^2n^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}+\frac{5bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3d^4}+\frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)}+\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}-\frac{ex(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2}+\frac{(a+b\log(cx^n))^2}{2d^2(d+ex)^2}+\frac{(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2b^2n^2\log(d+ex)}{d^4}+\frac{b^2n^2\log(x)}{3d^4}+\frac{b^2n^2}{3d^3(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^4),x]
```

```
[Out] (b^2*n^2)/(3*d^3*(d + e*x)) + (b^2*n^2*Log[x])/(3*d^4) - (b*n*(a + b*Log[c*
x^n]))/(3*d^2*(d + e*x)^2) + (5*b*e*n*x*(a + b*Log[c*x^n]))/(3*d^4*(d + e*x
)) + (5*b*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*d^4) + (a + b*Log[c*x^n
])^2/(3*d*(d + e*x)^3) + (a + b*Log[c*x^n])^2/(2*d^2*(d + e*x)^2) - (e*x*(a
 + b*Log[c*x^n])^2)/(d^4*(d + e*x)) - (Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^
2)/d^4 - (2*b^2*n^2*Log[d + e*x])/d^4 + (2*b*n*(a + b*Log[c*x^n])*Log[1 + (
e*x)/d])/d^4 - (5*b^2*n^2*PolyLog[2, -(d/(e*x))])/(3*d^4) + (2*b*n*(a + b*L
og[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 + (2*b^2*n^2*PolyLog[2, -((e*x)/d)])
/d^4 + (2*b^2*n^2*PolyLog[3, -(d/(e*x))])/d^4
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
```

```
n + 2, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx &= \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx}{d} \\
&= \frac{(a+b\log(cx^n))^2}{3d(d+ex)^3} + \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx}{d^2} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{d^2} - \frac{(2bn)\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,d}{3d} \\
&= \frac{(a+b\log(cx^n))^2}{3d(d+ex)^3} + \frac{(a+b\log(cx^n))^2}{2d^2(d+ex)^2} + \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx}{d^3} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{d^3} - \\
&= -\frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2} + \frac{(a+b\log(cx^n))^2}{3d(d+ex)^3} + \frac{(a+b\log(cx^n))^2}{2d^2(d+ex)^2} - \frac{ex(a+b\log(cx^n)}{d^4(d+ex)} \\
&= -\frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2} + \frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)} + \frac{(a+b\log(cx^n))^2}{3d(d+ex)^3} + \frac{(a+b\log(c}{2d^2(d+e} \\
&= \frac{b^2n^2}{3d^3(d+ex)} + \frac{b^2n^2\log(x)}{3d^4} - \frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2} + \frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)} - \frac{5(a+}{} \\
&= \frac{b^2n^2}{3d^3(d+ex)} + \frac{b^2n^2\log(x)}{3d^4} - \frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2} + \frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)} - \frac{5(a+}{}
\end{aligned}
$$

Mathematica [A]
time = 0.28, size = 318, normalized size = 0.91

$$
\frac{-\frac{2bd^2n(a+b\log(cx^n))}{(d+ex)^2} - \frac{10bdn(a+b\log(cx^n))}{d+ex} - 11(a+b\log(cx^n))^2 + \frac{2d^3(a+b\log(cx^n))^2}{(d+ex)^3} + \frac{3d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{6d(a+b\log(cx^n))^2}{d+ex} + \frac{2(a+b\log(cx^n))^3}{bn} + 10b^2n^2(\log(x)-\log(d+ex)) + \frac{2b^2n^2(d+(d+ex)\log(x)-(d+ex)\log(d+ex))}{d+ex} + 22bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 6(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 22b^2n^2\mathrm{Li}_2\left(-\frac{ex}{d}\right) - 12bn(a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{ex}{d}\right) + 12b^2n^2\mathrm{Li}_3\left(-\frac{ex}{d}\right)}{6d^4}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^4),x]
```

```
[Out] ((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x)^2 - (10*b*d*n*(a + b*Log[c*x^n])
)/(d + e*x) - 11*(a + b*Log[c*x^n])^2 + (2*d^3*(a + b*Log[c*x^n])^2)/(d + e
*x)^3 + (3*d^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (6*d*(a + b*Log[c*x^n])^
2)/(d + e*x) + (2*(a + b*Log[c*x^n])^3)/(b*n) + 10*b^2*n^2*(Log[x] - Log[d
+ e*x]) + (2*b^2*n^2*(d + (d + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d +
e*x) + 22*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*(a + b*Log[c*x^n])^2*
Log[1 + (e*x)/d] + 22*b^2*n^2*PolyLog[2, -((e*x)/d)] - 12*b*n*(a + b*Log[c*
x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*d^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.22, size = 5668, normalized size = 16.15

method	result	size
risch	Expression too large to display	5668

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] 1/6*a^2*((6*x^2*e^2 + 15*d*x*e + 11*d^2)/(d^3*x^3*e^3 + 3*d^4*x^2*e^2 + 3*d
^5*x*e + d^6) - 6*log(x*e + d)/d^4 + 6*log(x)/d^4) + integrate((b^2*log(c)^
2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(x^5*e^4
 + 4*d*x^4*e^3 + 6*d^2*x^3*e^2 + 4*d^3*x^2*e + d^4*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^5*e^4 + 4*d*x^4*e^3
 + 6*d^2*x^3*e^2 + 4*d^3*x^2*e + d^4*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})^2}{x\,(d + ex)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**4,x)
[Out] Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**4), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^4*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\,\ln\left(c\,x^n\right))^2}{x\,(d + e\,x)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x)^4),x)
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x)^4), x)
```

3.119 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx$

Optimal. Leaf size=420

$$-\frac{2b^2n^2}{d^4x}-\frac{b^2en^2}{3d^4(d+ex)}-\frac{b^2en^2\log(x)}{3d^5}-\frac{2bn(a+b\log(cx^n))}{d^4x}+\frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2}-\frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)}+$$

```
[Out] -2*b^2*n^2/d^4/x-1/3*b^2*e*n^2/d^4/(e*x+d)-1/3*b^2*e*n^2*ln(x)/d^5-2*b*n*(a
+b*ln(c*x^n))/d^4/x+1/3*b*e*n*(a+b*ln(c*x^n))/d^3/(e*x+d)^2-8/3*b*e^2*n*x*(
a+b*ln(c*x^n))/d^5/(e*x+d)+4/3*e*(a+b*ln(c*x^n))^2/d^5-(a+b*ln(c*x^n))^2/d^
4/x-1/3*e*(a+b*ln(c*x^n))^2/d^2/(e*x+d)^3-e*(a+b*ln(c*x^n))^2/d^3/(e*x+d)^2
+3*e^2*x*(a+b*ln(c*x^n))^2/d^5/(e*x+d)-4/3*e*(a+b*ln(c*x^n))^3/b/d^5/n+3*b^
2*e*n^2*ln(e*x+d)/d^5-26/3*b*e*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^5+4*e*(a+b*l
n(c*x^n))^2*ln(1+e*x/d)/d^5-26/3*b^2*e*n^2*polylog(2,-e*x/d)/d^5+8*b*e*n*(a
+b*ln(c*x^n))*polylog(2,-e*x/d)/d^5-8*b^2*e*n^2*polylog(3,-e*x/d)/d^5
```

Rubi [A]

time = 0.55, antiderivative size = 432, normalized size of antiderivative = 1.03, number of steps used = 26, number of rules used = 14, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.609$, Rules used = {2395, 2342, 2341, 2356, 2389, 2379, 2438, 2351, 31, 46, 2355, 2354, 2421, 6724}

$$-\frac{8ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5}+\frac{8b^2en^2\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^5}-\frac{6b^2en^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^5}-\frac{8b^2en^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^5}+\frac{3e^2x(a+b\log(cx^n))^2}{d^5(d+ex)}-\frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)}+\frac{4e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^5}-\frac{8ben\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3d^5}-\frac{6ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^5}-\frac{(a+b\log(cx^n))^2}{d^4x}-\frac{2bn(a+b\log(cx^n))}{d^4x}-\frac{e(a+b\log(cx^n))^2}{d^3(d+ex)^2}+\frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2}-\frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3}-\frac{b^2en^2\log(x)}{3d^5}+\frac{3b^2en^2\log(d+ex)}{d^5}-\frac{b^2en^2}{3d^4(d+ex)}-\frac{2b^2n^2}{d^4x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^4),x]
```

```
[Out] (-2*b^2*n^2)/(d^4*x) - (b^2*e*n^2)/(3*d^4*(d + e*x)) - (b^2*e*n^2*Log[x])/(
3*d^5) - (2*b*n*(a + b*Log[c*x^n]))/(d^4*x) + (b*e*n*(a + b*Log[c*x^n]))/(3
*d^3*(d + e*x)^2) - (8*b*e^2*n*x*(a + b*Log[c*x^n]))/(3*d^5*(d + e*x)) - (8
*b*e*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*d^5) - (a + b*Log[c*x^n])^2/
(d^4*x) - (e*(a + b*Log[c*x^n])^2)/(3*d^2*(d + e*x)^3) - (e*(a + b*Log[c*x^
n])^2)/(d^3*(d + e*x)^2) + (3*e^2*x*(a + b*Log[c*x^n])^2)/(d^5*(d + e*x)) +
 (4*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^5 + (3*b^2*e*n^2*Log[d + e*x
])/d^5 - (6*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^5 + (8*b^2*e*n^2*P
olyLog[2, -(d/(e*x))])/(3*d^5) - (8*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d
/(e*x))])/d^5 - (6*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^5 - (8*b^2*e*n^2*Pol
yLog[3, -(d/(e*x))])/d^5
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
```

```
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{d^4x^2} - \frac{4e(a+b\log(cx^n))^2}{d^5x} + \frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^4} + \frac{2e^2(a+b\log\cdots}{d^3(d+\cdots}\right.$$

$$= \frac{\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx}{d^4} - \frac{(4e)\int \frac{(a+b\log(cx^n))^2}{x}\,dx}{d^5} + \frac{(4e^2)\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx}{d^5} + \frac{(3e^2)\int \frac{(a+\cdots}{\cdots}}{\cdots}$$

$$= -\frac{(a+b\log(cx^n))^2}{d^4x} - \frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3} - \frac{e(a+b\log(cx^n))^2}{d^3(d+ex)^2} + \frac{3e^2x(a+b\log(c\cdots}{d^5(d+ex)}$$

$$= -\frac{2b^2n^2}{d^4x} - \frac{2bn(a+b\log(cx^n))}{d^4x} - \frac{(a+b\log(cx^n))^2}{d^4x} - \frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3} - \frac{e(a+\cdots}{d^3(\cdots}$$

$$= -\frac{2b^2n^2}{d^4x} - \frac{2bn(a+b\log(cx^n))}{d^4x} + \frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2} - \frac{2be^2nx(a+b\log(cx^n))}{d^5(d+ex)} - \cdots$$

$$= -\frac{2b^2n^2}{d^4x} - \frac{2bn(a+b\log(cx^n))}{d^4x} + \frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2} - \frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)} + \cdots$$

$$= -\frac{2b^2n^2}{d^4x} - \frac{b^2en^2}{3d^4(d+ex)} - \frac{b^2en^2\log(x)}{3d^5} - \frac{2bn(a+b\log(cx^n))}{d^4x} + \frac{ben(a+b\log(cx^{n\cdots}}{3d^3(d+ex)^2}$$

$$= -\frac{2b^2n^2}{d^4x} - \frac{b^2en^2}{3d^4(d+ex)} - \frac{b^2en^2\log(x)}{3d^5} - \frac{2bn(a+b\log(cx^n))}{d^4x} + \frac{ben(a+b\log(cx^{n\cdots}}{3d^3(d+ex)^2}$$

Mathematica [A]
time = 0.44, size = 378, normalized size = 0.90

$$-\frac{\frac{6b^2dn^2}{x} + \frac{6bdn(a+b\log(cx^n))}{x} - \frac{bd^2en(a+b\log(cx^n))}{(d+ex)^2} - \frac{8bden(a+b\log(cx^n))}{d+ex} - 13e(a+b\log(cx^n))^2 + \frac{3d(a+b\log(cx^n))^2}{x} + \frac{d^3e(a+b\log(cx^n))^2}{(d+ex)^3} + \frac{3d^2e(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{9de(a+b\log(cx^n))^2}{d+ex} + \frac{4e(a+b\log(cx^n))^3}{bn} + 8b^2en^2(\log(x)-\log(d+ex)) + \frac{b^2en^2(d+(d+ex)\log(x)-(d+ex)\log(d+ex))}{d+ex} + 26ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 12e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right) + 26b^2en^2\operatorname{Li}_2\left(-\frac{ex}{d}\right) - 24ben(a+b\log(cx^n))\operatorname{Li}_2\left(-\frac{ex}{d}\right) + 24b^2en^2\operatorname{Li}_3\left(-\frac{ex}{d}\right)}{3d^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^4),x]
```

```
[Out] -1/3*((6*b^2*d*n^2)/x + (6*b*d*n*(a + b*Log[c*x^n]))/x - (b*d^2*e*n*(a + b*
Log[c*x^n]))/(d + e*x)^2 - (8*b*d*e*n*(a + b*Log[c*x^n]))/(d + e*x) - 13*e*
(a + b*Log[c*x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/x + (d^3*e*(a + b*Log[c*x
^n])^2)/(d + e*x)^3 + (3*d^2*e*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (9*d*e*(
a + b*Log[c*x^n])^2)/(d + e*x) + (4*e*(a + b*Log[c*x^n])^3)/(b*n) + 8*b^2*e
*n^2*(Log[x] - Log[d + e*x]) + (b^2*e*n^2*(d + (d + e*x)*Log[x] - (d + e*x)
*Log[d + e*x]))/(d + e*x) + 26*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] -
12*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 26*b^2*e*n^2*PolyLog[2, -((e*x
)/d)] - 24*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 24*b^2*e*n^2*P
olyLog[3, -((e*x)/d)])/d^5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.24, size = 6791, normalized size = 16.17

method	result	size
risch	Expression too large to display	6791

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="maxima")
```

```
[Out] -1/3*a^2*((12*x^3*e^3 + 30*d*x^2*e^2 + 22*d^2*x*e + 3*d^3)/(d^4*x^4*e^3 + 3
*d^5*x^3*e^2 + 3*d^6*x^2*e + d^7*x) - 12*e*log(x*e + d)/d^5 + 12*e*log(x)/d
^5) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(
c) + a*b)*log(x^n))/(x^6*e^4 + 4*d*x^5*e^3 + 6*d^2*x^4*e^2 + 4*d^3*x^3*e +
d^4*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^6*e^4 + 4*d*x^5*e^3
 + 6*d^2*x^4*e^2 + 4*d^3*x^3*e + d^4*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b\log\left(cx^{n}\right)\right)^{2}}{x^{2}\left(d + ex\right)^{4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**4,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**4), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2/((x*e + d)^4*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{x^2\,\left(d+e\,x\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^4),x)
[Out] int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^4), x)
```

3.120 $\int \frac{x\log^2(x)}{(d+ex)^4}\,dx$

Optimal. Leaf size=107

$$-\frac{x}{3d^2e(d+ex)}+\frac{x\log(x)}{3de(d+ex)^2}+\frac{x^2(3d+ex)\log^2(x)}{6d^2(d+ex)^3}-\frac{\log(x)\log\left(1+\frac{ex}{d}\right)}{3d^2e^2}-\frac{\text{Li}_2\left(-\frac{ex}{d}\right)}{3d^2e^2}$$

```
[Out] -1/3*x/d^2/e/(e*x+d)+1/3*x*ln(x)/d/e/(e*x+d)^2+1/6*x^2*(e*x+3*d)*ln(x)^2/d^
2/(e*x+d)^3-1/3*ln(x)*ln(1+e*x/d)/d^2/e^2-1/3*polylog(2,-e*x/d)/d^2/e^2
```

Rubi [A]
time = 0.11, antiderivative size = 157, normalized size of antiderivative = 1.47, number of steps used = 8, number of rules used = 7, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.538, Rules used = {2383, 2381, 2384, 2354, 2438, 2373, 45}

$$-\frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^2e^2}+\frac{\log(d+ex)}{3d^2e^2}-\frac{(\log(x)+1)\log\left(\frac{ex}{d}+1\right)}{3d^2e^2}+\frac{x^2\log^2(x)}{6d^2(d+ex)^2}-\frac{x^2\log(x)}{3d^2(d+ex)^2}+\frac{x\log(x)}{3d^2e(d+ex)}+\frac{1}{3de^2(d+ex)}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x*Log[x]^2)/(d + e*x)^4,x]
```

```
[Out] 1/(3*d*e^2*(d + e*x)) - (x^2*Log[x])/(3*d^2*(d + e*x)^2) + (x*Log[x])/(3*d^
2*e*(d + e*x)) + (x^2*Log[x]^2)/(3*d*(d + e*x)^3) + (x^2*Log[x]^2)/(6*d^2*(
d + e*x)^2) + Log[d + e*x]/(3*d^2*e^2) - ((1 + Log[x])*Log[1 + (e*x)/d])/(3
*d^2*e^2) - PolyLog[2, -((e*x)/d)]/(3*d^2*e^2)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
```

```
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2381

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Dist[b*n*(p/(d*(q + 1))), Int[(f*x)^
m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2383

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + (Dist[(m + q + 2)/(d*(q + 1)), Int[(
f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^p, x], x] + Dist[b*n*(p/(d*(q +
 1))), Int[(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x]) /;
 FreeQ[{a, b, c, d, e, f, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ
[q, -1] && GtQ[m, 0]
```

Rule 2384

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Dist[f/(e*(q + 1)), Int[(f*x)^(m - 1)*(d + e*x)^(q + 1
)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x
] && ILtQ[q, -1] && GtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = \int \left(-\frac{d\log^2(x)}{e(d+ex)^4}+\frac{\log^2(x)}{e(d+ex)^3}\right)dx$$
$$= \frac{\int \frac{\log^2(x)}{(d+ex)^3}\,dx}{e} - \frac{d\int \frac{\log^2(x)}{(d+ex)^4}\,dx}{e}$$
$$= \frac{d\log^2(x)}{3e^2(d+ex)^3} - \frac{\log^2(x)}{2e^2(d+ex)^2} + \frac{\int \frac{\log(x)}{x(d+ex)^2}\,dx}{e^2} - \frac{(2d)\int \frac{\log(x)}{x(d+ex)^3}\,dx}{3e^2}$$
$$= \frac{d\log^2(x)}{3e^2(d+ex)^3} - \frac{\log^2(x)}{2e^2(d+ex)^2} - \frac{2\int \frac{\log(x)}{x(d+ex)^2}\,dx}{3e^2} + \frac{\int \frac{\log(x)}{x(d+ex)}\,dx}{de^2} + \frac{2\int \frac{\log(x)}{(d+ex)^3}\,dx}{3e} - \frac{\int \frac{\log(x)}{(d+ex)}}{de}$$
$$= -\frac{\log(x)}{3e^2(d+ex)^2} - \frac{x\log(x)}{d^2e(d+ex)} + \frac{d\log^2(x)}{3e^2(d+ex)^3} - \frac{\log^2(x)}{2e^2(d+ex)^2} + \frac{\int \frac{1}{x(d+ex)^2}\,dx}{3e^2} + \frac{\int \frac{\log(x)}{x}}{d^2e^2}$$
$$= -\frac{\log(x)}{3e^2(d+ex)^2} - \frac{x\log(x)}{3d^2e(d+ex)} + \frac{\log^2(x)}{2d^2e^2} + \frac{d\log^2(x)}{3e^2(d+ex)^3} - \frac{\log^2(x)}{2e^2(d+ex)^2} + \frac{\log(d+ex)}{d^2e^2}$$
$$= \frac{1}{3de^2(d+ex)} + \frac{\log(x)}{3d^2e^2} - \frac{\log(x)}{3e^2(d+ex)^2} - \frac{x\log(x)}{3d^2e(d+ex)} + \frac{\log^2(x)}{6d^2e^2} + \frac{d\log^2(x)}{3e^2(d+ex)^3} - \frac{\mathrm{l}}{2e^2(}$$
$$= \frac{1}{3de^2(d+ex)} + \frac{\log(x)}{3d^2e^2} - \frac{\log(x)}{3e^2(d+ex)^2} - \frac{x\log(x)}{3d^2e(d+ex)} + \frac{\log^2(x)}{6d^2e^2} + \frac{d\log^2(x)}{3e^2(d+ex)^3} - \frac{\mathrm{l}}{2e^2(}$$

Mathematica [A]
time = 0.09, size = 96, normalized size = 0.90

$$\frac{2d(d+ex)^2+e^2x^2(3d+ex)\log^2(x)-2(d+ex)\log(x)\left(-dex+(d+ex)^2\log\left(1+\frac{ex}{d}\right)\right)-2(d+ex)^3\mathrm{Li}_2\left(-\frac{ex}{d}\right)}{6d^2e^2(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*Log[x]^2)/(d + e*x)^4,x]
```

```
[Out] (2*d*(d + e*x)^2 + e^2*x^2*(3*d + e*x)*Log[x]^2 - 2*(d + e*x)*Log[x]*(-(d*e
*x) + (d + e*x)^2*Log[1 + (e*x)/d]) - 2*(d + e*x)^3*PolyLog[2, -((e*x)/d)])
/(6*d^2*e^2*(d + e*x)^3)
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{x\ln(x)^2}{(ex+d)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(x)^2/(e*x+d)^4,x)
```

[Out] int(x*ln(x)^2/(e*x+d)^4,x)

Maxima [A]
time = 0.29, size = 129, normalized size = 1.21

$$\frac{e^{(-2)}\log(x)^2}{6\,d^2}-\frac{d^2\log(x)^2-2\,(e^2\log(x)+e^2)x^2-2\,d^2+\left(3\,de\log(x)^2-2\,de\log(x)-4\,de\right)x}{6\,(dx^3e^5+3\,d^2x^2e^4+3\,d^3xe^3+d^4e^2)}-\frac{\left(\log(x)\log\left(\frac{xe}{d}+1\right)+\mathrm{Li}_2\left(-\frac{xe}{d}\right)\right)e^{(-2)}}{3\,d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="maxima")

[Out] 1/6*e^(-2)*log(x)^2/d^2 - 1/6*(d^2*log(x)^2 - 2*(e^2*log(x) + e^2)*x^2 - 2*d^2 + (3*d*e*log(x)^2 - 2*d*e*log(x) - 4*d*e)*x)/(d*x^3*e^5 + 3*d^2*x^2*e^4 + 3*d^3*x*e^3 + d^4*e^2) - 1/3*(log(x)*log(x*e/d + 1) + dilog(-x*e/d))*e^(-2)/d^2

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="fricas")

[Out] integral(x*log(x)^2/(x^4*e^4 + 4*d*x^3*e^3 + 6*d^2*x^2*e^2 + 4*d^3*x*e + d^4), x)

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*ln(x)**2/(e*x+d)**4,x)

[Out] Timed out

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="giac")

[Out] integrate(x*log(x)^2/(x*e + d)^4, x)

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\ln(x)^2}{(d+e\,x)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*log(x)^2)/(d + e*x)^4,x)
```

```
[Out] int((x*log(x)^2)/(d + e*x)^4, x)
```

3.121 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$

Optimal. Leaf size=113

$$-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^3}{d}+\frac{3bn(a+b\log(cx^n))^2\,\mathrm{Li}_2\left(-\frac{d}{ex}\right)}{d}+\frac{6b^2n^2(a+b\log(cx^n))\,\mathrm{Li}_3\left(-\frac{d}{ex}\right)}{d}+\frac{6b^3n^3\mathrm{Li}_4}{d}$$

```
[Out] -ln(1+d/e/x)*(a+b*ln(c*x^n))^3/d+3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-d/e/x)/
d+6*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-d/e/x)/d+6*b^3*n^3*polylog(4,-d/e/x)
/d
```

Rubi [A]
time = 0.10, antiderivative size = 113, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2379, 2421, 2430, 6724}

$$\frac{6b^2n^2\mathrm{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d}+\frac{3bn\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d}+\frac{6b^3n^3\mathrm{PolyLog}\left(4,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)),x]
```

```
[Out] -((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^3)/d) + (3*b*n*(a + b*Log[c*x^n])^2*
PolyLog[2, -(d/(e*x))])/d + (6*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, -(d/(e
*x))])/d + (6*b^3*n^3*PolyLog[4, -(d/(e*x))])/d
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2430

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Dist[b*n*(p/q), Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p - 1
```

```
)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx &= \frac{\int \frac{(a+b\log(cx^n))^3}{x}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^3}{d+ex}\,dx}{d}\\ &= -\frac{(a+b\log(cx^n))^3\log\left(1+\frac{ex}{d}\right)}{d} + \frac{\mathrm{Subst}\left(\int x^3\,dx, x, a+b\log(cx^n)\right)}{bdn} + \frac{(3bn)\int \frac{(a}{}\\ &= \frac{(a+b\log(cx^n))^4}{4bdn} - \frac{(a+b\log(cx^n))^3\log\left(1+\frac{ex}{d}\right)}{d} - \frac{3bn(a+b\log(cx^n))^2\,\mathrm{Li}_2(-}{d}\\ &= \frac{(a+b\log(cx^n))^4}{4bdn} - \frac{(a+b\log(cx^n))^3\log\left(1+\frac{ex}{d}\right)}{d} - \frac{3bn(a+b\log(cx^n))^2\,\mathrm{Li}_2(-}{d}\\ &= \frac{(a+b\log(cx^n))^4}{4bdn} - \frac{(a+b\log(cx^n))^3\log\left(1+\frac{ex}{d}\right)}{d} - \frac{3bn(a+b\log(cx^n))^2\,\mathrm{Li}_2(-}{d}\end{aligned}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 243 vs. 2(113) = 226.
time = 0.11, size = 243, normalized size = 2.15

$$\frac{4\log(x)\left(a-bn\log(x)+b\log(cx^n)\right)^3-4\left(a-bn\log(x)+b\log(cx^n)\right)^3\log(d+ex)+6bn\left(a-bn\log(x)+b\log(cx^n)\right)^2\left(\log^2(x)-2\left(\log(x)\log\left(1+\frac{ex}{d}\right)+\mathrm{Li}_2\left(-\frac{ex}{d}\right)\right)\right)-4b^2n^2\left(-a+bn\log(x)-b\log(cx^n)\right)\left(\log^2(x)\left(\log(x)-3\log\left(1+\frac{ex}{d}\right)\right)-6\log(x)\mathrm{Li}_2\left(-\frac{ex}{d}\right)+6\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)+b^3n^3\left(\log^4(x)-4\log^3(x)\log\left(1+\frac{ex}{d}\right)-12\log^2(x)\mathrm{Li}_2\left(-\frac{ex}{d}\right)+24\log(x)\mathrm{Li}_3\left(-\frac{ex}{d}\right)-24\mathrm{Li}_4\left(-\frac{ex}{d}\right)\right)}{4d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)),x]
```

```
[Out] (4*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])^3 - 4*(a - b*n*Log[x] + b*Log[c*x
^n])^3*Log[d + e*x] + 6*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*(Log[x]^2 - 2
*(Log[x]*Log[1 + (e*x)/d] + PolyLog[2, -((e*x)/d)])) - 4*b^2*n^2*(-a + b*n*
Log[x] - b*Log[c*x^n])*(Log[x]^2*(Log[x] - 3*Log[1 + (e*x)/d]) - 6*Log[x]*P
olyLog[2, -((e*x)/d)] + 6*PolyLog[3, -((e*x)/d)]) + b^3*n^3*(Log[x]^4 - 4*L
og[x]^3*Log[1 + (e*x)/d] - 12*Log[x]^2*PolyLog[2, -((e*x)/d)] + 24*Log[x]*P
olyLog[3, -((e*x)/d)] - 24*PolyLog[4, -((e*x)/d)]))/(4*d)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.34, size = 9690, normalized size = 85.75

method	result	size
risch	Expression too large to display	9690

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x/(e*x+d),x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="maxima")
```

```
[Out] -a^3*(log(x*e + d)/d - log(x)/d) + integrate((b^3*log(c)^3 + b^3*log(x^n)^3
 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 +
3*(b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))/(x^2*e + d*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a^
3)/(x^2*e + d*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))^3}{x(d + ex)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/x/(e*x+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))**3/(x*(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^3/((x*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a+b\,\ln(c\,x^n))^3}{x\,(d+e\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/(x*(d + e*x)),x)
```

```
[Out] int((a + b*log(c*x^n))^3/(x*(d + e*x)), x)
```

3.122 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$

Optimal. Leaf size=217

$$-\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^3}{d^2}+\frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2}+\frac{3bn(a+b\log(cx^n}{d^2}$$

```
[Out] -e*x*(a+b*ln(c*x^n))^3/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))^3/d^2+3*b*n*
(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^2+3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-d/e/x)
/d^2+6*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^2+6*b^2*n^2*(a+b*ln(c*x^
n))*polylog(3,-d/e/x)/d^2-6*b^3*n^3*polylog(3,-e*x/d)/d^2+6*b^3*n^3*polylog
(4,-d/e/x)/d^2
```

Rubi [A]
time = 0.22, antiderivative size = 217, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2389, 2379, 2421, 2430, 6724, 2355, 2354}

$$\frac{6b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{d^2}+\frac{6b^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2}+\frac{3bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2}-\frac{6b^3n^3\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^2}+\frac{6b^3n^3\text{PolyLog}\left(4,-\frac{d}{ex}\right)}{d^2}+\frac{3bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{d^2}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d^2}-\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)^2),x]
```

```
[Out] -((e*x*(a + b*Log[c*x^n])^3)/(d^2*(d + e*x))) - (Log[1 + d/(e*x)]*(a + b*Lo
g[c*x^n])^3)/d^2 + (3*b*n*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/d^2 + (3*b
*n*(a + b*Log[c*x^n])^2*PolyLog[2, -(d/(e*x))])/d^2 + (6*b^2*n^2*(a + b*Log
[c*x^n])*PolyLog[2, -((e*x)/d)])/d^2 + (6*b^2*n^2*(a + b*Log[c*x^n])*PolyLo
g[3, -(d/(e*x))])/d^2 - (6*b^3*n^3*PolyLog[3, -((e*x)/d)])/d^2 + (6*b^3*n^3
*PolyLog[4, -(d/(e*x))])/d^2
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2430

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Dist[b*n*(p/q), Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p - 1
)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}\,dx}{d}$$

$$= -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} + \frac{\int \frac{(a+b\log(cx^n))^3}{x}\,dx}{d^2} - \frac{e\int \frac{(a+b\log(cx^n))^3}{d+ex}\,dx}{d^2} + \frac{(3ben)\int \frac{(a+b\log}{d+}}{d^2}$$

$$= -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} + \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} - \frac{(a+b\log(cx^n))^3\log}{d^2}$$

$$= -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^4}{4bd^2n} + \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} -$$

$$= -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^4}{4bd^2n} + \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} -$$

$$= -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^4}{4bd^2n} + \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} -$$

Mathematica [**A**]
time = 0.31, size = 432, normalized size = 1.99

$$\frac{4d(a-bn\log(x)+b\log(cx^n))^3+4(d+ex)\log(x)(a-bn\log(x)+b\log(cx^n))^3-4(d+ex)(a-bn\log(x)+b\log(cx^n))^3\log(d+ex)+6bn(a-bn\log(x)+b\log(cx^n))^2\left(-2ex\log(x)+(d+ex)\log^2(x)+2(d+ex)\log(d+ex)-2(d+ex)\left(\log(x)\log\left(1+\frac{ex}{d}\right)+\mathrm{Li}_2\left(-\frac{ex}{d}\right)\right)\right)+4b^2n^2(a-bn\log(x)+b\log(cx^n))\left(\log(x)\left((d+ex)\log^2(x)+6(d+ex)\log\left(1+\frac{ex}{d}\right)-3\log(x)\left(ex+(d+ex)\log\left(1+\frac{ex}{d}\right)\right)\right)-6(d+ex)(-1+\log(x))\mathrm{Li}_2\left(-\frac{ex}{d}\right)+6(d+ex)\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)+b^3n^3\left((d+ex)\log^4(x)-4\left(\log^2(x)\left(ex\log(x)-3(d+ex)\log\left(1+\frac{ex}{d}\right)\right)-6(d+ex)\log(x)\mathrm{Li}_2\left(-\frac{ex}{d}\right)+6(d+ex)\mathrm{Li}_3\left(-\frac{ex}{d}\right)\right)-4(d+ex)\left(\log^3(x)\log\left(1+\frac{ex}{d}\right)+3\log^2(x)\mathrm{Li}_2\left(-\frac{ex}{d}\right)-6\log(x)\mathrm{Li}_3\left(-\frac{ex}{d}\right)+6\mathrm{Li}_4\left(-\frac{ex}{d}\right)\right)\right)}{4d^2(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)^2),x]
```

```
[Out] (4*d*(a - b*n*Log[x] + b*Log[c*x^n])^3 + 4*(d + e*x)*Log[x]*(a - b*n*Log[x]
 + b*Log[c*x^n])^3 - 4*(d + e*x)*(a - b*n*Log[x] + b*Log[c*x^n])^3*Log[d +
e*x] + 6*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*(-2*e*x*Log[x] + (d + e*x)*L
og[x]^2 + 2*(d + e*x)*Log[d + e*x] - 2*(d + e*x)*(Log[x]*Log[1 + (e*x)/d] +
 PolyLog[2, -((e*x)/d)])) + 4*b^2*n^2*(a - b*n*Log[x] + b*Log[c*x^n])*(Log[
x]*((d + e*x)*Log[x]^2 + 6*(d + e*x)*Log[1 + (e*x)/d] - 3*Log[x]*(e*x + (d
+ e*x)*Log[1 + (e*x)/d])) - 6*(d + e*x)*(-1 + Log[x])*PolyLog[2, -((e*x)/d)
] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) + b^3*n^3*((d + e*x)*Log[x]^4 - 4*(
Log[x]^2*(e*x*Log[x] - 3*(d + e*x)*Log[1 + (e*x)/d]) - 6*(d + e*x)*Log[x]*P
olyLog[2, -((e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) - 4*(d + e*x)*(
Log[x]^3*Log[1 + (e*x)/d] + 3*Log[x]^2*PolyLog[2, -((e*x)/d)] - 6*Log[x]*Po
lyLog[3, -((e*x)/d)] + 6*PolyLog[4, -((e*x)/d)])))/(4*d^2*(d + e*x))
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.40, size = 14905, normalized size = 68.69

method	result	size

risch	Expression too large to display	14905

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] a^3*(1/(d*x*e + d^2) - log(x*e + d)/d^2 + log(x)/d^2) + integrate((b^3*log(
c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) +
 a*b^2)*log(x^n)^2 + 3*(b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))/(x
^3*e^2 + 2*d*x^2*e + d^2*x), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a^
3)/(x^3*e^2 + 2*d*x^2*e + d^2*x), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b \log\left(cx^{n}\right)\right)^{3}}{x\left(d + ex\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/x/(e*x+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**3/(x*(d + e*x)**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^3/((x*e + d)^2*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^3}{x\,\left(d+e\,x\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/(x*(d + e*x)^2),x)
```

```
[Out] int((a + b*log(c*x^n))^3/(x*(d + e*x)^2), x)
```

3.123 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

Optimal. Leaf size=361

$$\frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)}-\frac{(a+b\log(cx^n))^3}{2d^3}+\frac{(a+b\log(cx^n))^3}{2d(d+ex)^2}-\frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)}+\frac{(a+b\log(cx^n))^4}{4bd^3n}-3$$

```
[Out] 3/2*b*e*n*x*(a+b*ln(c*x^n))^2/d^3/(e*x+d)-1/2*(a+b*ln(c*x^n))^3/d^3+1/2*(a+
b*ln(c*x^n))^3/d/(e*x+d)^2-e*x*(a+b*ln(c*x^n))^3/d^3/(e*x+d)+1/4*(a+b*ln(c*
x^n))^4/b/d^3/n-3*b^2*n^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3+9/2*b*n*(a+b*ln(c
*x^n))^2*ln(1+e*x/d)/d^3-(a+b*ln(c*x^n))^3*ln(1+e*x/d)/d^3-3*b^3*n^3*polylo
g(2,-e*x/d)/d^3+9*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^3-3*b*n*(a+b*
ln(c*x^n))^2*polylog(2,-e*x/d)/d^3-9*b^3*n^3*polylog(3,-e*x/d)/d^3+6*b^2*n^
2*(a+b*ln(c*x^n))*polylog(3,-e*x/d)/d^3-6*b^3*n^3*polylog(4,-e*x/d)/d^3
```

Rubi [A]
time = 0.48, antiderivative size = 409, normalized size of antiderivative = 1.13, number of steps used = 18, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {2389, 2379, 2421, 2430, 6724, 2355, 2354, 2356, 2438}

$$-\frac{3b^2n^2\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}+\frac{6b^2n^2\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{d^3}+\frac{6b^2n^2\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}+\frac{3bn\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^3}-\frac{3b^3n^3\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{3b^3n^3\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}-\frac{6b^3n^3\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3}+\frac{6b^3n^3\text{PolyLog}\left(4,-\frac{d}{ex}\right)}{d^3}-\frac{3b^2n^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^3}+\frac{3bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{2d^3}+\frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)}+\frac{3bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{d^3}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d^3}-\frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)}+\frac{(a+b\log(cx^n))^3}{2d(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)^3),x]
```

```
[Out] (3*b*e*n*x*(a + b*Log[c*x^n])^2)/(2*d^3*(d + e*x)) + (3*b*n*Log[1 + d/(e*x)
]*(a + b*Log[c*x^n])^2)/(2*d^3) + (a + b*Log[c*x^n])^3/(2*d*(d + e*x)^2) -
(e*x*(a + b*Log[c*x^n])^3)/(d^3*(d + e*x)) - (Log[1 + d/(e*x)]*(a + b*Log[c
*x^n])^3)/d^3 - (3*b^2*n^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^3 + (3*b*
n*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/d^3 - (3*b^2*n^2*(a + b*Log[c*x^n]
)*PolyLog[2, -(d/(e*x))])/d^3 + (3*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -(d/
(e*x))])/d^3 - (3*b^3*n^3*PolyLog[2, -((e*x)/d)])/d^3 + (6*b^2*n^2*(a + b*L
og[c*x^n])*PolyLog[2, -((e*x)/d)])/d^3 - (3*b^3*n^3*PolyLog[3, -(d/(e*x))])
/d^3 + (6*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, -(d/(e*x))])/d^3 - (6*b^3*n
^3*PolyLog[3, -((e*x)/d)])/d^3 + (6*b^3*n^3*PolyLog[4, -(d/(e*x))])/d^3
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2430

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Dist[b*n*(p/q), Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p - 1
)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^3}\,dx}{d}$$

$$= \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} + \frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx}{d^2} - \frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}\,dx}{d^2} - \frac{(3bn)\int \frac{(a+b\log(cx^n}{x(d+ex)^2}}{2d}$$

$$= \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)} + \frac{\int \frac{(a+b\log(cx^n))^3}{x}\,dx}{d^3} - \frac{e\int \frac{(a+b\log(cx^n))^3}{d+ex}}{d^3}$$

$$= \frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)} + \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)} + \frac{3bn(a+b\,l}{}$$

$$= \frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)} + \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)} + \frac{(a+b\log(}{4bd^3n}$$

$$= \frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)} - \frac{(a+b\log(cx^n))^3}{2d^3} + \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(}{d^3(d+e}$$

$$= \frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)} - \frac{(a+b\log(cx^n))^3}{2d^3} + \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(}{d^3(d+e}$$

Mathematica [A]
time = 0.59, size = 706, normalized size = 1.96

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)^3),x]
```

```
[Out] (2*d^2*(a - b*n*Log[x] + b*Log[c*x^n])^3 + 4*d*(d + e*x)*(a - b*n*Log[x] +
b*Log[c*x^n])^3 + 4*(d + e*x)^2*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])^3 -
4*(d + e*x)^2*(a - b*n*Log[x] + b*Log[c*x^n])^3*Log[d + e*x] + 6*b*n*(a - b
*n*Log[x] + b*Log[c*x^n])^2*((d + e*x)^2*Log[x]^2 + (d + e*x)*(-d + 3*(d +
```

```
e*x)*Log[d + e*x]) - Log[x]*(e*x*(4*d + 3*e*x) + 2*(d + e*x)^2*Log[1 + (e*x
)/d]) - 2*(d + e*x)^2*PolyLog[2, -((e*x)/d)]) + 2*b^2*n^2*(a - b*n*Log[x] +
 b*Log[c*x^n])*(-3*e*x*(2*d + e*x)*Log[x]^2 + 2*(d + e*x)^2*Log[x]^3 - 6*(d
 + e*x)^2*Log[d + e*x] + 6*(d + e*x)*Log[x]*(e*x + (d + e*x)*Log[1 + (e*x)/
d]) + 6*(d + e*x)^2*PolyLog[2, -((e*x)/d)] - 6*(d + e*x)*(Log[x]*(e*x*Log[x
] - 2*(d + e*x)*Log[1 + (e*x)/d]) - 2*(d + e*x)*PolyLog[2, -((e*x)/d)]) - 6
*(d + e*x)^2*(Log[x]^2*Log[1 + (e*x)/d] + 2*Log[x]*PolyLog[2, -((e*x)/d)] -
 2*PolyLog[3, -((e*x)/d)])) + b^3*n^3*((d + e*x)^2*Log[x]^4 - 4*(d + e*x)*(
Log[x]^2*(e*x*Log[x] - 3*(d + e*x)*Log[1 + (e*x)/d]) - 6*(d + e*x)*Log[x]*P
olyLog[2, -((e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) - 2*(Log[x]*(e*
x*(2*d + e*x)*Log[x]^2 + 6*(d + e*x)^2*Log[1 + (e*x)/d] - 3*(d + e*x)*Log[x
]*(e*x + (d + e*x)*Log[1 + (e*x)/d])) - 6*(d + e*x)^2*(-1 + Log[x])*PolyLog
[2, -((e*x)/d)] + 6*(d + e*x)^2*PolyLog[3, -((e*x)/d)]) - 4*(d + e*x)^2*(Lo
g[x]^3*Log[1 + (e*x)/d] + 3*Log[x]^2*PolyLog[2, -((e*x)/d)] - 6*Log[x]*Poly
Log[3, -((e*x)/d)] + 6*PolyLog[4, -((e*x)/d)])))/(4*d^3*(d + e*x)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.42, size = 19018, normalized size = 52.68

method	result	size
risch	Expression too large to display	19018

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*a^3*((2*x*e + 3*d)/(d^2*x^2*e^2 + 2*d^3*x*e + d^4) - 2*log(x*e + d)/d^3
 + 2*log(x)/d^3) + integrate((b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log(c
)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)^2
+ 2*a*b^2*log(c) + a^2*b)*log(x^n))/(x^4*e^3 + 3*d*x^3*e^2 + 3*d^2*x^2*e +
d^3*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a^
3)/(x^4*e^3 + 3*d*x^3*e^2 + 3*d^2*x^2*e + d^3*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})^3}{x\,(d + ex)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/x/(e*x+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**3/(x*(d + e*x)**3), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^3/((x*e + d)^3*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\,\ln(c\,x^n))^3}{x\,(d + e\,x)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/(x*(d + e*x)^3),x)
```

```
[Out] int((a + b*log(c*x^n))^3/(x*(d + e*x)^3), x)
```

3.124 $\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=189

$$-\frac{1}{2}\sqrt{b}\,de^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\,x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)-\frac{1}{4}\sqrt{b}\,ee^{-\frac{2a}{bn}}\sqrt{n}\,\sqrt{\frac{\pi}{2}}\,x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+}}{\sqrt{b}}\right.$$

```
[Out] -1/8*e*x^2*erfi(2^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1
/2)*2^(1/2)*Pi^(1/2)/exp(2*a/b/n)/((c*x^n)^(2/n))-1/2*d*x*erfi((a+b*ln(c*x^
n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp(a/b/n)/((c*x^n)^(1/
n))+d*x*(a+b*ln(c*x^n))^(1/2)+1/2*e*x^2*(a+b*ln(c*x^n))^(1/2)
```

Rubi [A]

time = 0.21, antiderivative size = 189, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.350$, Rules used = {2367, 2333, 2337, 2211, 2235, 2342, 2347}

$$-\frac{1}{2}\sqrt{\pi}\,\sqrt{b}\,d\sqrt{n}\,xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+dx\sqrt{a+b\log(cx^n)}-\frac{1}{4}\sqrt{\frac{\pi}{2}}\,\sqrt{b}\,e\sqrt{n}\,x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{Erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+\frac{1}{2}ex^2\sqrt{a+b\log(cx^n)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)*Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] -1/2*(Sqrt[b]*d*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sqr
t[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e*Sqrt[n]*Sqrt[Pi/2]*x^2*Er
fi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(4*E^((2*a)/(b*n))*
(c*x^n)^(2/n)) + d*x*Sqrt[a + b*Log[c*x^n]] + (e*x^2*Sqrt[a + b*Log[c*x^n]]
)/2
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rubi steps

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int \left(d\sqrt{a+b\log(cx^n)}+ex\sqrt{a+b\log(cx^n)}\right)dx$$

$$= d\int \sqrt{a+b\log(cx^n)}\,dx + e\int x\sqrt{a+b\log(cx^n)}\,dx$$

$$= dx\sqrt{a+b\log(cx^n)} + \frac{1}{2}ex^2\sqrt{a+b\log(cx^n)} - \frac{1}{2}(bdn)\int \frac{1}{\sqrt{a+b\log(c}$$

$$= dx\sqrt{a+b\log(cx^n)} + \frac{1}{2}ex^2\sqrt{a+b\log(cx^n)} - \frac{1}{4}\left(bex^2(cx^n)^{-2/n}\right)\text{Subs}$$

$$= dx\sqrt{a+b\log(cx^n)} + \frac{1}{2}ex^2\sqrt{a+b\log(cx^n)} - \frac{1}{2}\left(ex^2(cx^n)^{-2/n}\right)\text{Subst}$$

$$= -\frac{1}{2}\sqrt{b}\,de^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\,x(cx^n)^{-1/n}\,\text{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right) - \frac{1}{4}\sqrt{b}\,ee^{-\frac{2a}{bn}}$$

Mathematica [A]
time = 0.19, size = 169, normalized size = 0.89

$$\frac{1}{8}x\left(-4\sqrt{b}\,de^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\,(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)-\sqrt{b}\,ee^{-\frac{2a}{bn}}\sqrt{n}\,\sqrt{2\pi}\,x(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+4(2d+ex)\sqrt{a+b\log(cx^n)}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)*Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] (x*((-4*Sqrt[b]*d*Sqrt[n]*Sqrt[Pi]*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sqr
t[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e*Sqrt[n]*Sqrt[2*Pi]*x*Erfi
[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(E^((2*a)/(b*n))*(c*x
^n)^(2/n)) + 4*(2*d + e*x)*Sqrt[a + b*Log[c*x^n]]))/8
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (ex+d)\sqrt{a+b\ln(c\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int((e*x+d)*(a+b*ln(c*x^n))^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate((x*e + d)*sqrt(b*log(c*x^n) + a), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{a + b \log{(cx^n)}}\,(d + ex)\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(sqrt(a + b*log(c*x**n))*(d + e*x), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate((x*e + d)*sqrt(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{a + b\,\ln\left(c\,x^n\right)}\,\left(d + e\,x\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2)*(d + e*x),x)
```

```
[Out] int((a + b*log(c*x^n))^(1/2)*(d + e*x), x)
```

3.125 $\int (d+ex)^2 \sqrt{a+b\log(cx^n)}\, dx$

Optimal. Leaf size=298

$$-\frac{1}{2}\sqrt{b}\, d^2 e^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\, x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)-\frac{1}{2}\sqrt{b}\, dee^{-\frac{2a}{bn}}\sqrt{n}\,\sqrt{\frac{\pi}{2}}\, x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\,\sqrt{a}\right.$$

```
[Out] -1/18*e^2*x^3*erfi(3^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n
^(1/2)*3^(1/2)*Pi^(1/2)/exp(3*a/b/n)/((c*x^n)^(3/n))-1/4*d*e*x^2*erfi(2^(1/
2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*2^(1/2)*Pi^(1/2)/
exp(2*a/b/n)/((c*x^n)^(2/n))-1/2*d^2*x*erfi((a+b*ln(c*x^n))^(1/2)/b^(1/2)/n
^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp(a/b/n)/((c*x^n)^(1/n))+d^2*x*(a+b*ln(c
*x^n))^(1/2)+d*e*x^2*(a+b*ln(c*x^n))^(1/2)+1/3*e^2*x^3*(a+b*ln(c*x^n))^(1/2
)
```

Rubi [A]
time = 0.34, antiderivative size = 298, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.318$, Rules used = {2367, 2333, 2337, 2211, 2235, 2342, 2347}

$$-\frac{1}{2}\sqrt{\pi}\,\sqrt{b}\, d^2\sqrt{n}\, xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+d^2x\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\frac{\pi}{2}}\,\sqrt{b}\, de\sqrt{n}\, x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{Erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+dex^2\sqrt{a+b\log(cx^n)}-\frac{1}{6}\sqrt{\frac{\pi}{3}}\,\sqrt{b}\, e^2\sqrt{n}\, x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{Erfi}\left(\frac{\sqrt{3}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+\frac{1}{3}e^2x^3\sqrt{a+b\log(cx^n)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^2*Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] -1/2*(Sqrt[b]*d^2*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*S
qrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*d*e*Sqrt[n]*Sqrt[Pi/2]*x^
2*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(2*E^((2*a)/(b*
n))*(c*x^n)^(2/n)) - (Sqrt[b]*e^2*Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt
[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(6*E^((3*a)/(b*n))*(c*x^n)^(3/n)) +
 d^2*x*Sqrt[a + b*Log[c*x^n]] + d*e*x^2*Sqrt[a + b*Log[c*x^n]] + (e^2*x^3*S
qrt[a + b*Log[c*x^n]])/3
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rubi steps

$$
\begin{aligned}
\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx &= \int \left(d^2\sqrt{a+b\log(cx^n)} + 2dex\sqrt{a+b\log(cx^n)} + e^2x^2\sqrt{a+b\log(cx^n)}\right.\\
&= d^2\int \sqrt{a+b\log(cx^n)}\,dx + (2de)\int x\sqrt{a+b\log(cx^n)}\,dx + e^2\int x^2\sqrt{a\right.\\
&= d^2x\sqrt{a+b\log(cx^n)} + dex^2\sqrt{a+b\log(cx^n)} + \frac{1}{3}e^2x^3\sqrt{a+b\log(cx^n)}\\
&= d^2x\sqrt{a+b\log(cx^n)} + dex^2\sqrt{a+b\log(cx^n)} + \frac{1}{3}e^2x^3\sqrt{a+b\log(cx^n)}\\
&= d^2x\sqrt{a+b\log(cx^n)} + dex^2\sqrt{a+b\log(cx^n)} + \frac{1}{3}e^2x^3\sqrt{a+b\log(cx^n)}\\
&= -\frac{1}{2}\sqrt{b}\,d^2e^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\,x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right) - \frac{1}{2}\sqrt{b}\,dee^{-}
\end{aligned}
$$

Mathematica [A]
time = 0.24, size = 287, normalized size = 0.96

$$
\frac{1}{36}x\left(-18\sqrt{b}\,d^2e^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\,(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right) - 9\sqrt{b}\,dee^{-\frac{2a}{bn}}\sqrt{n}\,\sqrt{2\pi}\,x(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right) - 2\sqrt{b}\,e^2e^{-\frac{3a}{bn}}\sqrt{n}\,\sqrt{3\pi}\,x^2(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right) + 36d^2\sqrt{a+b\log(cx^n)} + 36dex\sqrt{a+b\log(cx^n)} + 12e^2x^2\sqrt{a+b\log(cx^n)}\right)
$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^2*Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] (x*((-18*Sqrt[b]*d^2*Sqrt[n]*Sqrt[Pi]*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*
Sqrt[n])]])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (9*Sqrt[b]*d*e*Sqrt[n]*Sqrt[2*Pi]
*x*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])]])/(E^((2*a)/(b*n
))*(c*x^n)^(2/n)) - (2*Sqrt[b]*e^2*Sqrt[n]*Sqrt[3*Pi]*x^2*Erfi[(Sqrt[3]*Sqr
t[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])]])/(E^((3*a)/(b*n))*(c*x^n)^(3/n)) +
36*d^2*Sqrt[a + b*Log[c*x^n]] + 36*d*e*x*Sqrt[a + b*Log[c*x^n]] + 12*e^2*x^
2*Sqrt[a + b*Log[c*x^n]]))/36
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$
\int (ex+d)^2\sqrt{a+b\ln(c\,x^n)}\,dx
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int((e*x+d)^2*(a+b*ln(c*x^n))^(1/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
[Out] integrate((x*e + d)^2*sqrt(b*log(c*x^n) + a), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{a + b\log(cx^n)}\,(d + ex)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(sqrt(a + b*log(c*x**n))*(d + e*x)**2, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate((x*e + d)^2*sqrt(b*log(c*x^n) + a), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \sqrt{a + b\,\ln(c\,x^n)}\,(d + e\,x)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2)*(d + e*x)^2,x)
[Out] int((a + b*log(c*x^n))^(1/2)*(d + e*x)^2, x)
```

3.126 $\int (d+ex)^3 \sqrt{a+b\log(cx^n)}\, dx$

Optimal. Leaf size=402

$$-\frac{1}{2}\sqrt{b}\, d^3 e^{-\frac{a}{bn}} \sqrt{n}\, \sqrt{\pi}\, x(cx^n)^{-1/n} \operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right) - \frac{1}{16}\sqrt{b}\, e^3 e^{-\frac{4a}{bn}} \sqrt{n}\, \sqrt{\pi}\, x^4(cx^n)^{-4/n} \operatorname{erfi}\left(\frac{2\sqrt{a+}}{\sqrt{}}\right.$$

```
[Out] -1/6*d*e^2*x^3*erfi(3^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*
n^(1/2)*3^(1/2)*Pi^(1/2)/exp(3*a/b/n)/((c*x^n)^(3/n))-3/8*d^2*e*x^2*erfi(2^
(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*2^(1/2)*Pi^(1/
2)/exp(2*a/b/n)/((c*x^n)^(2/n))-1/2*d^3*x*erfi((a+b*ln(c*x^n))^(1/2)/b^(1/2
)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp(a/b/n)/((c*x^n)^(1/n))-1/16*e^3*x^4
*erfi(2*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp
(4*a/b/n)/((c*x^n)^(4/n))+d^3*x*(a+b*ln(c*x^n))^(1/2)+3/2*d^2*e*x^2*(a+b*ln
(c*x^n))^(1/2)+d*e^2*x^3*(a+b*ln(c*x^n))^(1/2)+1/4*e^3*x^4*(a+b*ln(c*x^n))^
(1/2)
```

Rubi [A]
time = 0.45, antiderivative size = 402, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.318$, Rules used = {2367, 2333, 2337, 2211, 2235, 2342, 2347}

$$-\frac{1}{2}\sqrt{\pi}\,\sqrt{b}\, d^3\sqrt{n}\, x e^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+d^3x\sqrt{a+b\log(cx^n)}-\frac{3}{4}\sqrt{\frac{\pi}{2}}\,\sqrt{b}\, d^2e\sqrt{n}\, x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{Erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+\frac{3}{2}d^2ex^2\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\frac{\pi}{3}}\,\sqrt{b}\, de^2\sqrt{n}\, x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{Erfi}\left(\frac{\sqrt{3}\,\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+de^2x^3\sqrt{a+b\log(cx^n)}-\frac{1}{16}\sqrt{\pi}\,\sqrt{b}\, e^3\sqrt{n}\, x^4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\operatorname{Erfi}\left(\frac{2\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+\frac{1}{4}e^3x^4\sqrt{a+b\log(cx^n)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^3*Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] -1/2*(Sqrt[b]*d^3*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*S
qrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e^3*Sqrt[n]*Sqrt[Pi]*x^4*
Erfi[(2*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(16*E^((4*a)/(b*n))*(c*
x^n)^(4/n)) - (3*Sqrt[b]*d^2*e*Sqrt[n]*Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqrt[a
+ b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(4*E^((2*a)/(b*n))*(c*x^n)^(2/n)) - (S
qrt[b]*d*e^2*Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[a + b*Log[c*x^n]])/(
Sqrt[b]*Sqrt[n])])/(2*E^((3*a)/(b*n))*(c*x^n)^(3/n)) + d^3*x*Sqrt[a + b*Log
[c*x^n]] + (3*d^2*e*x^2*Sqrt[a + b*Log[c*x^n]])/2 + d*e^2*x^3*Sqrt[a + b*Lo
g[c*x^n]] + (e^3*x^4*Sqrt[a + b*Log[c*x^n]])/4
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
```

```
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rubi steps

$$\int (d+ex)^3 \sqrt{a+b\log(cx^n)}\, dx = \int \left(d^3\sqrt{a+b\log(cx^n)} + 3d^2ex\sqrt{a+b\log(cx^n)} + 3de^2x^2\sqrt{a+b\log(c\right.$$

$$= d^3 \int \sqrt{a+b\log(cx^n)}\, dx + (3d^2e)\int x\sqrt{a+b\log(cx^n)}\, dx + (3de^2)\int$$

$$= d^3x\sqrt{a+b\log(cx^n)} + \frac{3}{2}d^2ex^2\sqrt{a+b\log(cx^n)} + de^2x^3\sqrt{a+b\log(cx^n}$$

$$= d^3x\sqrt{a+b\log(cx^n)} + \frac{3}{2}d^2ex^2\sqrt{a+b\log(cx^n)} + de^2x^3\sqrt{a+b\log(cx^n}$$

$$= d^3x\sqrt{a+b\log(cx^n)} + \frac{3}{2}d^2ex^2\sqrt{a+b\log(cx^n)} + de^2x^3\sqrt{a+b\log(cx^n}$$

$$= -\frac{1}{2}\sqrt{b}\, d^3e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}\, x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) - \frac{1}{16}\sqrt{b}\, e^3e^{-}$$

Mathematica [**A**]
time = 0.34, size = 366, normalized size = 0.91

$$\frac{1}{48}e^{-\frac{4a}{bn}}x(cx^n)^{-4/n}\left(-24\sqrt{b}\,d^3e^{\frac{3a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{3/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) - 3\sqrt{b}\,e^3\sqrt{n}\sqrt{\pi}\,x^3\operatorname{erfi}\left(\frac{2\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) + 2e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\left(-9\sqrt{b}\,d^2ee^{\frac{a}{bn}}\sqrt{n}\sqrt{2\pi}\,x(cx^n)^{\frac{1}{n}}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) - 4\sqrt{b}\,de^2\sqrt{n}\sqrt{3\pi}\,x^2\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) + 6e^{\frac{3a}{bn}}(cx^n)^{3/n}(4d^3+6d^2ex+4de^2x^2+e^3x^3)\sqrt{a+b\log(cx^n)}\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^3*Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] (x*(-24*Sqrt[b]*d^3*E^((3*a)/(b*n))*Sqrt[n]*Sqrt[Pi]*(c*x^n)^(3/n)*Erfi[Sqr
t[a + b*Log[c*x^n]]/(Sqrt[b]*Sqrt[n])] - 3*Sqrt[b]*e^3*Sqrt[n]*Sqrt[Pi]*x^3
*Erfi[(2*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])] + 2*E^(a/(b*n))*(c*x^n)
^n^(-1)*(-9*Sqrt[b]*d^2*e*E^(a/(b*n))*Sqrt[n]*Sqrt[2*Pi]*x*(c*x^n)^n^(-1)*E
rfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])] - 4*Sqrt[b]*d*e^2*S
qrt[n]*Sqrt[3*Pi]*x^2*Erfi[(Sqrt[3]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n
])] + 6*E^((3*a)/(b*n))*(c*x^n)^(3/n)*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2 + e^
3*x^3)*Sqrt[a + b*Log[c*x^n]])))/(48*E^((4*a)/(b*n))*(c*x^n)^(4/n))
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int (ex+d)^3\sqrt{a+b\ln(c\,x^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int((e*x+d)^3*(a+b*ln(c*x^n))^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
[Out] integrate((x*e + d)^3*sqrt(b*log(c*x^n) + a), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{a + b \log \left(cx^{n}\right)} \left(d + ex\right)^{3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(sqrt(a + b*log(c*x**n))*(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate((x*e + d)^3*sqrt(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \sqrt{a+b\,\ln\left(c\,x^n\right)}\,{\left(d+e\,x\right)}^3 \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2)*(d + e*x)^3,x)
[Out] int((a + b*log(c*x^n))^(1/2)*(d + e*x)^3, x)
```

3.127 $\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$

Optimal. Leaf size=25

$$\mathrm{Int}\left(\frac{\sqrt{a+b\log(cx^n)}}{d+ex},x\right)$$

[Out] Unintegrable((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)

Rubi [A]
time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$$

Verification is not applicable to the result.

[In] Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x),x]

[Out] Defer[Int][Sqrt[a + b*Log[c*x^n]]/(d + e*x), x]

Rubi steps

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$$

Mathematica [A]
time = 7.60, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$$

Verification is not applicable to the result.

[In] Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x),x]

[Out] Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x), x]

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\ln(c\,x^n)}}{ex+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

```
[Out] int((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*log(c*x^n) + a)/(x*e + d), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a + b \log{\left(c x^{n} \right)}}}{d + e x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d),x)
```

```
[Out] Integral(sqrt(a + b*log(c*x**n))/(d + e*x), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*log(c*x^n) + a)/(x*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{\sqrt{a+b\ln\left(c\,x^n\right)}}{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2)/(d + e*x),x)
[Out] int((a + b*log(c*x^n))^(1/2)/(d + e*x), x)
```

3.128 $\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$

Optimal. Leaf size=61

$$\frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)} - \frac{bn\text{Int}\left(\frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}},x\right)}{2d}$$

```
[Out] x*(a+b*ln(c*x^n))^(1/2)/d/(e*x+d)-1/2*b*n*Unintegrable(1/(e*x+d)/(a+b*ln(c*
x^n))^(1/2),x)/d
```

Rubi [A]
time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2,x]
```

```
[Out] (x*Sqrt[a + b*Log[c*x^n]])/(d*(d + e*x)) - (b*n*Defer[Int][1/((d + e*x)*Sqr
t[a + b*Log[c*x^n]]), x])/(2*d)
```

Rubi steps

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx = \frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)} - \frac{(bn)\int \frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}}\,dx}{2d}$$

Mathematica [A]
time = 6.88, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2,x]
```

```
[Out] Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2, x]
```

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\ln\left(c\,x^{n}\right)}}{\left(ex+d\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*log(c*x^n) + a)/(x*e + d)^2, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{\left(d+ex\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d)**2,x)
```

```
[Out] Integral(sqrt(a + b*log(c*x**n))/(d + e*x)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*log(c*x^n) + a)/(x*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\sqrt{a+b\,\ln\left(c\,x^n\right)}}{{\left(d+e\,x\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2)/(d + e*x)^2,x)
```

```
[Out] int((a + b*log(c*x^n))^(1/2)/(d + e*x)^2, x)
```

3.129 $\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$

Optimal. Leaf size=66

$$-\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}+\frac{bn\text{Int}\left(\frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}},x\right)}{4e}$$

```
[Out] -1/2*(a+b*ln(c*x^n))^(1/2)/e/(e*x+d)^2+1/4*b*n*Unintegrable(1/x/(e*x+d)^2/(
a+b*ln(c*x^n))^(1/2),x)/e
```

Rubi [A]
time = 0.13, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$

Verification is not applicable to the result.

```
[In] Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3,x]
```

```
[Out] -1/2*Sqrt[a + b*Log[c*x^n]]/(e*(d + e*x)^2) + (b*n*Defer[Int][1/(x*(d + e*x
)^2*Sqrt[a + b*Log[c*x^n]]), x])/(4*e)
```

Rubi steps

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx=-\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}+\frac{(bn)\int \frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}}\,dx}{4e}$$

Mathematica [A]
time = 15.65, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3,x]
```

```
[Out] Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3, x]
```

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\ln\left(c\,x^{n}\right)}}{\left(ex+d\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^3,x)
[Out] int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^3,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="maxima")
[Out] integrate(sqrt(b*log(c*x^n) + a)/(x*e + d)^3, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{\left(d+ex\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d)**3,x)
[Out] Integral(sqrt(a + b*log(c*x**n))/(d + e*x)**3, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*log(c*x^n) + a)/(x*e + d)^3, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\sqrt{a+b\,\ln\left(c\,x^n\right)}}{{\left(d+e\,x\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2)/(d + e*x)^3,x)
```

```
[Out] int((a + b*log(c*x^n))^(1/2)/(d + e*x)^3, x)
```

3.130 $\int x^3 \sqrt{d+ex}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=242

$$\frac{64bd^4n\sqrt{d+ex}}{315e^4}+\frac{64bd^3n(d+ex)^{3/2}}{945e^4}-\frac{356bd^2n(d+ex)^{5/2}}{1575e^4}+\frac{80bdn(d+ex)^{7/2}}{441e^4}-\frac{4bn(d+ex)^{9/2}}{81e^4}-\frac{64bd^{9/2}n\,\mathrm{t}}{}$$

```
[Out] 64/945*b*d^3*n*(e*x+d)^(3/2)/e^4-356/1575*b*d^2*n*(e*x+d)^(5/2)/e^4+80/441*
b*d*n*(e*x+d)^(7/2)/e^4-4/81*b*n*(e*x+d)^(9/2)/e^4-64/315*b*d^(9/2)*n*arcta
nh((e*x+d)^(1/2)/d^(1/2))/e^4-2/3*d^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4+6/5
*d^2*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4-6/7*d*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/
e^4+2/9*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/e^4+64/315*b*d^4*n*(e*x+d)^(1/2)/e^4
```

Rubi [A]
time = 0.15, antiderivative size = 242, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {45, 2392, 12, 1634, 52, 65, 214}

$$-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{64bd^{9/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{315e^4}+\frac{64bd^4n\sqrt{d+ex}}{315e^4}+\frac{64bd^3n(d+ex)^{3/2}}{945e^4}-\frac{356bd^2n(d+ex)^{5/2}}{1575e^4}+\frac{80bdn(d+ex)^{7/2}}{441e^4}-\frac{4bn(d+ex)^{9/2}}{81e^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

```
[Out] (64*b*d^4*n*Sqrt[d + e*x])/(315*e^4) + (64*b*d^3*n*(d + e*x)^(3/2))/(945*e^
4) - (356*b*d^2*n*(d + e*x)^(5/2))/(1575*e^4) + (80*b*d*n*(d + e*x)^(7/2))/
(441*e^4) - (4*b*n*(d + e*x)^(9/2))/(81*e^4) - (64*b*d^(9/2)*n*ArcTanh[Sqrt
[d + e*x]/Sqrt[d]])/(315*e^4) - (2*d^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/
(3*e^4) + (6*d^2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4) - (6*d*(d + e*
x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4) + (2*(d + e*x)^(9/2)*(a + b*Log[c*x^n]
))/(9*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 1634

```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2]) && GtQ[E
xpon[Px, x], 2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^3\sqrt{d+ex}\,(a+b\log(cx^n))\,dx = -\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4} + \frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} -$$

$$= -\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4} + \frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} -$$

$$= -\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4} + \frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} -$$

$$= -\frac{356bd^2n(d+ex)^{5/2}}{1575e^4} + \frac{80bdn(d+ex)^{7/2}}{441e^4} - \frac{4bn(d+ex)^{9/2}}{81e^4} - \frac{2d^3(d-}{}$$

$$= \frac{64bd^3n(d+ex)^{3/2}}{945e^4} - \frac{356bd^2n(d+ex)^{5/2}}{1575e^4} + \frac{80bdn(d+ex)^{7/2}}{441e^4} - \frac{4bn(d}{}$$

$$= \frac{64bd^4n\sqrt{d+ex}}{315e^4} + \frac{64bd^3n(d+ex)^{3/2}}{945e^4} - \frac{356bd^2n(d+ex)^{5/2}}{1575e^4} + \frac{80bdn}{}$$

$$= \frac{64bd^4n\sqrt{d+ex}}{315e^4} + \frac{64bd^3n(d+ex)^{3/2}}{945e^4} - \frac{356bd^2n(d+ex)^{5/2}}{1575e^4} + \frac{80bdn}{}$$

$$= \frac{64bd^4n\sqrt{d+ex}}{315e^4} + \frac{64bd^3n(d+ex)^{3/2}}{945e^4} - \frac{356bd^2n(d+ex)^{5/2}}{1575e^4} + \frac{80bdn}{}$$

Mathematica [A]
time = 0.28, size = 183, normalized size = 0.76

$$-\frac{2\left(10080bd^{9/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}\,(315a(16d^4-8d^3ex+6d^2e^2x^2-5de^3x^3-35e^4x^4)+2bn(-4388d^4+934d^3ex-543d^2e^2x^2+400de^3x^3+1225e^4x^4)+315b(16d^4-8d^3ex+6d^2e^2x^2-5de^3x^3-35e^4x^4)\log(cx^n))\right)}{99225e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-2*(10080*b*d^(9/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(315*
a*(16*d^4 - 8*d^3*e*x + 6*d^2*e^2*x^2 - 5*d*e^3*x^3 - 35*e^4*x^4) + 2*b*n*(
-4388*d^4 + 934*d^3*e*x - 543*d^2*e^2*x^2 + 400*d*e^3*x^3 + 1225*e^4*x^4) +
 315*b*(16*d^4 - 8*d^3*e*x + 6*d^2*e^2*x^2 - 5*d*e^3*x^3 - 35*e^4*x^4)*Log[
c*x^n])))/(99225*e^4)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^3(a+b\ln(c\,x^n))\sqrt{ex+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
[Out] int(x^3*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.50, size = 232, normalized size = 0.96

$$\frac{4}{99225}\left(2520\,d^{\frac{9}{2}}e^{(-4)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left(1225\,(xe+d)^{\frac{9}{2}}-4500\,(xe+d)^{\frac{7}{2}}d+5607\,(xe+d)^{\frac{5}{2}}d^2-1680\,(xe+d)^{\frac{3}{2}}d^3-5040\,\sqrt{xe+d}\,d^4\right)e^{(-4)}\right)bn+\frac{2}{315}\left(35\,(xe+d)^{\frac{9}{2}}e^{(-4)}-135\,(xe+d)^{\frac{7}{2}}de^{(-4)}+189\,(xe+d)^{\frac{5}{2}}d^2e^{(-4)}-105\,(xe+d)^{\frac{3}{2}}d^3e^{(-4)}\right)b\log\left(cx^n\right)+\frac{2}{315}\left(35\,(xe+d)^{\frac{9}{2}}e^{(-4)}-135\,(xe+d)^{\frac{7}{2}}de^{(-4)}+189\,(xe+d)^{\frac{5}{2}}d^2e^{(-4)}-105\,(xe+d)^{\frac{3}{2}}d^3e^{(-4)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
[Out] 4/99225*(2520*d^(9/2)*e^(-4)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) +
 sqrt(d))) - (1225*(x*e + d)^(9/2) - 4500*(x*e + d)^(7/2)*d + 5607*(x*e + d
)^(5/2)*d^2 - 1680*(x*e + d)^(3/2)*d^3 - 5040*sqrt(x*e + d)*d^4)*e^(-4))*b*
n + 2/315*(35*(x*e + d)^(9/2)*e^(-4) - 135*(x*e + d)^(7/2)*d*e^(-4) + 189*(
x*e + d)^(5/2)*d^2*e^(-4) - 105*(x*e + d)^(3/2)*d^3*e^(-4))*b*log(c*x^n) +
2/315*(35*(x*e + d)^(9/2)*e^(-4) - 135*(x*e + d)^(7/2)*d*e^(-4) + 189*(x*e
+ d)^(5/2)*d^2*e^(-4) - 105*(x*e + d)^(3/2)*d^3*e^(-4))*a
```

Fricas [A]
time = 0.40, size = 466, normalized size = 1.93

$$\left[\frac{2}{99225}\left(5040\,bd^{\frac{9}{2}}n\log\left(\frac{xe-2\sqrt{xe+d}\sqrt{d}+2d}{x}\right)+\left(8776\,bd^4n-1225\,(2bn-9a)x^4e^4-5040\,ad^4-25\,(32bdn-63ad)x^3e^3+6\,(181\,bd^2n-315\,ad^2)x^2e^2-4\,(467\,bd^3n-630\,ad^3)xe+315\,(35\,bx^4e^4+5\,bdx^3e^3-6\,bd^2x^2e^2+8\,bd^3xe-16\,bd^4)\log(c)+315\,(35\,bnx^4e^4+5\,bdnx^3e^3-6\,bd^2nx^2e^2+8\,bd^3nxe-16\,bd^4n)\log(x)\right)\sqrt{xe+d}\right)e^{(-4)},\ \frac{2}{99225}\left(10080\,b\sqrt{-d}\,d^4n\arctan\left(\frac{\sqrt{xe+d}\sqrt{-d}}{d}\right)+\left(8776\,bd^4n-1225\,(2bn-9a)x^4e^4-5040\,ad^4-25\,(32bdn-63ad)x^3e^3+6\,(181\,bd^2n-315\,ad^2)x^2e^2-4\,(467\,bd^3n-630\,ad^3)xe+315\,(35\,bx^4e^4+5\,bdx^3e^3-6\,bd^2x^2e^2+8\,bd^3xe-16\,bd^4)\log(c)+315\,(35\,bnx^4e^4+5\,bdnx^3e^3-6\,bd^2nx^2e^2+8\,bd^3nxe-16\,bd^4n)\log(x)\right)\sqrt{xe+d}\right)e^{(-4)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
[Out] [2/99225*(5040*b*d^(9/2)*n*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) + (
8776*b*d^4*n - 1225*(2*b*n - 9*a)*x^4*e^4 - 5040*a*d^4 - 25*(32*b*d*n - 63*
a*d)*x^3*e^3 + 6*(181*b*d^2*n - 315*a*d^2)*x^2*e^2 - 4*(467*b*d^3*n - 630*a
*d^3)*x*e + 315*(35*b*x^4*e^4 + 5*b*d*x^3*e^3 - 6*b*d^2*x^2*e^2 + 8*b*d^3*x
*e - 16*b*d^4)*log(c) + 315*(35*b*n*x^4*e^4 + 5*b*d*n*x^3*e^3 - 6*b*d^2*n*x
^2*e^2 + 8*b*d^3*n*x*e - 16*b*d^4*n)*log(x))*sqrt(x*e + d))*e^(-4), 2/99225
*(10080*b*sqrt(-d)*d^4*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (8776*b*d^4*n -
 1225*(2*b*n - 9*a)*x^4*e^4 - 5040*a*d^4 - 25*(32*b*d*n - 63*a*d)*x^3*e^3 +
 6*(181*b*d^2*n - 315*a*d^2)*x^2*e^2 - 4*(467*b*d^3*n - 630*a*d^3)*x*e + 31
5*(35*b*x^4*e^4 + 5*b*d*x^3*e^3 - 6*b*d^2*x^2*e^2 + 8*b*d^3*x*e - 16*b*d^4)
*log(c) + 315*(35*b*n*x^4*e^4 + 5*b*d*n*x^3*e^3 - 6*b*d^2*n*x^2*e^2 + 8*b*d
^3*n*x*e - 16*b*d^4*n)*log(x))*sqrt(x*e + d))*e^(-4)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 518 vs. $2(245) = 490$.
time = 8.73, size = 518, normalized size = 2.14

$$\frac{2\left(-\frac{ad^3(d+ex)^{\frac{3}{2}}}{3}+\frac{3ad^2(d+ex)^{\frac{5}{2}}}{5}-\frac{3ad(d+ex)^{\frac{7}{2}}}{7}+\frac{a(d+ex)^{\frac{9}{2}}}{9}-bd^3\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{3}-\frac{2n\left(\frac{d^2e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)+3bd^2\left(\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{5}-\frac{2n\left(\frac{d^3e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^2e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)-3bd\left(\frac{(d+ex)^{\frac{7}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{7}-\frac{2n\left(\frac{d^4e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^3e\sqrt{d+ex}+\frac{d^2e(d+ex)^{\frac{3}{2}}}{3}+\frac{de(d+ex)^{\frac{5}{2}}}{5}+\frac{e(d+ex)^{\frac{7}{2}}}{7}\right)}{7e}\right)+b\left(\frac{(d+ex)^{\frac{9}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{9}-\frac{2n\left(\frac{d^5e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^4e\sqrt{d+ex}+\frac{d^3e(d+ex)^{\frac{3}{2}}}{3}+\frac{d^2e(d+ex)^{\frac{5}{2}}}{5}+\frac{de(d+ex)^{\frac{7}{2}}}{7}+\frac{e(d+ex)^{\frac{9}{2}}}{9}\right)}{9e}\right)\right)}{e^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

```
[Out] 2*(-a*d**3*(d + e*x)**(3/2)/3 + 3*a*d**2*(d + e*x)**(5/2)/5 - 3*a*d*(d + e*
x)**(7/2)/7 + a*(d + e*x)**(9/2)/9 - b*d**3*((d + e*x)**(3/2)*log(c*(-d/e +
 (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d
*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) + 3*b*d**2*((d + e*x)**(5/2
)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sqrt(-d
))/sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d + e*x)**
(5/2)/5)/(5*e)) - 3*b*d*((d + e*x)**(7/2)*log(c*(-d/e + (d + e*x)/e)**n)/7
- 2*n*(d**4*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**3*e*sqrt(d + e*x)
+ d**2*e*(d + e*x)**(3/2)/3 + d*e*(d + e*x)**(5/2)/5 + e*(d + e*x)**(7/2)/7
)/(7*e)) + b*((d + e*x)**(9/2)*log(c*(-d/e + (d + e*x)/e)**n)/9 - 2*n*(d**5
*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**4*e*sqrt(d + e*x) + d**3*e*(d
 + e*x)**(3/2)/3 + d**2*e*(d + e*x)**(5/2)/5 + d*e*(d + e*x)**(7/2)/7 + e*(
d + e*x)**(9/2)/9)/(9*e)))/e**4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a)*x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\sqrt{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

```
[Out] int(x^3*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.131 $\int x^2 \sqrt{d+ex} \left(a+b\log\left(cx^n\right)\right) \, dx$

Optimal. Leaf size=192

$$-\frac{32bd^3n\sqrt{d+ex}}{105e^3}-\frac{32bd^2n(d+ex)^{3/2}}{315e^3}+\frac{36bdn(d+ex)^{5/2}}{175e^3}-\frac{4bn(d+ex)^{7/2}}{49e^3}+\frac{32bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{105e^3}+$$

```
[Out] -32/315*b*d^2*n*(e*x+d)^(3/2)/e^3+36/175*b*d*n*(e*x+d)^(5/2)/e^3-4/49*b*n*(
e*x+d)^(7/2)/e^3+32/105*b*d^(7/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^3+2/3*
d^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3-4/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e
^3+2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^3-32/105*b*d^3*n*(e*x+d)^(1/2)/e^3
```

Rubi [A]
time = 0.12, antiderivative size = 192, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {45, 2392, 12, 911, 1275, 214}

$$\frac{2d^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^3}-\frac{4d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^3}+\frac{2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^3}+\frac{32bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{105e^3}-\frac{32bd^3n\sqrt{d+ex}}{105e^3}-\frac{32bd^2n(d+ex)^{3/2}}{315e^3}+\frac{36bdn(d+ex)^{5/2}}{175e^3}-\frac{4bn(d+ex)^{7/2}}{49e^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-32*b*d^3*n*Sqrt[d + e*x])/(105*e^3) - (32*b*d^2*n*(d + e*x)^(3/2))/(315*e
^3) + (36*b*d*n*(d + e*x)^(5/2))/(175*e^3) - (4*b*n*(d + e*x)^(7/2))/(49*e^
3) + (32*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(105*e^3) + (2*d^2*(d
+ e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3) - (4*d*(d + e*x)^(5/2)*(a + b*Log[
c*x^n]))/(5*e^3) + (2*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^2\sqrt{d+ex}\,(a+b\log(cx^n))\,dx = \frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{2(d}{}$$

$$= \frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{2(d}{}$$

$$= \frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{2(d}{}$$

$$= \frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{2(d}{}$$

$$= -\frac{32bd^3n\sqrt{d+ex}}{105e^3} - \frac{32bd^2n(d+ex)^{3/2}}{315e^3} + \frac{36bdn(d+ex)^{5/2}}{175e^3} - \frac{4bn(d+}{49}$$

$$= -\frac{32bd^3n\sqrt{d+ex}}{105e^3} - \frac{32bd^2n(d+ex)^{3/2}}{315e^3} + \frac{36bdn(d+ex)^{5/2}}{175e^3} - \frac{4bn(d+}{49}$$

Mathematica [A]
time = 0.14, size = 151, normalized size = 0.79

$$\frac{3360bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}\,(105a(8d^3-4d^2ex+3de^2x^2+15e^3x^3)-2bn(778d^3-179d^2ex+108de^2x^2+225e^3x^3)+105b(8d^3-4d^2ex+3de^2x^2+15e^3x^3)\log(cx^n))}{11025e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

```
[Out] (3360*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(105*a*(
8*d^3 - 4*d^2*e*x + 3*d*e^2*x^2 + 15*e^3*x^3) - 2*b*n*(778*d^3 - 179*d^2*e*
x + 108*d*e^2*x^2 + 225*e^3*x^3) + 105*b*(8*d^3 - 4*d^2*e*x + 3*d*e^2*x^2 +
 15*e^3*x^3)*Log[c*x^n]))/(11025*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^2(a+b\ln(c\,x^n))\sqrt{ex+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.50, size = 188, normalized size = 0.98

$$-\frac{4}{11025}\left(420\,d^{\frac{7}{2}}e^{(-3)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+\left(225\,(xe+d)^{\frac{7}{2}}-567\,(xe+d)^{\frac{5}{2}}d+280\,(xe+d)^{\frac{3}{2}}d^{2}+840\,\sqrt{xe+d}\,d^{3}\right)e^{(-3)}\right)bn+\frac{2}{105}\left(15\,(xe+d)^{\frac{7}{2}}e^{(-3)}-42\,(xe+d)^{\frac{5}{2}}de^{(-3)}+35\,(xe+d)^{\frac{3}{2}}d^{2}e^{(-3)}\right)b\log\left(cx^{n}\right)+\frac{2}{105}\left(15\,(xe+d)^{\frac{7}{2}}e^{(-3)}-42\,(xe+d)^{\frac{5}{2}}de^{(-3)}+35\,(xe+d)^{\frac{3}{2}}d^{2}e^{(-3)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -4/11025*(420*d^(7/2)*e^(-3)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) +
 sqrt(d))) + (225*(x*e + d)^(7/2) - 567*(x*e + d)^(5/2)*d + 280*(x*e + d)^(
3/2)*d^2 + 840*sqrt(x*e + d)*d^3)*e^(-3))*b*n + 2/105*(15*(x*e + d)^(7/2)*e
^(-3) - 42*(x*e + d)^(5/2)*d*e^(-3) + 35*(x*e + d)^(3/2)*d^2*e^(-3))*b*log(
c*x^n) + 2/105*(15*(x*e + d)^(7/2)*e^(-3) - 42*(x*e + d)^(5/2)*d*e^(-3) + 3
5*(x*e + d)^(3/2)*d^2*e^(-3))*a
```

Fricas [A]
time = 0.39, size = 379, normalized size = 1.97

$$\left[\frac{2}{11025}\left(840\,bd^{\frac{7}{2}}n\log\left(\frac{xe+2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)-\left(1556\,bd^{3}n+225\,(2\,bn-7\,a)x^{3}e^{3}-840\,ad^{3}+9\,(24\,bdn-35\,ad)x^{2}e^{2}-2\,(179\,bd^{2}n-210\,ad^{2})xe-105\,(15\,bx^{3}e^{3}+3\,bdx^{2}e^{2}-4\,bd^{2}xe+8\,bd^{3})\log(c)-105\,(15\,bnx^{3}e^{3}+3\,bdnx^{2}e^{2}-4\,bd^{2}nxe+8\,bd^{3}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-3)},\ -\frac{2}{11025}\left(1680\,b\sqrt{-d}\,d^{3}n\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+\left(1556\,bd^{3}n+225\,(2\,bn-7\,a)x^{3}e^{3}-840\,ad^{3}+9\,(24\,bdn-35\,ad)x^{2}e^{2}-2\,(179\,bd^{2}n-210\,ad^{2})xe-105\,(15\,bx^{3}e^{3}+3\,bdx^{2}e^{2}-4\,bd^{2}xe+8\,bd^{3})\log(c)-105\,(15\,bnx^{3}e^{3}+3\,bdnx^{2}e^{2}-4\,bd^{2}nxe+8\,bd^{3}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [2/11025*(840*b*d^(7/2)*n*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) - (1
556*b*d^3*n + 225*(2*b*n - 7*a)*x^3*e^3 - 840*a*d^3 + 9*(24*b*d*n - 35*a*d)
*x^2*e^2 - 2*(179*b*d^2*n - 210*a*d^2)*x*e - 105*(15*b*x^3*e^3 + 3*b*d*x^2*
e^2 - 4*b*d^2*x*e + 8*b*d^3)*log(c) - 105*(15*b*n*x^3*e^3 + 3*b*d*n*x^2*e^2
 - 4*b*d^2*n*x*e + 8*b*d^3*n)*log(x))*sqrt(x*e + d))*e^(-3), -2/11025*(1680
*b*sqrt(-d)*d^3*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (1556*b*d^3*n + 225*(2
*b*n - 7*a)*x^3*e^3 - 840*a*d^3 + 9*(24*b*d*n - 35*a*d)*x^2*e^2 - 2*(179*b*
d^2*n - 210*a*d^2)*x*e - 105*(15*b*x^3*e^3 + 3*b*d*x^2*e^2 - 4*b*d^2*x*e +
8*b*d^3)*log(c) - 105*(15*b*n*x^3*e^3 + 3*b*d*n*x^2*e^2 - 4*b*d^2*n*x*e + 8
*b*d^3*n)*log(x))*sqrt(x*e + d))*e^(-3)]
```

Sympy [A]
time = 5.63, size = 364, normalized size = 1.90

$$\frac{2\left(\frac{ad^{2}(d+ex)^{\frac{3}{2}}}{3}-\frac{2ad(d+ex)^{\frac{5}{2}}}{5}+\frac{a(d+ex)^{\frac{7}{2}}}{7}+bd^{2}\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)-2bd\left(\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{5}-\frac{2n\left(\frac{d^{3}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{2}e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)+b\left(\frac{(d+ex)^{\frac{7}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{7}-\frac{2n\left(\frac{d^{4}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{3}e\sqrt{d+ex}+\frac{d^{2}e(d+ex)^{\frac{3}{2}}}{3}+\frac{de(d+ex)^{\frac{5}{2}}}{5}+\frac{e(d+ex)^{\frac{7}{2}}}{7}\right)}{7e}\right)\right)}{e^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

```
[Out] 2*(a*d**2*(d + e*x)**(3/2)/3 - 2*a*d*(d + e*x)**(5/2)/5 + a*(d + e*x)**(7/2
)/7 + b*d**2*((d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2
```

```
*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)*
*(3/2)/3)/(3*e)) - 2*b*d*((d + e*x)**(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5
 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**2*e*sqrt(d + e*x)
 + d*e*(d + e*x)**(3/2)/3 + e*(d + e*x)**(5/2)/5)/(5*e)) + b*((d + e*x)**(7
/2)*log(c*(-d/e + (d + e*x)/e)**n)/7 - 2*n*(d**4*e*atan(sqrt(d + e*x)/sqrt(
-d))/sqrt(-d) + d**3*e*sqrt(d + e*x) + d**2*e*(d + e*x)**(3/2)/3 + d*e*(d +
 e*x)**(5/2)/5 + e*(d + e*x)**(7/2)/7)/(7*e)))/e**3
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\sqrt{d+e\,x}\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
[Out] int(x^2*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.132 $\int x\sqrt{d+ex}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=142

$$\frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2}-\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{8bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^2}-\frac{2d(d+ex)^{3/2}\,(a+b\log$$

[Out] 8/45*b*d*n*(e*x+d)^(3/2)/e^2-4/25*b*n*(e*x+d)^(5/2)/e^2-8/15*b*d^(5/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^2-2/3*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^2+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^2+8/15*b*d^2*n*(e*x+d)^(1/2)/e^2

Rubi [A]
time = 0.07, antiderivative size = 142, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {45, 2392, 12, 81, 52, 65, 214}

$$-\frac{2d(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e^2}+\frac{2(d+ex)^{5/2}\,(a+b\log(cx^n))}{5e^2}-\frac{8bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^2}+\frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2}-\frac{4bn(d+ex)^{5/2}}{25e^2}$$

Antiderivative was successfully verified.

[In] Int[x*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]

[Out] (8*b*d^2*n*Sqrt[d + e*x])/(15*e^2) + (8*b*d*n*(d + e*x)^(3/2))/(45*e^2) - (4*b*n*(d + e*x)^(5/2))/(25*e^2) - (8*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(15*e^2) - (2*d*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2) + (2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^2)

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
```

```
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x\sqrt{d+ex}\,(a+b\log(cx^n))\,dx = -\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-(bn$$

$$= -\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{(2b}{}$$

$$= -\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{2(d+ex)^{5/2}(a+}{5e^2}$$

$$= \frac{8bdn(d+ex)^{3/2}}{45e^2}-\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}+$$

$$= \frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2}-\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{2d(d+ex)^{3/2}(}{3}$$

$$= \frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2}-\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{2d(d+ex)^{3/2}(}{3}$$

$$= \frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2}-\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{8bd^{5/2}n\tanh^{-1}}{15}$$

Mathematica [A]
time = 0.09, size = 116, normalized size = 0.82

$$\frac{-120bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}\,(2bn(31d^2-8dex-9e^2x^2)+15a(-2d^2+dex+3e^2x^2)+15b(-2d^2+dex+3e^2x^2)\log(cx^n))}{225e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-120*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(2*b*n*(
31*d^2 - 8*d*e*x - 9*e^2*x^2) + 15*a*(-2*d^2 + d*e*x + 3*e^2*x^2) + 15*b*(-
2*d^2 + d*e*x + 3*e^2*x^2)*Log[c*x^n]))/(225*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x(a+b\ln(c\,x^n))\sqrt{ex+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.51, size = 146, normalized size = 1.03

$$\frac{4}{225}\left(15\,d^{\frac{5}{2}}e^{(-2)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left(9\,(xe+d)^{\frac{5}{2}}-10\,(xe+d)^{\frac{3}{2}}d-30\,\sqrt{xe+d}\,d^{2}\right)e^{(-2)}\right)bn+\frac{2}{15}\left(3\,(xe+d)^{\frac{5}{2}}e^{(-2)}-5\,(xe+d)^{\frac{3}{2}}de^{(-2)}\right)b\log\left(cx^{n}\right)+\frac{2}{15}\left(3\,(xe+d)^{\frac{5}{2}}e^{(-2)}-5\,(xe+d)^{\frac{3}{2}}de^{(-2)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 4/225*(15*d^(5/2)*e^(-2)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqr
t(d))) - (9*(x*e + d)^(5/2) - 10*(x*e + d)^(3/2)*d - 30*sqrt(x*e + d)*d^2)*
e^(-2))*b*n + 2/15*(3*(x*e + d)^(5/2)*e^(-2) - 5*(x*e + d)^(3/2)*d*e^(-2))*
b*log(c*x^n) + 2/15*(3*(x*e + d)^(5/2)*e^(-2) - 5*(x*e + d)^(3/2)*d*e^(-2))
*a
```

Fricas [A]
time = 0.39, size = 286, normalized size = 2.01

$$\left[\frac{2}{225}\left(30\,bd^{\frac{5}{2}}n\log\left(\frac{xe-2\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)+\left(62\,bd^{2}n-9\,(2\,bn-5\,a)x^{2}e^{2}-30\,ad^{2}-(16\,bdn-15\,ad)xe+15\,(3\,bx^{2}e^{2}+bdxe-2\,bd^{2})\log(c)+15\,(3\,bnx^{2}e^{2}+bdnxe-2\,bd^{2}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-2)},\ \frac{2}{225}\left(60\,b\sqrt{-d}\,d^{2}n\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+\left(62\,bd^{2}n-9\,(2\,bn-5\,a)x^{2}e^{2}-30\,ad^{2}-(16\,bdn-15\,ad)xe+15\,(3\,bx^{2}e^{2}+bdxe-2\,bd^{2})\log(c)+15\,(3\,bnx^{2}e^{2}+bdnxe-2\,bd^{2}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [2/225*(30*b*d^(5/2)*n*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) + (62*b
*d^2*n - 9*(2*b*n - 5*a)*x^2*e^2 - 30*a*d^2 - (16*b*d*n - 15*a*d)*x*e + 15*
(3*b*x^2*e^2 + b*d*x*e - 2*b*d^2)*log(c) + 15*(3*b*n*x^2*e^2 + b*d*n*x*e -
2*b*d^2*n)*log(x))*sqrt(x*e + d))*e^(-2), 2/225*(60*b*sqrt(-d)*d^2*n*arctan
(sqrt(x*e + d)*sqrt(-d)/d) + (62*b*d^2*n - 9*(2*b*n - 5*a)*x^2*e^2 - 30*a*d
^2 - (16*b*d*n - 15*a*d)*x*e + 15*(3*b*x^2*e^2 + b*d*x*e - 2*b*d^2)*log(c)
+ 15*(3*b*n*x^2*e^2 + b*d*n*x*e - 2*b*d^2*n)*log(x))*sqrt(x*e + d))*e^(-2)]
```

Sympy [A]
time = 3.49, size = 224, normalized size = 1.58

$$\frac{2\left(-\frac{ad(d+ex)^{\frac{3}{2}}}{3}+\frac{a(d+ex)^{\frac{5}{2}}}{5}-bd\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)+b\left(\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{5}-\frac{2n\left(\frac{d^{3}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{2}e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)\right)}{e^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

```
[Out] 2*(-a*d*(d + e*x)**(3/2)/3 + a*(d + e*x)**(5/2)/5 - b*d*((d + e*x)**(3/2)*l
og(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/
sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) + b*((d + e*x)*
*(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sq
```

```
rt(-d))/sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d + e
*x)**(5/2)/5)/(5*e)))/e**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a)*x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\sqrt{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
[Out] int(x*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.133 $\int \sqrt{d+ex}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=94

$$-\frac{4bdn\sqrt{d+ex}}{3e}-\frac{4bn(d+ex)^{3/2}}{9e}+\frac{4bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e}+\frac{2(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e}$$

```
[Out] -4/9*b*n*(e*x+d)^(3/2)/e+4/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e+2
/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e-4/3*b*d*n*(e*x+d)^(1/2)/e
```

Rubi [A]
time = 0.03, antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2356, 52, 65, 214}

$$\frac{2(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e}+\frac{4bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e}-\frac{4bdn\sqrt{d+ex}}{3e}-\frac{4bn(d+ex)^{3/2}}{9e}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-4*b*d*n*Sqrt[d + e*x])/(3*e) - (4*b*n*(d + e*x)^(3/2))/(9*e) + (4*b*d^(3/
2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(3*e) + (2*(d + e*x)^(3/2)*(a + b*Log[
c*x^n]))/(3*e)
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$\int \sqrt{d+ex}\,(a+b\log(cx^n))\,dx = \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e} - \frac{(2bn)\int\frac{(d+ex)^{3/2}}{x}\,dx}{3e}$$

$$= -\frac{4bn(d+ex)^{3/2}}{9e} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e} - \frac{(2bdn)\int\frac{\sqrt{d+ex}}{x}\,d}{3e}$$

$$= -\frac{4bdn\sqrt{d+ex}}{3e} - \frac{4bn(d+ex)^{3/2}}{9e} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e} - \frac{(2}{}$$

$$= -\frac{4bdn\sqrt{d+ex}}{3e} - \frac{4bn(d+ex)^{3/2}}{9e} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e} - \frac{(4}{}$$

$$= -\frac{4bdn\sqrt{d+ex}}{3e} - \frac{4bn(d+ex)^{3/2}}{9e} + \frac{4bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e} + \frac{2(}{}$$

Mathematica [A]
time = 0.07, size = 77, normalized size = 0.82

$$\frac{2\left(6bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}\,(3a(d+ex)-2bn(4d+ex)+3b(d+ex)\log(cx^n))\right)}{9e}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
[Out] (2*(6*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(3*a*(d +
e*x) - 2*b*n*(4*d + e*x) + 3*b*(d + e*x)*Log[c*x^n])))/(9*e)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int (a+b\ln(c\,x^n))\sqrt{ex+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.50, size = 96, normalized size = 1.02

$$\frac{2}{3}\,(xe+d)^{\frac{3}{2}}be^{(-1)}\log(cx^n)-\frac{2}{9}\left(3\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+2\,(xe+d)^{\frac{3}{2}}+6\,\sqrt{xe+d}\,d\right)bne^{(-1)}+\frac{2}{3}\,(xe+d)^{\frac{3}{2}}ae^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 2/3*(x*e + d)^(3/2)*b*e^(-1)*log(c*x^n) - 2/9*(3*d^(3/2)*log((sqrt(x*e + d)
 - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) + 2*(x*e + d)^(3/2) + 6*sqrt(x*e + d
)*d)*b*n*e^(-1) + 2/3*(x*e + d)^(3/2)*a*e^(-1)
```

Fricas [A]
time = 0.38, size = 191, normalized size = 2.03

$$\left[\frac{2}{9}\left(3\,bd^{\frac{3}{2}}n\log\left(\frac{xe+2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)-(8\,bdn+(2\,bn-3\,a)xe-3\,ad-3\,(bxe+bd)\log(c)-3\,(bnxe+bdn)\log(x))\sqrt{xe+d}\right)e^{(-1)},-\frac{2}{9}\left(6\,b\sqrt{-d}\,dn\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+(8\,bdn+(2\,bn-3\,a)xe-3\,ad-3\,(bxe+bd)\log(c)-3\,(bnxe+bdn)\log(x))\sqrt{xe+d}\right)e^{(-1)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [2/9*(3*b*d^(3/2)*n*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) - (8*b*d*n
 + (2*b*n - 3*a)*x*e - 3*a*d - 3*(b*x*e + b*d)*log(c) - 3*(b*n*x*e + b*d*n)
*log(x))*sqrt(x*e + d))*e^(-1), -2/9*(6*b*sqrt(-d)*d*n*arctan(sqrt(x*e + d)
*sqrt(-d)/d) + (8*b*d*n + (2*b*n - 3*a)*x*e - 3*a*d - 3*(b*x*e + b*d)*log(c
) - 3*(b*n*x*e + b*d*n)*log(x))*sqrt(x*e + d))*e^(-1)]
```

Sympy [A]
time = 1.75, size = 102, normalized size = 1.09

$$\frac{2\left(\frac{a(d+ex)^{\frac{3}{2}}}{3}+b\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{3}-\frac{2n\left(\frac{d^2e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)\right)}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

```
[Out] 2*(a*(d + e*x)**(3/2)/3 + b*((d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)**n
)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d + e*x)
 + e*(d + e*x)**(3/2)/3)/(3*e)))/e
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (a+b\,\ln\left(c\,x^n\right))\,\sqrt{d+e\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

```
[Out] int((a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.134 $\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=211

$$-4bn\sqrt{d+ex}+4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+2\sqrt{d+ex}\,(a+b\log(cx^n))-$$

```
[Out] 4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)+2*b*n*arctanh((e*x+d)^(1/2)/d^
(1/2))^2*d^(1/2)-2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)-4
*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))*d
^(1/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))*d^(1/2)-4*b*n*(
e*x+d)^(1/2)+2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)
```

Rubi [A]
time = 0.22, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {2388, 65, 214, 2390, 12, 6131, 6055, 2449, 2352, 2356, 52}

$$-2b\sqrt{d}\,n\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)+2\sqrt{d+ex}\,(a+b\log(cx^n))-2\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-4bn\sqrt{d+ex}+2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-4b\sqrt{d}\,n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -4*b*n*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*b*S
qrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 + 2*Sqrt[d + e*x]*(a + b*Log[c*x^
n]) - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]) - 4*b*Sqr
t[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e
*x])] - 2*b*Sqrt[d]*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2388

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Dist[d, Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x),
 x], x] + Dist[e, Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x}\,dx = d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx + e\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx$$

$$= 2\sqrt{d+ex}\,(a+b\log(cx^n)) - 2\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n)$$

$$= -4bn\sqrt{d+ex} + 2\sqrt{d+ex}\,(a+b\log(cx^n)) - 2\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.$$

$$= -4bn\sqrt{d+ex} + 2\sqrt{d+ex}\,(a+b\log(cx^n)) - 2\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.$$

$$= -4bn\sqrt{d+ex} + 4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2b\sqrt{d}\,n\tanh^{-1}\left(\right.$$

$$= -4bn\sqrt{d+ex} + 4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2b\sqrt{d}\,n\tanh^{-1}\left(\right.$$

$$= -4bn\sqrt{d+ex} + 4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2b\sqrt{d}\,n\tanh^{-1}\left(\right.$$

$$= -4bn\sqrt{d+ex} + 4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2b\sqrt{d}\,n\tanh^{-1}\left(\right.$$

Mathematica [A]
time = 0.14, size = 331, normalized size = 1.57

$$2a\sqrt{d+ex} - 4bn\left(\sqrt{d+ex} - \sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right) + 2b\sqrt{d+ex}\,\log(cx^n) + \sqrt{d}\,(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right) - \sqrt{d}\,(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right) - \frac{1}{2}b\sqrt{d}\,n\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right) + 2\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right) + 2\text{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + \frac{1}{2}b\sqrt{d}\,n\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right) + 2\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + 2\text{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] 2*a*Sqrt[d + e*x] - 4*b*n*(Sqrt[d + e*x] - Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sq
rt[d]]) + 2*b*Sqrt[d + e*x]*Log[c*x^n] + Sqrt[d]*(a + b*Log[c*x^n])*Log[Sqr
```

```
t[d] - Sqrt[d + e*x]] - Sqrt[d]*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sqrt[d + e
*x]] - (b*Sqrt[d]*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d] - Sqrt[d + e
*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2, 1/2 - Sqrt[d +
e*x]/(2*Sqrt[d])]))/2 + (b*Sqrt[d]*n*(Log[Sqrt[d] + Sqrt[d + e*x]]*(Log[Sqr
t[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + 2*PolyLog
[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/2
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))\sqrt{ex+d}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x,x)
[Out] int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x,x, algorithm="maxima")
[Out] (sqrt(d)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) + 2*sqrt(
x*e + d))*a + b*integrate(sqrt(x*e + d)*(log(c) + log(x^n))/x, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x,x, algorithm="fricas")
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/x, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))\sqrt{d+ex}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2)/x,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a+b\,\ln\left(c\,x^n\right))\,\sqrt{d+e\,x}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x,x)
```

```
[Out] int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x, x)
```

3.135 $\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=221

$$-\frac{bn\sqrt{d+ex}}{x}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}+\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x}-\frac{e\tanh^{-1}}{}$$

```
[Out] -b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(1/2)+b*e*n*arctanh((e*x+d)^(1/2)/d
^(1/2))^2/d^(1/2)-e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-
2*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2))
)/d^(1/2)-b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-b*n*
(e*x+d)^(1/2)/x-(a+b*ln(c*x^n))*(e*x+d)^(1/2)/x
```

Rubi [A]
time = 0.19, antiderivative size = 221, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {43, 65, 214, 2392, 14, 6131, 6055, 2449, 2352}

$$-\frac{ben\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}-\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x}-\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{bn\sqrt{d+ex}}{x}+\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*n*Sqrt[d + e*x])/x) - (b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/Sqrt[d] +
 (b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/Sqrt[d] - (Sqrt[d + e*x]*(a + b*L
og[c*x^n]))/x - (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[
d] - (2*b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqr
t[d + e*x])])/Sqrt[d] - (b*e*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d
 + e*x])])/Sqrt[d]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \cdots$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \cdots$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + \cdots$$

$$= -\frac{bn\sqrt{d+ex}}{x} - \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+\cdots}{\sqrt{d}}$$

$$= -\frac{bn\sqrt{d+ex}}{x} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x} \cdots$$

$$= -\frac{bn\sqrt{d+ex}}{x} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \cdots$$

$$= -\frac{bn\sqrt{d+ex}}{x} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \cdots$$

$$= -\frac{bn\sqrt{d+ex}}{x} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \cdots$$

Mathematica [A]

time = 0.22, size = 392, normalized size = 1.77

$$-\frac{4a\sqrt{d}\,\sqrt{d+ex}+4b\sqrt{d}\,n\sqrt{d+ex}+4benx\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+4b\sqrt{d}\,\sqrt{d+ex}\,\log\left(cx^n\right)-2aex\log\left(\sqrt{d}-\sqrt{d+ex}\right)-2bex\log\left(cx^n\right)\log\left(\sqrt{d}-\sqrt{d+ex}\right)+benx\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)+2aex\log\left(\sqrt{d}+\sqrt{d+ex}\right)+2bex\log\left(cx^n\right)\log\left(\sqrt{d}+\sqrt{d+ex}\right)-benx\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)-2benx\log\left(\sqrt{d}+\sqrt{d+ex}\right)\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)+2benx\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+2benx\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)-2benx\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{4\sqrt{d}\,x}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -1/4*(4*a*Sqrt[d]*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*Sqrt[d + e*x] + 4*b*e*n*x*A
rcTanh[Sqrt[d + e*x]/Sqrt[d]] + 4*b*Sqrt[d]*Sqrt[d + e*x]*Log[c*x^n] - 2*a*
e*x*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d
+ e*x]] + b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 2*a*e*x*Log[Sqrt[d] + Sq
rt[d + e*x]] + 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] - b*e*n*x*Lo
g[Sqrt[d] + Sqrt[d + e*x]]^2 - 2*b*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] + 2*b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]*Lo
g[(1 + Sqrt[d + e*x]/Sqrt[d])/2] + 2*b*e*n*x*PolyLog[2, 1/2 - Sqrt[d + e*x]
/(2*Sqrt[d])] - 2*b*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2])/(Sqrt[
d]*x)
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{ex+d}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^2,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*(e*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/sqrt(d) - 2
*sqrt(x*e + d)/x)*a + b*integrate(sqrt(x*e + d)*(log(c) + log(x^n))/x^2, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^2,x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log{(cx^n)})\sqrt{d+ex}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2)/x**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)\,\sqrt{d+e\,x}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^2,x)
```

```
[Out] int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^2, x)
```

3.136 $\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=298

$$-\frac{bn\sqrt{d+ex}}{4x^2}-\frac{3ben\sqrt{d+ex}}{8dx}-\frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{3/2}}-\frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+ex}\,(a+b\,\mathrm{lo}}{2x^2}$$

```
[Out] -1/8*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)-1/4*b*e^2*n*arctanh((e*
x+d)^(1/2)/d^(1/2))^2/d^(3/2)+1/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*l
n(c*x^n))/d^(3/2)+1/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(
d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)+1/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-
(e*x+d)^(1/2)))/d^(3/2)-1/4*b*n*(e*x+d)^(1/2)/x^2-3/8*b*e*n*(e*x+d)^(1/2)/d
/x-1/2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^2-1/4*e*(a+b*ln(c*x^n))*(e*x+d)^(1/2
)/d/x
```

Rubi [A]
time = 0.24, antiderivative size = 298, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {43, 44, 65, 214, 2392, 12, 14, 6131, 6055, 2449, 2352}

$$\frac{be^2n\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4d^{3/2}}+\frac{e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}\,(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2x^2}-\frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{3/2}}+\frac{be^2n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{2d^{3/2}}-\frac{bn\sqrt{d+ex}}{4x^2}-\frac{3ben\sqrt{d+ex}}{8dx}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*n*Sqrt[d + e*x])/x^2 - (3*b*e*n*Sqrt[d + e*x])/(8*d*x) - (b*e^2*n*A
rcTanh[Sqrt[d + e*x]/Sqrt[d]])/(8*d^(3/2)) - (b*e^2*n*ArcTanh[Sqrt[d + e*x]
/Sqrt[d]]^2)/(4*d^(3/2)) - (Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(2*x^2) - (e*
Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(4*d*x) + (e^2*ArcTanh[Sqrt[d + e*x]/Sqrt
[d]]*(a + b*Log[c*x^n]))/(4*d^(3/2)) + (b*e^2*n*ArcTanh[Sqrt[d + e*x]/Sqrt[
d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/(2*d^(3/2)) + (b*e^2*n*Poly
Log[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/(4*d^(3/2))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
```

```
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2x^2} - \frac{e\sqrt{d+ex}\,(a+b\log(cx^n))}{4dx} + \frac{e^2\tanh^{-1}\big(\cdots}{\cdots}$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2x^2} - \frac{e\sqrt{d+ex}\,(a+b\log(cx^n))}{4dx} + \frac{e^2\tanh^{-1}\big(\cdots}{\cdots}$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2x^2} - \frac{e\sqrt{d+ex}\,(a+b\log(cx^n))}{4dx} + \frac{e^2\tanh^{-1}\big(\cdots}{\cdots}$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2x^2} - \frac{e\sqrt{d+ex}\,(a+b\log(cx^n))}{4dx} + \frac{e^2\tanh^{-1}\big(\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{4x^2} - \frac{ben\sqrt{d+ex}}{4dx} - \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2x^2} - \frac{e\sqrt{d+ex}\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{4x^2} - \frac{3ben\sqrt{d+ex}}{8dx} - \frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{3/2}} - \frac{\sqrt{d+ex}\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{4x^2} - \frac{3ben\sqrt{d+ex}}{8dx} - \frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{4d^{3/2}} - \frac{be^2n\tanh\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{4x^2} - \frac{3ben\sqrt{d+ex}}{8dx} - \frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{3/2}} - \frac{be^2n\tanh\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{4x^2} - \frac{3ben\sqrt{d+ex}}{8dx} - \frac{be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{3/2}} - \frac{be^2n\tanh\cdots}{\cdots}$$

Mathematica [A]

time = 0.37, size = 500, normalized size = 1.68

$$-\frac{8ad^{3/2}\sqrt{d+ex}+4bd^{3/2}n\sqrt{d+ex}+4a\sqrt{d}\,ex\sqrt{d+ex}+6b\sqrt{d}\,enx\sqrt{d+ex}+2be^2nx^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8bd^{3/2}\sqrt{d+ex}\log\left(cx^n\right)+4b\sqrt{d}\,ex\sqrt{d+ex}\log\left(cx^n\right)+2ae^2x^2\log\left(\sqrt{d}-\sqrt{d+ex}\right)+2be^2x^2\log\left(cx^n\right)\log\left(\sqrt{d}-\sqrt{d+ex}\right)-be^2nx^2\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)-2ae^2x^2\log\left(\sqrt{d}+\sqrt{d+ex}\right)-2be^2x^2\log\left(cx^n\right)\log\left(\sqrt{d}+\sqrt{d+ex}\right)+be^2nx^2\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)+2be^2nx^2\log\left(\sqrt{d}+\sqrt{d+ex}\right)\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)-2be^2nx^2\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)-2be^2nx^2\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)+2be^2nx^2\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{16d^{3/2}x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/16*(8*a*d^(3/2)*Sqrt[d + e*x] + 4*b*d^(3/2)*n*Sqrt[d + e*x] + 4*a*Sqrt[d
]*e*x*Sqrt[d + e*x] + 6*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 2*b*e^2*n*x^2*ArcTa
nh[Sqrt[d + e*x]/Sqrt[d]] + 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 4*b*Sqrt
[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] + 2*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e*x]]
 + 2*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] - b*e^2*n*x^2*Log[Sq
rt[d] - Sqrt[d + e*x]]^2 - 2*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]] - 2*b*e
^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + b*e^2*n*x^2*Log[Sqrt[d] +
Sqrt[d + e*x]]^2 + 2*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1/2 - Sqr
t[d + e*x]/(2*Sqrt[d])] - 2*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d + e*x]]*Log[(1
 + Sqrt[d + e*x]/Sqrt[d])/2] - 2*b*e^2*n*x^2*PolyLog[2, 1/2 - Sqrt[d + e*x]
/(2*Sqrt[d])] + 2*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2])/(d
^(3/2)*x^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{ex+d}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^3,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^3,x, algorithm="maxima")
```

```
[Out] -1/8*a*(e^2*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/d^(3/2
) + 2*((x*e + d)^(3/2)*e^2 + sqrt(x*e + d)*d*e^2)/((x*e + d)^2*d - 2*(x*e +
 d)*d^2 + d^3)) + b*integrate(sqrt(x*e + d)*(log(c) + log(x^n))/x^3, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^3,x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/x^3, x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})\sqrt{d + ex}}{x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2)/x**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x**3, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^3,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x*e + d)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)\,\sqrt{d+e\,x}}{x^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^3,x)
```

```
[Out] int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^3, x)
```

3.137 $\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=263

$$\frac{64bd^5n\sqrt{d+ex}}{1155e^4}+\frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd^2n(d+ex)^{7/2}}{1617e^4}+\frac{32bdn(d+ex)^{9/2}}{297e^4}-\frac{4bn(d+}{12}$$

```
[Out] 64/3465*b*d^4*n*(e*x+d)^(3/2)/e^4+64/5775*b*d^3*n*(e*x+d)^(5/2)/e^4-172/161
7*b*d^2*n*(e*x+d)^(7/2)/e^4+32/297*b*d*n*(e*x+d)^(9/2)/e^4-4/121*b*n*(e*x+d
)^(11/2)/e^4-64/1155*b*d^(11/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^4-2/5*d^
3*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+6/7*d^2*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e
^4-2/3*d*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/e^4+2/11*(e*x+d)^(11/2)*(a+b*ln(c*x^
n))/e^4+64/1155*b*d^5*n*(e*x+d)^(1/2)/e^4
```

Rubi [A]
time = 0.16, antiderivative size = 263, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.304$, Rules used = {45, 2392, 12, 1634, 52, 65, 214}

$$-\frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4}-\frac{2d(d+ex)^{9/2}\left(a+b\log\left(cx^n\right)\right)}{3e^4}+\frac{2(d+ex)^{11/2}\left(a+b\log\left(cx^n\right)\right)}{11e^4}-\frac{64bd^{11/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{1155e^4}+\frac{64bd^5n\sqrt{d+ex}}{1155e^4}+\frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd^2n(d+ex)^{7/2}}{1617e^4}+\frac{32bdn(d+ex)^{9/2}}{297e^4}-\frac{4bn(d+ex)^{11/2}}{121e^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (64*b*d^5*n*Sqrt[d + e*x])/(1155*e^4) + (64*b*d^4*n*(d + e*x)^(3/2))/(3465*
e^4) + (64*b*d^3*n*(d + e*x)^(5/2))/(5775*e^4) - (172*b*d^2*n*(d + e*x)^(7/
2))/(1617*e^4) + (32*b*d*n*(d + e*x)^(9/2))/(297*e^4) - (4*b*n*(d + e*x)^(1
1/2))/(121*e^4) - (64*b*d^(11/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(1155*e^
4) - (2*d^3*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4) + (6*d^2*(d + e*x)^
(7/2)*(a + b*Log[c*x^n]))/(7*e^4) - (2*d*(d + e*x)^(9/2)*(a + b*Log[c*x^n])
)/(3*e^4) + (2*(d + e*x)^(11/2)*(a + b*Log[c*x^n]))/(11*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] && !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) && !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 1634

```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2]) && GtQ[E
xpon[Px, x], 2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4}$$

$$= -\frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4}$$

$$= -\frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4}$$

$$= -\frac{172bd^2n(d+ex)^{7/2}}{1617e^4}+\frac{32bdn(d+ex)^{9/2}}{297e^4}-\frac{4bn(d+ex)^{11/2}}{121e^4}-\frac{2d^3(}{}$$

$$= \frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd^2n(d+ex)^{7/2}}{1617e^4}+\frac{32bdn(d+ex)^{9/2}}{297e^4}-\frac{4bn}{}$$

$$= \frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd^2n(d+ex)^{7/2}}{1617e^4}+\frac{32}{}$$

$$= \frac{64bd^5n\sqrt{d+ex}}{1155e^4}+\frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd}{}$$

$$= \frac{64bd^5n\sqrt{d+ex}}{1155e^4}+\frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd}{}$$

$$= \frac{64bd^5n\sqrt{d+ex}}{1155e^4}+\frac{64bd^4n(d+ex)^{3/2}}{3465e^4}+\frac{64bd^3n(d+ex)^{5/2}}{5775e^4}-\frac{172bd}{}$$

Mathematica [A]
time = 0.23, size = 187, normalized size = 0.71

$$\frac{-221760bd^{11/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}\left(-3465a(d+ex)^2\left(16d^3-40d^2ex+70de^2x^2-105e^3x^3\right)+2bn\left(53308d^5-12794d^4ex+7863d^3e^2x^2-5975d^2e^3x^3-57575de^4x^4-33075e^5x^5\right)-3465b(d+ex)^2\left(16d^3-40d^2ex+70de^2x^2-105e^3x^3\right)\log\left(cx^n\right)\right)}{4002075e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-221760*b*d^(11/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(-34
65*a*(d + e*x)^2*(16*d^3 - 40*d^2*e*x + 70*d*e^2*x^2 - 105*e^3*x^3) + 2*b*n
*(53308*d^5 - 12794*d^4*e*x + 7863*d^3*e^2*x^2 - 5975*d^2*e^3*x^3 - 57575*d
*e^4*x^4 - 33075*e^5*x^5) - 3465*b*(d + e*x)^2*(16*d^3 - 40*d^2*e*x + 70*d*
e^2*x^2 - 105*e^3*x^3)*Log[c*x^n]))/(4002075*e^4)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^{3}(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
[Out] int(x^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.51, size = 245, normalized size = 0.93

$$\frac{4}{4002075}\left(27720\,d^{\frac{11}{2}}e^{(-4)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left(33075\,(xe+d)^{\frac{11}{2}}-107800\,(xe+d)^{\frac{9}{2}}d+106425\,(xe+d)^{\frac{7}{2}}d^2-11088\,(xe+d)^{\frac{5}{2}}d^3-18480\,(xe+d)^{\frac{3}{2}}d^4-55440\,\sqrt{xe+d}\,d^5\right)e^{(-4)}\right)bn+\frac{2}{1155}\left(105\,(xe+d)^{\frac{11}{2}}e^{(-4)}-385\,(xe+d)^{\frac{9}{2}}de^{(-4)}+495\,(xe+d)^{\frac{7}{2}}d^2e^{(-4)}-231\,(xe+d)^{\frac{5}{2}}d^3e^{(-4)}\right)b\log\left(cx^n\right)+\frac{2}{1155}\left(105\,(xe+d)^{\frac{11}{2}}e^{(-4)}-385\,(xe+d)^{\frac{9}{2}}de^{(-4)}+495\,(xe+d)^{\frac{7}{2}}d^2e^{(-4)}-231\,(xe+d)^{\frac{5}{2}}d^3e^{(-4)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] 4/4002075*(27720*d^(11/2)*e^(-4)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e +
d) + sqrt(d))) - (33075*(x*e + d)^(11/2) - 107800*(x*e + d)^(9/2)*d + 10642
5*(x*e + d)^(7/2)*d^2 - 11088*(x*e + d)^(5/2)*d^3 - 18480*(x*e + d)^(3/2)*d
^4 - 55440*sqrt(x*e + d)*d^5)*e^(-4))*b*n + 2/1155*(105*(x*e + d)^(11/2)*e^
(-4) - 385*(x*e + d)^(9/2)*d*e^(-4) + 495*(x*e + d)^(7/2)*d^2*e^(-4) - 231*
(x*e + d)^(5/2)*d^3*e^(-4))*b*log(c*x^n) + 2/1155*(105*(x*e + d)^(11/2)*e^(
-4) - 385*(x*e + d)^(9/2)*d*e^(-4) + 495*(x*e + d)^(7/2)*d^2*e^(-4) - 231*(
x*e + d)^(5/2)*d^3*e^(-4))*a
```

Fricas [A]
time = 0.41, size = 554, normalized size = 2.11

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] [2/4002075*(55440*b*d^(11/2)*n*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x)
 + (106616*b*d^5*n - 33075*(2*b*n - 11*a)*x^5*e^5 - 55440*a*d^5 - 2450*(47*
b*d*n - 198*a*d)*x^4*e^4 - 25*(478*b*d^2*n - 693*a*d^2)*x^3*e^3 + 6*(2621*b
*d^3*n - 3465*a*d^3)*x^2*e^2 - 4*(6397*b*d^4*n - 6930*a*d^4)*x*e + 3465*(10
5*b*x^5*e^5 + 140*b*d*x^4*e^4 + 5*b*d^2*x^3*e^3 - 6*b*d^3*x^2*e^2 + 8*b*d^4
*x*e - 16*b*d^5)*log(c) + 3465*(105*b*n*x^5*e^5 + 140*b*d*n*x^4*e^4 + 5*b*d
^2*n*x^3*e^3 - 6*b*d^3*n*x^2*e^2 + 8*b*d^4*n*x*e - 16*b*d^5*n)*log(x))*sqrt
(x*e + d))*e^(-4), 2/4002075*(110880*b*sqrt(-d)*d^5*n*arctan(sqrt(x*e + d)*
sqrt(-d)/d) + (106616*b*d^5*n - 33075*(2*b*n - 11*a)*x^5*e^5 - 55440*a*d^5
- 2450*(47*b*d*n - 198*a*d)*x^4*e^4 - 25*(478*b*d^2*n - 693*a*d^2)*x^3*e^3
+ 6*(2621*b*d^3*n - 3465*a*d^3)*x^2*e^2 - 4*(6397*b*d^4*n - 6930*a*d^4)*x*e
 + 3465*(105*b*x^5*e^5 + 140*b*d*x^4*e^4 + 5*b*d^2*x^3*e^3 - 6*b*d^3*x^2*e^
2 + 8*b*d^4*x*e - 16*b*d^5)*log(c) + 3465*(105*b*n*x^5*e^5 + 140*b*d*n*x^4*
e^4 + 5*b*d^2*n*x^3*e^3 - 6*b*d^3*n*x^2*e^2 + 8*b*d^4*n*x*e - 16*b*d^5*n)*l
og(x))*sqrt(x*e + d))*e^(-4)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1188 vs. $2(267) = 534$.

time = 73.96, size = 1188, normalized size = 4.52

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] 2*a*d*(-d**3*(d + e*x)**(3/2)/3 + 3*d**2*(d + e*x)**(5/2)/5 - 3*d*(d + e*x)
**(7/2)/7 + (d + e*x)**(9/2)/9)/e**4 + 2*a*(d**4*(d + e*x)**(3/2)/3 - 4*d**
3*(d + e*x)**(5/2)/5 + 6*d**2*(d + e*x)**(7/2)/7 - 4*d*(d + e*x)**(9/2)/9 +
 (d + e*x)**(11/2)/11)/e**4 + 2*b*d*(-d**3*((d + e*x)**(3/2)*log(c*(-d/e +
(d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*
e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) + 3*d**2*((d + e*x)**(5/2)*l
og(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sqrt(-d))/
sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d + e*x)**(5/
2)/5)/(5*e)) - 3*d*((d + e*x)**(7/2)*log(c*(-d/e + (d + e*x)/e)**n)/7 - 2*n
*(d**4*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**3*e*sqrt(d + e*x) + d**
2*e*(d + e*x)**(3/2)/3 + d*e*(d + e*x)**(5/2)/5 + e*(d + e*x)**(7/2)/7)/(7*
e)) + (d + e*x)**(9/2)*log(c*(-d/e + (d + e*x)/e)**n)/9 - 2*n*(d**5*e*atan(
sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**4*e*sqrt(d + e*x) + d**3*e*(d + e*x)*
*(3/2)/3 + d**2*e*(d + e*x)**(5/2)/5 + d*e*(d + e*x)**(7/2)/7 + e*(d + e*x)
**(9/2)/9)/(9*e))/e**4 + 2*b*(d**4*((d + e*x)**(3/2)*log(c*(-d/e + (d + e*x
)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d
 + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) - 4*d**3*((d + e*x)**(5/2)*log(c*(-d
/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d)
 + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d + e*x)**(5/2)/5)/(5
*e)) + 6*d**2*((d + e*x)**(7/2)*log(c*(-d/e + (d + e*x)/e)**n)/7 - 2*n*(d**
4*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**3*e*sqrt(d + e*x) + d**2*e*(
d + e*x)**(3/2)/3 + d*e*(d + e*x)**(5/2)/5 + e*(d + e*x)**(7/2)/7)/(7*e)) -
 4*d*((d + e*x)**(9/2)*log(c*(-d/e + (d + e*x)/e)**n)/9 - 2*n*(d**5*e*atan(
sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**4*e*sqrt(d + e*x) + d**3*e*(d + e*x)*
*(3/2)/3 + d**2*e*(d + e*x)**(5/2)/5 + d*e*(d + e*x)**(7/2)/7 + e*(d + e*x)
**(9/2)/9)/(9*e)) + (d + e*x)**(11/2)*log(c*(-d/e + (d + e*x)/e)**n)/11 - 2
*n*(d**6*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**5*e*sqrt(d + e*x) + d
**4*e*(d + e*x)**(3/2)/3 + d**3*e*(d + e*x)**(5/2)/5 + d**2*e*(d + e*x)**(7
/2)/7 + d*e*(d + e*x)**(9/2)/9 + e*(d + e*x)**(11/2)/11)/(11*e))/e**4
```

Giac [F]

time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a)*x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^3 \left(a+b \ln \left(c x^n\right)\right) \left(d+e x\right)^{3/2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
[Out] int(x^3*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.138 $\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx$

Optimal. Leaf size=213

$$-\frac{32bd^4n\sqrt{d+ex}}{315e^3}-\frac{32bd^3n(d+ex)^{3/2}}{945e^3}-\frac{32bd^2n(d+ex)^{5/2}}{1575e^3}+\frac{44bdn(d+ex)^{7/2}}{441e^3}-\frac{4bn(d+ex)^{9/2}}{81e^3}+\frac{32bd^{9/2}n}{}$$

```
[Out] -32/945*b*d^3*n*(e*x+d)^(3/2)/e^3-32/1575*b*d^2*n*(e*x+d)^(5/2)/e^3+44/441*
b*d*n*(e*x+d)^(7/2)/e^3-4/81*b*n*(e*x+d)^(9/2)/e^3+32/315*b*d^(9/2)*n*arcta
nh((e*x+d)^(1/2)/d^(1/2))/e^3+2/5*d^2*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3-4/7
*d*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^3+2/9*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/e^3-
32/315*b*d^4*n*(e*x+d)^(1/2)/e^3
```

Rubi [A]
time = 0.14, antiderivative size = 213, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {45, 2392, 12, 911, 1275, 214}

$$\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}+\frac{32bd^{9/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{315e^3}-\frac{32bd^4n\sqrt{d+ex}}{315e^3}-\frac{32bd^3n(d+ex)^{3/2}}{945e^3}-\frac{32bd^2n(d+ex)^{5/2}}{1575e^3}+\frac{44bdn(d+ex)^{7/2}}{441e^3}-\frac{4bn(d+ex)^{9/2}}{81e^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-32*b*d^4*n*Sqrt[d + e*x])/(315*e^3) - (32*b*d^3*n*(d + e*x)^(3/2))/(945*e
^3) - (32*b*d^2*n*(d + e*x)^(5/2))/(1575*e^3) + (44*b*d*n*(d + e*x)^(7/2))/
(441*e^3) - (4*b*n*(d + e*x)^(9/2))/(81*e^3) + (32*b*d^(9/2)*n*ArcTanh[Sqrt
[d + e*x]/Sqrt[d]])/(315*e^3) + (2*d^2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/
(5*e^3) - (4*d*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3) + (2*(d + e*x)^(
9/2)*(a + b*Log[c*x^n]))/(9*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{2d^2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^3} - \frac{4d(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^3} + \cdots$$

$$= \frac{2d^2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^3} - \frac{4d(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^3} + \cdots$$

$$= \frac{2d^2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^3} - \frac{4d(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^3} + \cdots$$

$$= \frac{2d^2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^3} - \frac{4d(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^3} + \cdots$$

$$= -\frac{32bd^4n\sqrt{d+ex}}{315e^3} - \frac{32bd^3n(d+ex)^{3/2}}{945e^3} - \frac{32bd^2n(d+ex)^{5/2}}{1575e^3} + \frac{44b\cdots}{\cdots}$$

$$= -\frac{32bd^4n\sqrt{d+ex}}{315e^3} - \frac{32bd^3n(d+ex)^{3/2}}{945e^3} - \frac{32bd^2n(d+ex)^{5/2}}{1575e^3} + \frac{44b\cdots}{\cdots}$$

Mathematica [A]
time = 0.16, size = 153, normalized size = 0.72

$$\frac{2\left(5040bd^{9/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}\left(315a(d+ex)^2\left(8d^2-20dex+35e^2x^2\right)-2bn\left(2614d^4-677d^3ex+429d^2e^2x^2+2425de^3x^3+1225e^4x^4\right)+315b(d+ex)^2\left(8d^2-20dex+35e^2x^2\right)\log\left(cx^n\right)\right)\right)}{99225e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (2*(5040*b*d^(9/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(315*a*
(d + e*x)^2*(8*d^2 - 20*d*e*x + 35*e^2*x^2) - 2*b*n*(2614*d^4 - 677*d^3*e*x
 + 429*d^2*e^2*x^2 + 2425*d*e^3*x^3 + 1225*e^4*x^4) + 315*b*(d + e*x)^2*(8*
d^2 - 20*d*e*x + 35*e^2*x^2)*Log[c*x^n])))/(99225*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^2(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

```
[Out] int(x^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.50, size = 201, normalized size = 0.94

$$-\frac{4}{99225}\left(1260\,d^{\frac{9}{2}}e^{(-3)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+\left(1225\,(xe+d)^{\frac{9}{2}}-2475\,(xe+d)^{\frac{7}{2}}d+504\,(xe+d)^{\frac{5}{2}}d^2+840\,(xe+d)^{\frac{3}{2}}d^3+2520\,\sqrt{xe+d}\,d^4\right)e^{(-3)}\right)bn+\frac{2}{315}\left(35\,(xe+d)^{\frac{9}{2}}e^{(-3)}-90\,(xe+d)^{\frac{7}{2}}de^{(-3)}+63\,(xe+d)^{\frac{5}{2}}d^2e^{(-3)}\right)b\log\left(cx^n\right)+\frac{2}{315}\left(35\,(xe+d)^{\frac{9}{2}}e^{(-3)}-90\,(xe+d)^{\frac{7}{2}}de^{(-3)}+63\,(xe+d)^{\frac{5}{2}}d^2e^{(-3)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -4/99225*(1260*d^(9/2)*e^(-3)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d)
+ sqrt(d))) + (1225*(x*e + d)^(9/2) - 2475*(x*e + d)^(7/2)*d + 504*(x*e + d
)^(5/2)*d^2 + 840*(x*e + d)^(3/2)*d^3 + 2520*sqrt(x*e + d)*d^4)*e^(-3))*b*n
 + 2/315*(35*(x*e + d)^(9/2)*e^(-3) - 90*(x*e + d)^(7/2)*d*e^(-3) + 63*(x*e
 + d)^(5/2)*d^2*e^(-3))*b*log(c*x^n) + 2/315*(35*(x*e + d)^(9/2)*e^(-3) - 9
0*(x*e + d)^(7/2)*d*e^(-3) + 63*(x*e + d)^(5/2)*d^2*e^(-3))*a
```

Fricas [A]
time = 0.41, size = 467, normalized size = 2.19

$$\left[\frac{2}{99225}\left(2520\,bd^{\frac{9}{2}}n\log\left(\frac{xe+2\,\sqrt{xe+d}\sqrt{d}+2\,d}{x}\right)-\left(5228\,bd^4n+1225\,(2\,bn-9\,a)x^4e^4-2520\,ad^4+50\,(97\,bdn-315\,ad)x^3e^3+3\,(286\,bd^2n-315\,ad^2)x^2e^2-2\,(677\,bd^3n-630\,ad^3)xe-315\,(35\,bx^4e^4+50\,bdx^3e^3+3\,bd^2x^2e^2-4\,bd^3xe+8\,bd^4)\log(c)-315\,(35\,bnx^4e^4+50\,bdnx^3e^3+3\,bd^2nx^2e^2-4\,bd^3nxe+8\,bd^4n)\log(x)\right)\sqrt{xe+d}\right)e^{(-3)},\ -\frac{2}{99225}\left(5040\,b\sqrt{-d}\,d^4n\arctan\left(\frac{\sqrt{xe+d}\sqrt{-d}}{d}\right)+\left(5228\,bd^4n+1225\,(2\,bn-9\,a)x^4e^4-2520\,ad^4+50\,(97\,bdn-315\,ad)x^3e^3+3\,(286\,bd^2n-315\,ad^2)x^2e^2-2\,(677\,bd^3n-630\,ad^3)xe-315\,(35\,bx^4e^4+50\,bdx^3e^3+3\,bd^2x^2e^2-4\,bd^3xe+8\,bd^4)\log(c)-315\,(35\,bnx^4e^4+50\,bdnx^3e^3+3\,bd^2nx^2e^2-4\,bd^3nxe+8\,bd^4n)\log(x)\right)\sqrt{xe+d}\right)e^{(-3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] [2/99225*(2520*b*d^(9/2)*n*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) - (
5228*b*d^4*n + 1225*(2*b*n - 9*a)*x^4*e^4 - 2520*a*d^4 + 50*(97*b*d*n - 315
*a*d)*x^3*e^3 + 3*(286*b*d^2*n - 315*a*d^2)*x^2*e^2 - 2*(677*b*d^3*n - 630*
a*d^3)*x*e - 315*(35*b*x^4*e^4 + 50*b*d*x^3*e^3 + 3*b*d^2*x^2*e^2 - 4*b*d^3
*x*e + 8*b*d^4)*log(c) - 315*(35*b*n*x^4*e^4 + 50*b*d*n*x^3*e^3 + 3*b*d^2*n
*x^2*e^2 - 4*b*d^3*n*x*e + 8*b*d^4*n)*log(x))*sqrt(x*e + d))*e^(-3), -2/992
25*(5040*b*sqrt(-d)*d^4*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (5228*b*d^4*n
+ 1225*(2*b*n - 9*a)*x^4*e^4 - 2520*a*d^4 + 50*(97*b*d*n - 315*a*d)*x^3*e^3
 + 3*(286*b*d^2*n - 315*a*d^2)*x^2*e^2 - 2*(677*b*d^3*n - 630*a*d^3)*x*e -
315*(35*b*x^4*e^4 + 50*b*d*x^3*e^3 + 3*b*d^2*x^2*e^2 - 4*b*d^3*x*e + 8*b*d^
4)*log(c) - 315*(35*b*n*x^4*e^4 + 50*b*d*n*x^3*e^3 + 3*b*d^2*n*x^2*e^2 - 4*
b*d^3*n*x*e + 8*b*d^4*n)*log(x))*sqrt(x*e + d))*e^(-3)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 870 vs. $2(216) = 432$.
time = 50.59, size = 870, normalized size = 4.08

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] 2*a*d*(d**2*(d + e*x)**(3/2)/3 - 2*d*(d + e*x)**(5/2)/5 + (d + e*x)**(7/2)/
7)/e**3 + 2*a*(-d**3*(d + e*x)**(3/2)/3 + 3*d**2*(d + e*x)**(5/2)/5 - 3*d*(
d + e*x)**(7/2)/7 + (d + e*x)**(9/2)/9)/e**3 + 2*b*d*(d**2*((d + e*x)**(3/2
)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d
))/sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) - 2*d*((d +
e*x)**(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*
x)/sqrt(-d))/sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(
d + e*x)**(5/2)/5)/(5*e)) + (d + e*x)**(7/2)*log(c*(-d/e + (d + e*x)/e)**n)
/7 - 2*n*(d**4*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**3*e*sqrt(d + e*
x) + d**2*e*(d + e*x)**(3/2)/3 + d*e*(d + e*x)**(5/2)/5 + e*(d + e*x)**(7/2
)/7)/(7*e))/e**3 + 2*b*(-d**3*((d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)*
*n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d + e*
x) + e*(d + e*x)**(3/2)/3)/(3*e)) + 3*d**2*((d + e*x)**(5/2)*log(c*(-d/e +
(d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*
*2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d + e*x)**(5/2)/5)/(5*e))
- 3*d*((d + e*x)**(7/2)*log(c*(-d/e + (d + e*x)/e)**n)/7 - 2*n*(d**4*e*atan
(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**3*e*sqrt(d + e*x) + d**2*e*(d + e*x)
**(3/2)/3 + d*e*(d + e*x)**(5/2)/5 + e*(d + e*x)**(7/2)/7)/(7*e)) + (d + e*
x)**(9/2)*log(c*(-d/e + (d + e*x)/e)**n)/9 - 2*n*(d**5*e*atan(sqrt(d + e*x)
/sqrt(-d))/sqrt(-d) + d**4*e*sqrt(d + e*x) + d**3*e*(d + e*x)**(3/2)/3 + d*
*2*e*(d + e*x)**(5/2)/5 + d*e*(d + e*x)**(7/2)/7 + e*(d + e*x)**(9/2)/9)/(9
*e))/e**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^{3/2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
[Out] int(x^2*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.139 $\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=163

$$\frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)^{7/2}}{49e^2}-\frac{8bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^2}-2d(d$$

```
[Out] 8/105*b*d^2*n*(e*x+d)^(3/2)/e^2+8/175*b*d*n*(e*x+d)^(5/2)/e^2-4/49*b*n*(e*x
+d)^(7/2)/e^2-8/35*b*d^(7/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^2-2/5*d*(e*
x+d)^(5/2)*(a+b*ln(c*x^n))/e^2+2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^2+8/35*b
*d^3*n*(e*x+d)^(1/2)/e^2
```

Rubi [A]

time = 0.08, antiderivative size = 163, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {45, 2392, 12, 81, 52, 65, 214}

$$-\frac{2d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-\frac{8bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^2}+\frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)^{7/2}}{49e^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (8*b*d^3*n*Sqrt[d + e*x])/(35*e^2) + (8*b*d^2*n*(d + e*x)^(3/2))/(105*e^2)
+ (8*b*d*n*(d + e*x)^(5/2))/(175*e^2) - (4*b*n*(d + e*x)^(7/2))/(49*e^2) -
(8*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(35*e^2) - (2*d*(d + e*x)^(5
/2)*(a + b*Log[c*x^n]))/(5*e^2) + (2*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7
*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
```

```
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{2d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-(bn$$

$$= -\frac{2d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-\frac{(2b$$

$$= -\frac{4bn(d+ex)^{7/2}}{49e^2}-\frac{2d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{2(d+ex)^{7/2}\left(a+\right.}{7e^2}$$

$$= \frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)^{7/2}}{49e^2}-\frac{2d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+$$

$$= \frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)^{7/2}}{49e^2}-\frac{2d(d+ex)^{5/}}{}$$

$$= \frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)}{49e^2}$$

$$= \frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)}{49e^2}$$

$$= \frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)}{49e^2}$$

Mathematica [A]
time = 0.12, size = 120, normalized size = 0.74

$$-\frac{2\left(420bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}\,(105a(2d-5ex)(d+ex)^2+2bn(-247d^3+71d^2ex+183de^2x^2+75e^3x^3)+105b(2d-5ex)(d+ex)^2\log\left(cx^n\right))\right)}{3675e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-2*(420*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(105*a*
(2*d - 5*e*x)*(d + e*x)^2 + 2*b*n*(-247*d^3 + 71*d^2*e*x + 183*d*e^2*x^2 +
75*e^3*x^3) + 105*b*(2*d - 5*e*x)*(d + e*x)^2*Log[c*x^n])))/(3675*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

[Out] int(x*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)

Maxima [A]
time = 0.50, size = 159, normalized size = 0.98

$$\frac{4}{3675}\left(105\,d^{\frac{7}{2}}e^{(-2)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left(75\,(xe+d)^{\frac{7}{2}}-42\,(xe+d)^{\frac{5}{2}}d-70\,(xe+d)^{\frac{3}{2}}d^{2}-210\,\sqrt{xe+d}\,d^{3}\right)e^{(-2)}\right)bn+\frac{2}{35}\left(5\,(xe+d)^{\frac{7}{2}}e^{(-2)}-7\,(xe+d)^{\frac{5}{2}}de^{(-2)}\right)b\log\left(cx^{n}\right)+\frac{2}{35}\left(5\,(xe+d)^{\frac{7}{2}}e^{(-2)}-7\,(xe+d)^{\frac{5}{2}}de^{(-2)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")

[Out] 4/3675*(105*d^(7/2)*e^(-2)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) - (75*(x*e + d)^(7/2) - 42*(x*e + d)^(5/2)*d - 70*(x*e + d)^(3/2)*d^2 - 210*sqrt(x*e + d)*d^3)*e^(-2))*b*n + 2/35*(5*(x*e + d)^(7/2)*e^(-2) - 7*(x*e + d)^(5/2)*d*e^(-2))*b*log(c*x^n) + 2/35*(5*(x*e + d)^(7/2)*e^(-2) - 7*(x*e + d)^(5/2)*d*e^(-2))*a

Fricas [A]
time = 0.40, size = 374, normalized size = 2.29

$$\left[\frac{2}{3675}\left(210\,bd^{\frac{7}{2}}n\log\left(\frac{xe-2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)+\left(494\,bd^{3}n-75\,(2\,bn-7\,a)x^{3}e^{3}-210\,ad^{3}-6\,(61\,bdn-140\,ad)x^{2}e^{2}-(142\,bd^{2}n-105\,ad^{2})xe+105\,(5\,bx^{3}e^{3}+8\,bdx^{2}e^{2}+bd^{2}xe-2\,bd^{3})\log(c)+105\,(5\,bnx^{3}e^{3}+8\,bdnx^{2}e^{2}+bd^{2}nxe-2\,bd^{3}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-2)},\ \frac{2}{3675}\left(420\,b\sqrt{-d}\,d^{3}n\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+\left(494\,bd^{3}n-75\,(2\,bn-7\,a)x^{3}e^{3}-210\,ad^{3}-6\,(61\,bdn-140\,ad)x^{2}e^{2}-(142\,bd^{2}n-105\,ad^{2})xe+105\,(5\,bx^{3}e^{3}+8\,bdx^{2}e^{2}+bd^{2}xe-2\,bd^{3})\log(c)+105\,(5\,bnx^{3}e^{3}+8\,bdnx^{2}e^{2}+bd^{2}nxe-2\,bd^{3}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")

[Out] [2/3675*(210*b*d^(7/2)*n*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) + (494*b*d^3*n - 75*(2*b*n - 7*a)*x^3*e^3 - 210*a*d^3 - 6*(61*b*d*n - 140*a*d)*x^2*e^2 - (142*b*d^2*n - 105*a*d^2)*x*e + 105*(5*b*x^3*e^3 + 8*b*d*x^2*e^2 + b*d^2*x*e - 2*b*d^3)*log(c) + 105*(5*b*n*x^3*e^3 + 8*b*d*n*x^2*e^2 + b*d^2*n*x*e - 2*b*d^3*n)*log(x))*sqrt(x*e + d))*e^(-2), 2/3675*(420*b*sqrt(-d)*d^3*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (494*b*d^3*n - 75*(2*b*n - 7*a)*x^3*e^3 - 210*a*d^3 - 6*(61*b*d*n - 140*a*d)*x^2*e^2 - (142*b*d^2*n - 105*a*d^2)*x*e + 105*(5*b*x^3*e^3 + 8*b*d*x^2*e^2 + b*d^2*x*e - 2*b*d^3)*log(c) + 105*(5*b*n*x^3*e^3 + 8*b*d*n*x^2*e^2 + b*d^2*n*x*e - 2*b*d^3*n)*log(x))*sqrt(x*e + d))*e^(-2)]

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 583 vs. $2(165) = 330$.
time = 33.33, size = 583, normalized size = 3.58

$$\frac{2ad\left(-\frac{d(d+ex)^{\frac{3}{2}}}{3}+\frac{(d+ex)^{\frac{5}{2}}}{5}\right)}{e^{2}}+\frac{2a\left(\frac{d^{2}(d+ex)^{\frac{3}{2}}}{3}-\frac{2d(d+ex)^{\frac{5}{2}}}{5}+\frac{(d+ex)^{\frac{7}{2}}}{7}\right)}{e^{2}}+\frac{2bd\left(-d\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)+\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{5}-\frac{2n\left(\frac{d^{3}e\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{2}e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)}{e^{2}}+\frac{2b\left(d^{2}\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)-2d\left(\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{5}-\frac{2n\left(\frac{d^{3}e\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{2}e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)+\frac{(d+ex)^{\frac{7}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{7}-\frac{2n\left(\frac{d^{4}e\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{3}e\sqrt{d+ex}+\frac{d^{2}e(d+ex)^{\frac{3}{2}}}{3}+\frac{de(d+ex)^{\frac{5}{2}}}{5}+\frac{e(d+ex)^{\frac{7}{2}}}{7}\right)}{7e}\right)}{e^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)

[Out] 2*a*d*(-d*(d + e*x)**(3/2)/3 + (d + e*x)**(5/2)/5)/e**2 + 2*a*(d**2*(d + e*x)**(3/2)/3 - 2*d*(d + e*x)**(5/2)/5 + (d + e*x)**(7/2)/7)/e**2 + 2*b*d*(-d

```
*((d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt
(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3
*e)) + (d + e*x)**(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan
(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(
3/2)/3 + e*(d + e*x)**(5/2)/5)/(5*e))/e**2 + 2*b*(d**2*((d + e*x)**(3/2)*lo
g(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/s
qrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) - 2*d*((d + e*x)
**(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/s
qrt(-d))/sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d +
e*x)**(5/2)/5)/(5*e)) + (d + e*x)**(7/2)*log(c*(-d/e + (d + e*x)/e)**n)/7 -
 2*n*(d**4*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d**3*e*sqrt(d + e*x) +
 d**2*e*(d + e*x)**(3/2)/3 + d*e*(d + e*x)**(5/2)/5 + e*(d + e*x)**(7/2)/7)
/(7*e))/e**2
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a)*x, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
[Out] int(x*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.140 $\int (d+ex)^{3/2} (a+b\log(cx^n))\,dx$

Optimal. Leaf size=115

$$-\frac{4bd^2n\sqrt{d+ex}}{5e}-\frac{4bdn(d+ex)^{3/2}}{15e}-\frac{4bn(d+ex)^{5/2}}{25e}+\frac{4bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e}+\frac{2(d+ex)^{5/2}(a+b\log$$

[Out] -4/15*b*d*n*(e*x+d)^(3/2)/e-4/25*b*n*(e*x+d)^(5/2)/e+4/5*b*d^(5/2)*n*arctan
h((e*x+d)^(1/2)/d^(1/2))/e+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e-4/5*b*d^2*n*
(e*x+d)^(1/2)/e

Rubi [A]
time = 0.04, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2356, 52, 65, 214}

$$\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e}+\frac{4bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e}-\frac{4bd^2n\sqrt{d+ex}}{5e}-\frac{4bdn(d+ex)^{3/2}}{15e}-\frac{4bn(d+ex)^{5/2}}{25e}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]

[Out] (-4*b*d^2*n*Sqrt[d + e*x])/(5*e) - (4*b*d*n*(d + e*x)^(3/2))/(15*e) - (4*b*
n*(d + e*x)^(5/2))/(25*e) + (4*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/
(5*e) + (2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e)

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$\int (d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e} - \frac{(2bn)\int\frac{(d+ex)^{5/2}}{x}\,dx}{5e}$$

$$= -\frac{4bn(d+ex)^{5/2}}{25e} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e} - \frac{(2bdn)\int\frac{(d+ex)^{3/2}}{x}\,dx}{5e}$$

$$= -\frac{4bdn(d+ex)^{3/2}}{15e} - \frac{4bn(d+ex)^{5/2}}{25e} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e} - \frac{(}{}$$

$$= -\frac{4bd^2n\sqrt{d+ex}}{5e} - \frac{4bdn(d+ex)^{3/2}}{15e} - \frac{4bn(d+ex)^{5/2}}{25e} + \frac{2(d+ex)^{5/2}(a}{5}$$

$$= -\frac{4bd^2n\sqrt{d+ex}}{5e} - \frac{4bdn(d+ex)^{3/2}}{15e} - \frac{4bn(d+ex)^{5/2}}{25e} + \frac{2(d+ex)^{5/2}(a}{5}$$

$$= -\frac{4bd^2n\sqrt{d+ex}}{5e} - \frac{4bdn(d+ex)^{3/2}}{15e} - \frac{4bn(d+ex)^{5/2}}{25e} + \frac{4bd^{5/2}n\tanh^{-}}{5}$$

Mathematica [A]
time = 0.06, size = 87, normalized size = 0.76

$$\frac{2\left(-\frac{2}{15}bn\sqrt{d+ex}\,(23d^2+11dex+3e^2x^2)+2bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+(d+ex)^{5/2}(a+b\log(cx^n))\right)}{5e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (2*((-2*b*n*Sqrt[d + e*x]*(23*d^2 + 11*d*e*x + 3*e^2*x^2))/15 + 2*b*d^(5/2)
*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + (d + e*x)^(5/2)*(a + b*Log[c*x^n])))/(5
*e)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int (ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

```
[Out] int((e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.50, size = 109, normalized size = 0.95

$$\frac{2}{5}\,(xe+d)^{\frac{5}{2}}be^{(-1)}\log\left(cx^{n}\right)+\frac{2}{5}\,(xe+d)^{\frac{5}{2}}ae^{(-1)}-\frac{2}{75}\left(15\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+6\,(xe+d)^{\frac{5}{2}}+10\,(xe+d)^{\frac{3}{2}}d+30\,\sqrt{xe+d}\,d^{2}\right)bne^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] 2/5*(x*e + d)^(5/2)*b*e^(-1)*log(c*x^n) + 2/5*(x*e + d)^(5/2)*a*e^(-1) - 2/
75*(15*d^(5/2)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) + 6
*(x*e + d)^(5/2) + 10*(x*e + d)^(3/2)*d + 30*sqrt(x*e + d)*d^2)*b*n*e^(-1)
```

Fricas [A]
time = 0.40, size = 283, normalized size = 2.46

$$\left[\frac{2}{75}\left(15\,bd^{\frac{5}{2}}n\log\left(\frac{xe+2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)-\left(46\,bd^{2}n+3\,(2\,bn-5\,a)x^{2}e^{2}-15\,ad^{2}+2\,(11\,bdn-15\,ad)xe-15\,\left(bx^{2}e^{2}+2\,bdxe+bd^{2}\right)\log\left(c\right)-15\,\left(bnx^{2}e^{2}+2\,bdnxe+bd^{2}n\right)\log\left(x\right)\right)\sqrt{xe+d}\right)e^{(-1)},\ -\frac{2}{75}\left(30\,b\sqrt{-d}\,d^{2}n\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+\left(46\,bd^{2}n+3\,(2\,bn-5\,a)x^{2}e^{2}-15\,ad^{2}+2\,(11\,bdn-15\,ad)xe-15\,\left(bx^{2}e^{2}+2\,bdxe+bd^{2}\right)\log\left(c\right)-15\,\left(bnx^{2}e^{2}+2\,bdnxe+bd^{2}n\right)\log\left(x\right)\right)\sqrt{xe+d}\right)e^{(-1)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] [2/75*(15*b*d^(5/2)*n*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) - (46*b*
d^2*n + 3*(2*b*n - 5*a)*x^2*e^2 - 15*a*d^2 + 2*(11*b*d*n - 15*a*d)*x*e - 15
*(b*x^2*e^2 + 2*b*d*x*e + b*d^2)*log(c) - 15*(b*n*x^2*e^2 + 2*b*d*n*x*e + b
*d^2*n)*log(x))*sqrt(x*e + d))*e^(-1), -2/75*(30*b*sqrt(-d)*d^2*n*arctan(sq
rt(x*e + d)*sqrt(-d)/d) + (46*b*d^2*n + 3*(2*b*n - 5*a)*x^2*e^2 - 15*a*d^2
+ 2*(11*b*d*n - 15*a*d)*x*e - 15*(b*x^2*e^2 + 2*b*d*x*e + b*d^2)*log(c) - 1
5*(b*n*x^2*e^2 + 2*b*d*n*x*e + b*d^2*n)*log(x))*sqrt(x*e + d))*e^(-1)]
```

Sympy [A]
time = 17.86, size = 333, normalized size = 2.90

$$ad\left(\begin{cases}\sqrt{d}\,x & \text{for}\ e=0\\ \frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{otherwise}\end{cases}\right)+\frac{2a\left(-\frac{d(d+ex)^{\frac{3}{2}}}{3}+\frac{(d+ex)^{\frac{5}{2}}}{5}\right)}{e}+\frac{2bd\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)}{e}+\frac{2b\left(-d\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)+\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{5}-\frac{2n\left(\frac{d^{3}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{2}e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*Piecewise((sqrt(d)*x, Eq(e, 0)), (2*(d + e*x)**(3/2)/(3*e), True)) + 2*
a*(-d*(d + e*x)**(3/2)/3 + (d + e*x)**(5/2)/5)/e + 2*b*d*((d + e*x)**(3/2)*
log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))
/sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e))/e + 2*b*(-d*((
d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d
+ e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)
) + (d + e*x)**(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sq
rt(d + e*x)/sqrt(-d))/sqrt(-d) + d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2
)/3 + e*(d + e*x)**(5/2)/5)/(5*e))/e
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (a+b\,\ln\left(c\,x^n\right))\,{\left(d+e\,x\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

```
[Out] int((a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.141 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=255

$$-\frac{16}{3}bdn\sqrt{d+ex}-\frac{4}{9}bn(d+ex)^{3/2}+\frac{16}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+2d\sqrt{d-}$$

```
[Out] -4/9*b*n*(e*x+d)^(3/2)+16/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))+2*b*
d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)
)-2*d^(3/2)*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))-4*b*d^(3/2)*n*ar
ctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-2*b*d^(3
/2)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-16/3*b*d*n*(e*x+d)^(1/
2)+2*d*(a+b*ln(c*x^n))*(e*x+d)^(1/2)
```

Rubi [A]
time = 0.30, antiderivative size = 255, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {2388, 65, 214, 2390, 12, 6131, 6055, 2449, 2352, 2356, 52}

$$-2bd^{3/2}n\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-2d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))+\frac{2}{3}(d+ex)^{3/2}(a+b\log(cx^n))+2d\sqrt{d+ex}(a+b\log(cx^n))+2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+\frac{16}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-4bd^{3/2}n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-\frac{4}{9}bn(d+ex)^{3/2}-\frac{16}{3}bdn\sqrt{d+ex}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-16*b*d*n*Sqrt[d + e*x])/3 - (4*b*n*(d + e*x)^(3/2))/9 + (16*b*d^(3/2)*n*A
rcTanh[Sqrt[d + e*x]/Sqrt[d]])/3 + 2*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt
[d]]^2 + 2*d*Sqrt[d + e*x]*(a + b*Log[c*x^n]) + (2*(d + e*x)^(3/2)*(a + b*L
og[c*x^n]))/3 - 2*d^(3/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n])
 - 4*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] -
Sqrt[d + e*x])] - 2*b*d^(3/2)*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[
d + e*x])]
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2388

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Dist[d, Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x),
 x], x] + Dist[e, Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = d\int \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{x}\,dx + e\int \sqrt{d+ex}\,(a+b\log(cx^n))\,dx$$

$$= \frac{2}{3}(d+ex)^{3/2}(a+b\log(cx^n)) + d^2\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx + (de)\int \frac{a+b\,\mathrm{l}}{\sqrt{d}}$$

$$= -\frac{4}{9}bn(d+ex)^{3/2} + 2d\sqrt{d+ex}\,(a+b\log(cx^n)) + \frac{2}{3}(d+ex)^{3/2}(a+b\,\mathrm{lo}$$

$$= -\frac{16}{3}bdn\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + 2d\sqrt{d+ex}\,(a+b\log(cx^n)) + \frac{2}{3}$$

$$= -\frac{16}{3}bdn\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + 2d\sqrt{d+ex}\,(a+b\log(cx^n)) + \frac{2}{3}$$

$$= -\frac{16}{3}bdn\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + \frac{16}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) +$$

$$= -\frac{16}{3}bdn\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + \frac{16}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) +$$

$$= -\frac{16}{3}bdn\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + \frac{16}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) +$$

$$= -\frac{16}{3}bdn\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + \frac{16}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) +$$

Mathematica [A]
time = 0.18, size = 375, normalized size = 1.47

$$2ad\sqrt{d+ex} - \frac{4}{9}bn(d+ex)^{3/2} + \frac{16}{3}bdn\left(-\sqrt{d+ex} + \sqrt{d}\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right) + 2bd\sqrt{d+ex}\log(cx^n) + \frac{2}{3}(d+ex)^{3/2}(a+b\log(cx^n)) + d^{3/2}(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right) - d^{3/2}(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right) - \frac{1}{2}bd^{3/2}n\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right) + 2\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right) + 2\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + \frac{1}{2}bd^{3/2}n\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right) + 2\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + 2\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] 2*a*d*Sqrt[d + e*x] - (4*b*n*(d + e*x)^(3/2))/9 + (16*b*d*n*(-Sqrt[d + e*x]
 + Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/3 + 2*b*d*Sqrt[d + e*x]*Log[c*x
^n] + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/3 + d^(3/2)*(a + b*Log[c*x^n])
*Log[Sqrt[d] - Sqrt[d + e*x]] - d^(3/2)*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sq
rt[d + e*x]] - (b*d^(3/2)*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d] - Sq
rt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2, 1/2 - S
qrt[d + e*x]/(2*Sqrt[d])]))/2 + (b*d^(3/2)*n*(Log[Sqrt[d] + Sqrt[d + e*x]]*
(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + 2
*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/2
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(ex+d)^{\frac{3}{2}} (a+b\ln(c\,x^n))}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

```
[Out] int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/3*(3*d^(3/2)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) + 2
*(x*e + d)^(3/2) + 6*sqrt(x*e + d)*d)*a + b*integrate((x*e*log(c) + d*log(c
) + (x*e + d)*log(x^n))*sqrt(x*e + d)/x, x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] integral(((b*x*e + b*d)*sqrt(x*e + d)*log(c*x^n) + (a*x*e + a*d)*sqrt(x*e +
 d))/x, x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\,\ln(c\,x^n))\,(d + e\,x)^{3/2}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x,x)
```

```
[Out] int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x, x)
```

3.142 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=259

$$-4ben\sqrt{d+ex}-\frac{bdn\sqrt{d+ex}}{x}+3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+3e\sqrt{d+$$

```
[Out] -(e*x+d)^(3/2)*(a+b*ln(c*x^n))/x+3*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(
1/2)+3*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2*d^(1/2)-3*e*arctanh((e*x+d)^(
1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)-6*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2)
)*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))*d^(1/2)-3*b*e*n*polylog(2,1-2*d^(1/
2)/(d^(1/2)-(e*x+d)^(1/2)))*d^(1/2)-4*b*e*n*(e*x+d)^(1/2)-b*d*n*(e*x+d)^(1/
2)/x+3*e*(a+b*ln(c*x^n))*(e*x+d)^(1/2)
```

Rubi [A]
time = 0.23, antiderivative size = 259, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 10, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {43, 52, 65, 214, 2392, 14, 6131, 6055, 2449, 2352}

$$-3b\sqrt{d}\,en\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}\,(a+b\log(cx^n))-3\sqrt{d}\,e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-4ben\sqrt{d+ex}-\frac{bdn\sqrt{d+ex}}{x}+3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-6b\sqrt{d}\,en\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -4*b*e*n*Sqrt[d + e*x] - (b*d*n*Sqrt[d + e*x])/x + 3*b*Sqrt[d]*e*n*ArcTanh[
Sqrt[d + e*x]/Sqrt[d]] + 3*b*Sqrt[d]*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 +
 3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]) - ((d + e*x)^(3/2)*(a + b*Log[c*x^n])
)/x - 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]) - 6*b*S
qrt[d]*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d
 + e*x])] - 3*b*Sqrt[d]*e*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d +
e*x])]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] && !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) && !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
```

```
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = 3e\sqrt{d+ex}\,(a+b\log(cx^n)) - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x} - 3\sqrt{d}\,e\tan$$

$$= 3e\sqrt{d+ex}\,(a+b\log(cx^n)) - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x} - 3\sqrt{d}\,e\tan$$

$$= 3e\sqrt{d+ex}\,(a+b\log(cx^n)) - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x} - 3\sqrt{d}\,e\tan$$

$$= -4ben\sqrt{d+ex} - \frac{bdn\sqrt{d+ex}}{x} + 3e\sqrt{d+ex}\,(a+b\log(cx^n)) - \frac{(d+}{}$$

$$= -4ben\sqrt{d+ex} - \frac{bdn\sqrt{d+ex}}{x} + 3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2 + 3e$$

$$= -4ben\sqrt{d+ex} - \frac{bdn\sqrt{d+ex}}{x} + 3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 3b$$

$$= -4ben\sqrt{d+ex} - \frac{bdn\sqrt{d+ex}}{x} + 3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 3b$$

$$= -4ben\sqrt{d+ex} - \frac{bdn\sqrt{d+ex}}{x} + 3b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 3b$$

Mathematica [A]
time = 0.24, size = 480, normalized size = 1.85

$$\frac{-4ad\sqrt{d+ex} - 4bdn\sqrt{d+ex} + 8aex\sqrt{d+ex} - 16benx\sqrt{d+ex} + 12b\sqrt{d}\,enx\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) - 4bd\sqrt{d+ex}\,\log(cx^n) + 8bex\sqrt{d+ex}\,\log(cx^n) + 6a\sqrt{d}\,ex\log\left(\sqrt{d}-\sqrt{d+ex}\right) + 6b\sqrt{d}\,ex\log(cx^n)\log\left(\sqrt{d}-\sqrt{d+ex}\right) - 3b\sqrt{d}\,enx\log^2\left(\sqrt{d}-\sqrt{d+ex}\right) - 6a\sqrt{d}\,ex\log\left(\sqrt{d}+\sqrt{d+ex}\right) - 6b\sqrt{d}\,ex\log(cx^n)\log\left(\sqrt{d}+\sqrt{d+ex}\right) + 3b\sqrt{d}\,enx\log^2\left(\sqrt{d}+\sqrt{d+ex}\right) + 6b\sqrt{d}\,enx\log\left(\sqrt{d}+\sqrt{d+ex}\right)\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right) - 6b\sqrt{d}\,enx\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right) - 6b\sqrt{d}\,enx\,\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right) + 6b\sqrt{d}\,enx\,\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{4x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] (-4*a*d*Sqrt[d + e*x] - 4*b*d*n*Sqrt[d + e*x] + 8*a*e*x*Sqrt[d + e*x] - 16*
b*e*n*x*Sqrt[d + e*x] + 12*b*Sqrt[d]*e*n*x*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] -
 4*b*d*Sqrt[d + e*x]*Log[c*x^n] + 8*b*e*x*Sqrt[d + e*x]*Log[c*x^n] + 6*a*Sq
rt[d]*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] + 6*b*Sqrt[d]*e*x*Log[c*x^n]*Log[Sqr
t[d] - Sqrt[d + e*x]] - 3*b*Sqrt[d]*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 -
6*a*Sqrt[d]*e*x*Log[Sqrt[d] + Sqrt[d + e*x]] - 6*b*Sqrt[d]*e*x*Log[c*x^n]*L
og[Sqrt[d] + Sqrt[d + e*x]] + 3*b*Sqrt[d]*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]
]^2 + 6*b*Sqrt[d]*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1/2 - Sqrt[d + e*x
]/(2*Sqrt[d])] - 6*b*Sqrt[d]*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]*Log[(1 + Sq
rt[d + e*x]/Sqrt[d])/2] - 6*b*Sqrt[d]*e*n*x*PolyLog[2, 1/2 - Sqrt[d + e*x]/
(2*Sqrt[d])] + 6*b*Sqrt[d]*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2])
/(4*x)
```

Maple [**F**]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{(ex+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

```
[Out] int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*(3*sqrt(d)*e*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) +
 4*sqrt(x*e + d)*e - 2*sqrt(x*e + d)*d/x)*a + b*integrate((x*e*log(c) + d*l
og(c) + (x*e + d)*log(x^n))*sqrt(x*e + d)/x^2, x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] integral(((b*x*e + b*d)*sqrt(x*e + d)*log(c*x^n) + (a*x*e + a*d)*sqrt(x*e +
 d))/x^2, x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log{(cx^n)})\,(d+ex)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x)**(3/2)/x**2, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a+b\,\ln{(c\,x^n)})\,\,(d+e\,x)^{3/2}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^2,x)
```

```
[Out] int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^2, x)
```

3.143 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=293

$$-\frac{bdn\sqrt{d+ex}}{4x^2}-\frac{11ben\sqrt{d+ex}}{8x}-\frac{9be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8\sqrt{d}}+\frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}\,(}{}$$

```
[Out] -1/2*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2-9/8*b*e^2*n*arctanh((e*x+d)^(1/2)/d^
(1/2))/d^(1/2)+3/4*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(1/2)-3/4*e^2
*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-3/2*b*e^2*n*arctanh
((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-3/4*b
*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-1/4*b*d*n*(e*
x+d)^(1/2)/x^2-11/8*b*e*n*(e*x+d)^(1/2)/x-3/4*e*(a+b*ln(c*x^n))*(e*x+d)^(1/
2)/x
```

Rubi [A]
time = 0.27, antiderivative size = 293, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {43, 65, 214, 2392, 12, 14, 44, 6131, 6055, 2449, 2352}

$$-\frac{3be^2n\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4\sqrt{d}}-\frac{3e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4\sqrt{d}}-\frac{9be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8\sqrt{d}}-\frac{3be^2n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{2\sqrt{d}}-\frac{bdn\sqrt{d+ex}}{4x^2}-\frac{11ben\sqrt{d+ex}}{8x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d*n*Sqrt[d + e*x])/x^2 - (11*b*e*n*Sqrt[d + e*x])/(8*x) - (9*b*e^2*
n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(8*Sqrt[d]) + (3*b*e^2*n*ArcTanh[Sqrt[d +
 e*x]/Sqrt[d]]^2)/(4*Sqrt[d]) - (3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(4*x
) - ((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(2*x^2) - (3*e^2*ArcTanh[Sqrt[d +
e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/(4*Sqrt[d]) - (3*b*e^2*n*ArcTanh[Sqrt[d +
 e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/(2*Sqrt[d]) - (3
*b*e^2*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/(4*Sqrt[d])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
```

```
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = -\frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4x} - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2} - \frac{3e^2\tanh}{}$$

$$= -\frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4x} - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2} - \frac{3e^2\tanh}{}$$

$$= -\frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4x} - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2} - \frac{3e^2\tanh}{}$$

$$= -\frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4x} - \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2} - \frac{3e^2\tanh}{}$$

$$= -\frac{bdn\sqrt{d+ex}}{4x^2} - \frac{5ben\sqrt{d+ex}}{4x} - \frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4x} - \frac{(d+}{}$$

$$= -\frac{bdn\sqrt{d+ex}}{4x^2} - \frac{11ben\sqrt{d+ex}}{8x} + \frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4\sqrt{d}} - \frac{3e}{}$$

$$= -\frac{bdn\sqrt{d+ex}}{4x^2} - \frac{11ben\sqrt{d+ex}}{8x} - \frac{5be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{4\sqrt{d}} + \frac{3be^2}{}$$

$$= -\frac{bdn\sqrt{d+ex}}{4x^2} - \frac{11ben\sqrt{d+ex}}{8x} - \frac{9be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8\sqrt{d}} + \frac{3be^2}{}$$

$$= -\frac{bdn\sqrt{d+ex}}{4x^2} - \frac{11ben\sqrt{d+ex}}{8x} - \frac{9be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8\sqrt{d}} + \frac{3be^2}{}$$

Mathematica [A]
time = 0.41, size = 501, normalized size = 1.71

$$-\frac{8ad^{3/2}\sqrt{d+ex}+4bd^{3/2}n\sqrt{d+ex}+20a\sqrt{d}\,ex\sqrt{d+ex}+22b\sqrt{d}\,enx\sqrt{d+ex}+18be^2nx^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8bd^{3/2}\sqrt{d+ex}\log(cx^n)+20b\sqrt{d}\,ex\sqrt{d+ex}\log(cx^n)-6ae^2x^2\log\left(\sqrt{d}-\sqrt{d+ex}\right)-6be^2x^2\log(cx^n)\log\left(\sqrt{d}-\sqrt{d+ex}\right)+3be^2nx^2\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)+6ae^2x^2\log\left(\sqrt{d}+\sqrt{d+ex}\right)+6be^2x^2\log(cx^n)\log\left(\sqrt{d}+\sqrt{d+ex}\right)-3be^2nx^2\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)-6be^2nx^2\log\left(\sqrt{d}+\sqrt{d+ex}\right)\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)+6be^2nx^2\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+6be^2nx^2\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)-6be^2nx^2\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{16\sqrt{d}\,x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/16*(8*a*d^(3/2)*Sqrt[d + e*x] + 4*b*d^(3/2)*n*Sqrt[d + e*x] + 20*a*Sqrt[
d]*e*x*Sqrt[d + e*x] + 22*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 18*b*e^2*n*x^2*Ar
cTanh[Sqrt[d + e*x]/Sqrt[d]] + 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 20*b*
Sqrt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] - 6*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e
*x]] - 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] + 3*b*e^2*n*x^2*
Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 6*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]] +
 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] - 3*b*e^2*n*x^2*Log[Sq
rt[d] + Sqrt[d + e*x]]^2 - 6*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] + 6*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d + e*x]
]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] + 6*b*e^2*n*x^2*PolyLog[2, 1/2 - Sqrt[
d + e*x]/(2*Sqrt[d])] - 6*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d]
)/2])/(Sqrt[d]*x^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

```
[Out] int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] 1/8*(3*e^2*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/sqrt(d)
 - 2*(5*(x*e + d)^(3/2)*e^2 - 3*sqrt(x*e + d)*d*e^2)/((x*e + d)^2 - 2*(x*e
+ d)*d + d^2))*a + b*integrate((x*e*log(c) + d*log(c) + (x*e + d)*log(x^n))
*sqrt(x*e + d)/x^3, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] integral(((b*x*e + b*d)*sqrt(x*e + d)*log(c*x^n) + (a*x*e + a*d)*sqrt(x*e +
 d))/x^3, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b \log (cx^n)) (d + ex)^{\frac{3}{2}}}{x^3} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x)**(3/2)/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] integrate((x*e + d)^(3/2)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b \ln (c\,x^n))\,(d + e\,x)^{3/2}}{x^3} \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^3,x)
```

```
[Out] int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^3, x)
```

3.144 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

Optimal. Leaf size=217

$$\frac{64bd^3n\sqrt{d+ex}}{35e^4}-\frac{76bd^2n(d+ex)^{3/2}}{105e^4}+\frac{64bdn(d+ex)^{5/2}}{175e^4}-\frac{4bn(d+ex)^{7/2}}{49e^4}-\frac{64bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^4}-$$

```
[Out] -76/105*b*d^2*n*(e*x+d)^(3/2)/e^4+64/175*b*d*n*(e*x+d)^(5/2)/e^4-4/49*b*n*(
e*x+d)^(7/2)/e^4-64/35*b*d^(7/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^4+2*d^2
*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4-6/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+
2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^4+64/35*b*d^3*n*(e*x+d)^(1/2)/e^4-2*d^3
*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^4
```

Rubi [A]
time = 0.14, antiderivative size = 217, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {45, 2392, 12, 1634, 52, 65, 214}

$$-\frac{2d^3\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}\,(a+b\log(cx^n))}{e^4}-\frac{6d(d+ex)^{5/2}\,(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{7/2}\,(a+b\log(cx^n))}{7e^4}-\frac{64bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^4}+\frac{64bd^3n\sqrt{d+ex}}{35e^4}-\frac{76bd^2n(d+ex)^{3/2}}{105e^4}+\frac{64bdn(d+ex)^{5/2}}{175e^4}-\frac{4bn(d+ex)^{7/2}}{49e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

```
[Out] (64*b*d^3*n*Sqrt[d + e*x])/(35*e^4) - (76*b*d^2*n*(d + e*x)^(3/2))/(105*e^4
) + (64*b*d*n*(d + e*x)^(5/2))/(175*e^4) - (4*b*n*(d + e*x)^(7/2))/(49*e^4)
 - (64*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(35*e^4) - (2*d^3*Sqrt[d
 + e*x]*(a + b*Log[c*x^n]))/e^4 + (2*d^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n])
)/e^4 - (6*d*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4) + (2*(d + e*x)^(7/
2)*(a + b*Log[c*x^n]))/(7*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 1634

```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2]) && GtQ[E
xpon[Px, x], 2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{2d^3\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4} + \frac{2d^2(d+ex)^{3/2}\,(a+b\log(cx^n))}{e^4} - \frac{6d(d+ex)}{}$$

$$= -\frac{2d^3\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4} + \frac{2d^2(d+ex)^{3/2}\,(a+b\log(cx^n))}{e^4} - \frac{6d(d+ex)}{}$$

$$= -\frac{2d^3\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4} + \frac{2d^2(d+ex)^{3/2}\,(a+b\log(cx^n))}{e^4} - \frac{6d(d+ex)}{}$$

$$= -\frac{76bd^2n(d+ex)^{3/2}}{105e^4} + \frac{64bdn(d+ex)^{5/2}}{175e^4} - \frac{4bn(d+ex)^{7/2}}{49e^4} - \frac{2d^3\sqrt{d+ex}\,(a+}{e^4}$$

$$= \frac{64bd^3n\sqrt{d+ex}}{35e^4} - \frac{76bd^2n(d+ex)^{3/2}}{105e^4} + \frac{64bdn(d+ex)^{5/2}}{175e^4} - \frac{4bn(d+ex)^{7/2}}{49e^4} -$$

$$= \frac{64bd^3n\sqrt{d+ex}}{35e^4} - \frac{76bd^2n(d+ex)^{3/2}}{105e^4} + \frac{64bdn(d+ex)^{5/2}}{175e^4} - \frac{4bn(d+ex)^{7/2}}{49e^4} -$$

$$= \frac{64bd^3n\sqrt{d+ex}}{35e^4} - \frac{76bd^2n(d+ex)^{3/2}}{105e^4} + \frac{64bdn(d+ex)^{5/2}}{175e^4} - \frac{4bn(d+ex)^{7/2}}{49e^4} -$$

Mathematica [A]
time = 0.16, size = 150, normalized size = 0.69

$$-\frac{2\left(3360bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}\,(105a(16d^3-8d^2ex+6de^2x^2-5e^3x^3)+2bn(-1276d^3+218d^2ex-111de^2x^2+75e^3x^3)+105b(16d^3-8d^2ex+6de^2x^2-5e^3x^3)\log(cx^n))\right)}{3675e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

```
[Out] (-2*(3360*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(105*a
*(16*d^3 - 8*d^2*e*x + 6*d*e^2*x^2 - 5*e^3*x^3) + 2*b*n*(-1276*d^3 + 218*d^
2*e*x - 111*d*e^2*x^2 + 75*e^3*x^3) + 105*b*(16*d^3 - 8*d^2*e*x + 6*d*e^2*x
^2 - 5*e^3*x^3)*Log[c*x^n])))/(3675*e^4)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.50, size = 219, normalized size = 1.01

$$\frac{4}{3675}\left(840\,d^{\frac{7}{2}}e^{(-4)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left(75\,(xe+d)^{\frac{7}{2}}-336\,(xe+d)^{\frac{5}{2}}d+665\,(xe+d)^{\frac{3}{2}}d^{2}-1680\,\sqrt{xe+d}\,d^{3}\right)e^{(-4)}\right)bn+\frac{2}{35}\left(5\,(xe+d)^{\frac{7}{2}}e^{(-4)}-21\,(xe+d)^{\frac{5}{2}}de^{(-4)}+35\,(xe+d)^{\frac{3}{2}}d^{2}e^{(-4)}-35\,\sqrt{xe+d}\,d^{3}e^{(-4)}\right)b\log\left(cx^{n}\right)+\frac{2}{35}\left(5\,(xe+d)^{\frac{7}{2}}e^{(-4)}-21\,(xe+d)^{\frac{5}{2}}de^{(-4)}+35\,(xe+d)^{\frac{3}{2}}d^{2}e^{(-4)}-35\,\sqrt{xe+d}\,d^{3}e^{(-4)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 4/3675*(840*d^(7/2)*e^(-4)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + s
qrt(d))) - (75*(x*e + d)^(7/2) - 336*(x*e + d)^(5/2)*d + 665*(x*e + d)^(3/2
)*d^2 - 1680*sqrt(x*e + d)*d^3)*e^(-4))*b*n + 2/35*(5*(x*e + d)^(7/2)*e^(-4
) - 21*(x*e + d)^(5/2)*d*e^(-4) + 35*(x*e + d)^(3/2)*d^2*e^(-4) - 35*sqrt(x
*e + d)*d^3*e^(-4))*b*log(c*x^n) + 2/35*(5*(x*e + d)^(7/2)*e^(-4) - 21*(x*e
 + d)^(5/2)*d*e^(-4) + 35*(x*e + d)^(3/2)*d^2*e^(-4) - 35*sqrt(x*e + d)*d^3
*e^(-4))*a
```

Fricas [A]
time = 0.39, size = 378, normalized size = 1.74

$$\left[\frac{2}{3675}\left(1680\,bd^{\frac{7}{2}}n\log\left(\frac{xe-2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)+\left(2552\,bd^{3}n-75\,(2\,bn-7\,a)x^{3}e^{3}-1680\,ad^{3}+6\,(37\,bdn-105\,ad)x^{2}e^{2}-4\,(109\,bd^{2}n-210\,ad^{2})xe+105\,(5\,bx^{3}e^{3}-6\,bdx^{2}e^{2}+8\,bd^{2}xe-16\,bd^{3})\log(c)+105\,(5\,bnx^{3}e^{3}-6\,bdnx^{2}e^{2}+8\,bd^{2}nxe-16\,bd^{3}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-4)},\ \frac{2}{3675}\left(3360\,b\sqrt{-d}\,d^{3}n\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+\left(2552\,bd^{3}n-75\,(2\,bn-7\,a)x^{3}e^{3}-1680\,ad^{3}+6\,(37\,bdn-105\,ad)x^{2}e^{2}-4\,(109\,bd^{2}n-210\,ad^{2})xe+105\,(5\,bx^{3}e^{3}-6\,bdx^{2}e^{2}+8\,bd^{2}xe-16\,bd^{3})\log(c)+105\,(5\,bnx^{3}e^{3}-6\,bdnx^{2}e^{2}+8\,bd^{2}nxe-16\,bd^{3}n)\log(x)\right)\sqrt{xe+d}\right)e^{(-4)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [2/3675*(1680*b*d^(7/2)*n*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) + (2
552*b*d^3*n - 75*(2*b*n - 7*a)*x^3*e^3 - 1680*a*d^3 + 6*(37*b*d*n - 105*a*d
)*x^2*e^2 - 4*(109*b*d^2*n - 210*a*d^2)*x*e + 105*(5*b*x^3*e^3 - 6*b*d*x^2*
e^2 + 8*b*d^2*x*e - 16*b*d^3)*log(c) + 105*(5*b*n*x^3*e^3 - 6*b*d*n*x^2*e^2
 + 8*b*d^2*n*x*e - 16*b*d^3*n)*log(x))*sqrt(x*e + d))*e^(-4), 2/3675*(3360*
b*sqrt(-d)*d^3*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (2552*b*d^3*n - 75*(2*b
*n - 7*a)*x^3*e^3 - 1680*a*d^3 + 6*(37*b*d*n - 105*a*d)*x^2*e^2 - 4*(109*b*
d^2*n - 210*a*d^2)*x*e + 105*(5*b*x^3*e^3 - 6*b*d*x^2*e^2 + 8*b*d^2*x*e - 1
6*b*d^3)*log(c) + 105*(5*b*n*x^3*e^3 - 6*b*d*n*x^2*e^2 + 8*b*d^2*n*x*e - 16
*b*d^3*n)*log(x))*sqrt(x*e + d))*e^(-4)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 986 vs. $2(219) = 438$.
time = 171.41, size = 986, normalized size = 4.54

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

```
[Out] Piecewise(((-2*a*d*(-d**3/sqrt(d + e*x) - 3*d**2*sqrt(d + e*x) + d*(d + e*x
)**(3/2) - (d + e*x)**(5/2)/5)/e**3 - 2*a*(d**4/sqrt(d + e*x) + 4*d**3*sqrt
(d + e*x) - 2*d**2*(d + e*x)**(3/2) + 4*d*(d + e*x)**(5/2)/5 - (d + e*x)**(
7/2)/7)/e**3 - 2*b*d*(-d**3*(log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x) -
 2*n*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/(d*sqrt(-1/d))) + 3*d**2*(-sqrt(d +
 e*x)*log(c*(-d/e + (d + e*x)/e)**n) - 2*n*(-e*sqrt(d + e*x) - e*atan(1/(sq
rt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d))/e) - 3*d*(-(d + e*x)**(3/2)*log(c*(-d/
e + (d + e*x)/e)**n)/3 - 2*n*(-d*e*sqrt(d + e*x) - d*e*atan(1/(sqrt(-1/d)*s
qrt(d + e*x)))/sqrt(-1/d) - e*(d + e*x)**(3/2)/3)/(3*e)) - (d + e*x)**(5/2)
*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(-d**2*e*sqrt(d + e*x) - d**2*e*ata
n(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d) - d*e*(d + e*x)**(3/2)/3 - e*(d
+ e*x)**(5/2)/5)/(5*e))/e**3 - 2*b*(d**4*(log(c*(-d/e + (d + e*x)/e)**n)/sq
rt(d + e*x) - 2*n*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/(d*sqrt(-1/d))) - 4*d*
*3*(-sqrt(d + e*x)*log(c*(-d/e + (d + e*x)/e)**n) - 2*n*(-e*sqrt(d + e*x) -
 e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d))/e) + 6*d**2*(-(d + e*x)**
(3/2)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(-d*e*sqrt(d + e*x) - d*e*atan
(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d) - e*(d + e*x)**(3/2)/3)/(3*e)) -
4*d*(-(d + e*x)**(5/2)*log(c*(-d/e + (d + e*x)/e)**n)/5 - 2*n*(-d**2*e*sqrt
(d + e*x) - d**2*e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d) - d*e*(d +
 e*x)**(3/2)/3 - e*(d + e*x)**(5/2)/5)/(5*e)) - (d + e*x)**(7/2)*log(c*(-d/
e + (d + e*x)/e)**n)/7 - 2*n*(-d**3*e*sqrt(d + e*x) - d**3*e*atan(1/(sqrt(-
1/d)*sqrt(d + e*x)))/sqrt(-1/d) - d**2*e*(d + e*x)**(3/2)/3 - d*e*(d + e*x)
**(5/2)/5 - e*(d + e*x)**(7/2)/7)/(7*e))/e**3)/e, Ne(e, 0)), ((a*x**4/4 + b
*(-n*x**4/16 + x**4*log(c*x**n)/4))/sqrt(d), True))
```

Giac [A]
time = 11.06, size = 275, normalized size = 1.27

$$\frac{64\,bd^4n\arctan\left(\frac{\sqrt{xe+d}}{\sqrt{-d}}\right)e^{(-4)}}{35\,\sqrt{-d}}+\frac{2}{3675}\left(525\,(xe+d)^{\frac{7}{2}}bn\log(xe)-2205\,(xe+d)^{\frac{5}{2}}bdn\log(xe)+3675\,(xe+d)^{\frac{3}{2}}bd^2n\log(xe)-3675\,\sqrt{xe+d}\,bd^3n\log(xe)-675\,(xe+d)^{\frac{7}{2}}bn+2877\,(xe+d)^{\frac{5}{2}}bdn-5005\,(xe+d)^{\frac{3}{2}}bd^2n+7035\,\sqrt{xe+d}\,bd^3n+525\,(xe+d)^{\frac{7}{2}}b\log(c)-2205\,(xe+d)^{\frac{5}{2}}bd\log(c)+3675\,(xe+d)^{\frac{3}{2}}bd^2\log(c)-3675\,\sqrt{xe+d}\,bd^3\log(c)+525\,(xe+d)^{\frac{7}{2}}a-2205\,(xe+d)^{\frac{5}{2}}ad+3675\,(xe+d)^{\frac{3}{2}}ad^2-3675\,\sqrt{xe+d}\,ad^3\right)e^{(-4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] 64/35*b*d^4*n*arctan(sqrt(x*e + d)/sqrt(-d))*e^(-4)/sqrt(-d) + 2/3675*(525*
(x*e + d)^(7/2)*b*n*log(x*e) - 2205*(x*e + d)^(5/2)*b*d*n*log(x*e) + 3675*(
x*e + d)^(3/2)*b*d^2*n*log(x*e) - 3675*sqrt(x*e + d)*b*d^3*n*log(x*e) - 675
*(x*e + d)^(7/2)*b*n + 2877*(x*e + d)^(5/2)*b*d*n - 5005*(x*e + d)^(3/2)*b*
d^2*n + 7035*sqrt(x*e + d)*b*d^3*n + 525*(x*e + d)^(7/2)*b*log(c) - 2205*(x
*e + d)^(5/2)*b*d*log(c) + 3675*(x*e + d)^(3/2)*b*d^2*log(c) - 3675*sqrt(x*
e + d)*b*d^3*log(c) + 525*(x*e + d)^(7/2)*a - 2205*(x*e + d)^(5/2)*a*d + 36
75*(x*e + d)^(3/2)*a*d^2 - 3675*sqrt(x*e + d)*a*d^3)*e^(-4)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{d+e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

3.145 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

Optimal. Leaf size=169

$$-\frac{32bd^2n\sqrt{d+ex}}{15e^3}+\frac{28bdn(d+ex)^{3/2}}{45e^3}-\frac{4bn(d+ex)^{5/2}}{25e^3}+\frac{32bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^3}+\frac{2d^2\sqrt{d+ex}\,(a+}{e^3}$$

```
[Out] 28/45*b*d*n*(e*x+d)^(3/2)/e^3-4/25*b*n*(e*x+d)^(5/2)/e^3+32/15*b*d^(5/2)*n*
arctanh((e*x+d)^(1/2)/d^(1/2))/e^3-4/3*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3+
2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3-32/15*b*d^2*n*(e*x+d)^(1/2)/e^3+2*d^2
*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^3
```

Rubi [A]
time = 0.12, antiderivative size = 169, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {45, 2392, 12, 911, 1275, 214}

$$\frac{2d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{32bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^3}-\frac{32bd^2n\sqrt{d+ex}}{15e^3}+\frac{28bdn(d+ex)^{3/2}}{45e^3}-\frac{4bn(d+ex)^{5/2}}{25e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

```
[Out] (-32*b*d^2*n*Sqrt[d + e*x])/(15*e^3) + (28*b*d*n*(d + e*x)^(3/2))/(45*e^3)
- (4*b*n*(d + e*x)^(5/2))/(25*e^3) + (32*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/
Sqrt[d]])/(15*e^3) + (2*d^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^3 - (4*d*(d
 + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3) + (2*(d + e*x)^(5/2)*(a + b*Log[c
*x^n]))/(5*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{2d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} - \frac{4d(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e^3} + \frac{2(d+ex)^{5/2}\,(}{5}$$

$$= \frac{2d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} - \frac{4d(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e^3} + \frac{2(d+ex)^{5/2}\,(}{5}$$

$$= \frac{2d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} - \frac{4d(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e^3} + \frac{2(d+ex)^{5/2}\,(}{5}$$

$$= \frac{2d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} - \frac{4d(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e^3} + \frac{2(d+ex)^{5/2}\,(}{5}$$

$$= -\frac{32bd^2n\sqrt{d+ex}}{15e^3} + \frac{28bdn(d+ex)^{3/2}}{45e^3} - \frac{4bn(d+ex)^{5/2}}{25e^3} + \frac{2d^2\sqrt{d+ex}\,(a+b}{e^3}$$

$$= -\frac{32bd^2n\sqrt{d+ex}}{15e^3} + \frac{28bdn(d+ex)^{3/2}}{45e^3} - \frac{4bn(d+ex)^{5/2}}{25e^3} + \frac{32bd^{5/2}n\tanh^{-1}\left(\right.}{15e^3}$$

Mathematica [A]
time = 0.12, size = 118, normalized size = 0.70

$$\frac{480bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2\sqrt{d+ex}\,(15a(8d^2-4dex+3e^2x^2) - 2bn(94d^2-17dex+9e^2x^2) + 15b(8d^2-4dex+3e^2x^2)\log(cx^n))}{225e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

```
[Out] (480*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(15*a*(8*
d^2 - 4*d*e*x + 3*e^2*x^2) - 2*b*n*(94*d^2 - 17*d*e*x + 9*e^2*x^2) + 15*b*(
8*d^2 - 4*d*e*x + 3*e^2*x^2)*Log[c*x^n]))/(225*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.49, size = 175, normalized size = 1.04

$$-\frac{4}{225}\left(60\, d^{\frac{5}{2}} e^{(-3)} \log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right) + \left(9\,(xe+d)^{\frac{5}{2}} - 35\,(xe+d)^{\frac{3}{2}} d + 120\,\sqrt{xe+d}\, d^2\right) e^{(-3)}\right) bn + \frac{2}{15}\left(3\,(xe+d)^{\frac{5}{2}} e^{(-3)} - 10\,(xe+d)^{\frac{3}{2}} d e^{(-3)} + 15\,\sqrt{xe+d}\, d^2 e^{(-3)}\right) b \log\left(cx^n\right) + \frac{2}{15}\left(3\,(xe+d)^{\frac{5}{2}} e^{(-3)} - 10\,(xe+d)^{\frac{3}{2}} d e^{(-3)} + 15\,\sqrt{xe+d}\, d^2 e^{(-3)}\right) a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -4/225*(60*d^(5/2)*e^(-3)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sq
rt(d))) + (9*(x*e + d)^(5/2) - 35*(x*e + d)^(3/2)*d + 120*sqrt(x*e + d)*d^2
)*e^(-3))*b*n + 2/15*(3*(x*e + d)^(5/2)*e^(-3) - 10*(x*e + d)^(3/2)*d*e^(-3
) + 15*sqrt(x*e + d)*d^2*e^(-3))*b*log(c*x^n) + 2/15*(3*(x*e + d)^(5/2)*e^(
-3) - 10*(x*e + d)^(3/2)*d*e^(-3) + 15*sqrt(x*e + d)*d^2*e^(-3))*a
```

Fricas [A]
time = 0.40, size = 291, normalized size = 1.72

$$\left[\frac{2}{225}\left(120\, b d^{\frac{5}{2}} n \log\left(\frac{xe + 2\sqrt{xe+d}\sqrt{d} + 2d}{x}\right) - \left(188\, b d^2 n + 9\,(2\, bn - 5\, a) x^2 e^2 - 120\, a d^2 - 2\,(17\, b d n - 30\, a d) x e - 15\,(3\, b x^2 e^2 - 4\, b d x e + 8\, b d^2) \log(c) - 15\,(3\, b n x^2 e^2 - 4\, b d n x e + 8\, b d^2 n) \log(x)\right)\sqrt{xe+d}\right) e^{(-3)}, -\frac{2}{225}\left(240\, b \sqrt{-d}\, d^2 n \arctan\left(\frac{\sqrt{xe+d}\sqrt{-d}}{d}\right) + \left(188\, b d^2 n + 9\,(2\, bn - 5\, a) x^2 e^2 - 120\, a d^2 - 2\,(17\, b d n - 30\, a d) x e - 15\,(3\, b x^2 e^2 - 4\, b d x e + 8\, b d^2) \log(c) - 15\,(3\, b n x^2 e^2 - 4\, b d n x e + 8\, b d^2 n) \log(x)\right)\sqrt{xe+d}\right) e^{(-3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [2/225*(120*b*d^(5/2)*n*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) - (188
*b*d^2*n + 9*(2*b*n - 5*a)*x^2*e^2 - 120*a*d^2 - 2*(17*b*d*n - 30*a*d)*x*e
 - 15*(3*b*x^2*e^2 - 4*b*d*x*e + 8*b*d^2)*log(c) - 15*(3*b*n*x^2*e^2 - 4*b*d
*n*x*e + 8*b*d^2*n)*log(x))*sqrt(x*e + d))*e^(-3), -2/225*(240*b*sqrt(-d)*d
^2*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (188*b*d^2*n + 9*(2*b*n - 5*a)*x^2*
e^2 - 120*a*d^2 - 2*(17*b*d*n - 30*a*d)*x*e - 15*(3*b*x^2*e^2 - 4*b*d*x*e +
 8*b*d^2)*log(c) - 15*(3*b*n*x^2*e^2 - 4*b*d*n*x*e + 8*b*d^2*n)*log(x))*sqr
t(x*e + d))*e^(-3)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 714 vs. $2(170) = 340$.
time = 122.51, size = 714, normalized size = 4.22

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

```
[Out] Piecewise(((-2*a*d*(d**2/sqrt(d + e*x) + 2*d*sqrt(d + e*x) - (d + e*x)**(3/
2)/3)/e**2 - 2*a*(-d**3/sqrt(d + e*x) - 3*d**2*sqrt(d + e*x) + d*(d + e*x)*
*(3/2) - (d + e*x)**(5/2)/5)/e**2 - 2*b*d*(d**2*(log(c*(-d/e + (d + e*x)/e)
**n)/sqrt(d + e*x) - 2*n*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/(d*sqrt(-1/d))
```

```
 - 2*d*(-sqrt(d + e*x)*log(c*(-d/e + (d + e*x)/e)**n) - 2*n*(-e*sqrt(d + e*
x) - e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d))/e) - (d + e*x)**(3/2)
*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(-d*e*sqrt(d + e*x) - d*e*atan(1/(s
qrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d) - e*(d + e*x)**(3/2)/3)/(3*e))/e**2 -
2*b*(-d**3*(log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x) - 2*n*atan(1/(sqrt
(-1/d)*sqrt(d + e*x)))/(d*sqrt(-1/d))) + 3*d**2*(-sqrt(d + e*x)*log(c*(-d/e
 + (d + e*x)/e)**n) - 2*n*(-e*sqrt(d + e*x) - e*atan(1/(sqrt(-1/d)*sqrt(d +
 e*x)))/sqrt(-1/d))/e) - 3*d*(-(d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)*
*n)/3 - 2*n*(-d*e*sqrt(d + e*x) - d*e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/sq
rt(-1/d) - e*(d + e*x)**(3/2)/3)/(3*e)) - (d + e*x)**(5/2)*log(c*(-d/e + (d
 + e*x)/e)**n)/5 - 2*n*(-d**2*e*sqrt(d + e*x) - d**2*e*atan(1/(sqrt(-1/d)*s
qrt(d + e*x)))/sqrt(-1/d) - d*e*(d + e*x)**(3/2)/3 - e*(d + e*x)**(5/2)/5)/
(5*e))/e**2)/e, Ne(e, 0)), ((a*x**3/3 + b*(-n*x**3/9 + x**3*log(c*x**n)/3))
/sqrt(d), True))
```

Giac [A]
time = 5.97, size = 210, normalized size = 1.24

$$-\frac{32 \, b d^{3} n \arctan\left(\frac{\sqrt{x e + d}}{\sqrt{-d}}\right) e^{\left(-3\right)}}{15 \, \sqrt{-d}} + \frac{2}{225} \, {\left(45 \, {\left(x e + d\right)}^{\frac{5}{2}} b n \log\left(x e\right) - 150 \, {\left(x e + d\right)}^{\frac{3}{2}} b d n \log\left(x e\right) + 225 \, \sqrt{x e + d} b d^{2} n \log\left(x e\right) - 63 \, {\left(x e + d\right)}^{\frac{5}{2}} b n + 220 \, {\left(x e + d\right)}^{\frac{3}{2}} b d n - 465 \, \sqrt{x e + d} b d^{2} n + 45 \, {\left(x e + d\right)}^{\frac{5}{2}} b \log\left(c\right) - 150 \, {\left(x e + d\right)}^{\frac{3}{2}} b d \log\left(c\right) + 225 \, \sqrt{x e + d} b d^{2} \log\left(c\right) + 45 \, {\left(x e + d\right)}^{\frac{5}{2}} a - 150 \, {\left(x e + d\right)}^{\frac{3}{2}} a d + 225 \, \sqrt{x e + d} a d^{2}\right)} e^{\left(-3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] -32/15*b*d^3*n*arctan(sqrt(x*e + d)/sqrt(-d))*e^(-3)/sqrt(-d) + 2/225*(45*(
x*e + d)^(5/2)*b*n*log(x*e) - 150*(x*e + d)^(3/2)*b*d*n*log(x*e) + 225*sqrt
(x*e + d)*b*d^2*n*log(x*e) - 63*(x*e + d)^(5/2)*b*n + 220*(x*e + d)^(3/2)*b
*d*n - 465*sqrt(x*e + d)*b*d^2*n + 45*(x*e + d)^(5/2)*b*log(c) - 150*(x*e +
 d)^(3/2)*b*d*log(c) + 225*sqrt(x*e + d)*b*d^2*log(c) + 45*(x*e + d)^(5/2)*
a - 150*(x*e + d)^(3/2)*a*d + 225*sqrt(x*e + d)*a*d^2)*e^(-3)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{d+e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

3.146 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

Optimal. Leaf size=119

$$\frac{8bdn\sqrt{d+ex}}{3e^2}-\frac{4bn(d+ex)^{3/2}}{9e^2}-\frac{8bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^2}-\frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2}+\frac{2(d+ex)^{3/2}\,(}{3}$$

```
[Out] -4/9*b*n*(e*x+d)^(3/2)/e^2-8/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e
^2+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^2+8/3*b*d*n*(e*x+d)^(1/2)/e^2-2*d*(a
+b*ln(c*x^n))*(e*x+d)^(1/2)/e^2
```

Rubi [A]
time = 0.06, antiderivative size = 119, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {45, 2392, 12, 81, 52, 65, 214}

$$-\frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2}+\frac{2(d+ex)^{3/2}\,(a+b\log(cx^n))}{3e^2}-\frac{8bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^2}+\frac{8bdn\sqrt{d+ex}}{3e^2}-\frac{4bn(d+ex)^{3/2}}{9e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

```
[Out] (8*b*d*n*Sqrt[d + e*x])/(3*e^2) - (4*b*n*(d + e*x)^(3/2))/(9*e^2) - (8*b*d^
(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(3*e^2) - (2*d*Sqrt[d + e*x]*(a + b
*Log[c*x^n]))/e^2 + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
```

```
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2} - (bn)\int \frac{2(-2d+\cdots}{\cdots}$$

$$= -\frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2} - \frac{(2bn)\int \frac{(-2d+ex)\cdots}{\cdots}}{3e^2}\cdots$$

$$= -\frac{4bn(d+ex)^{3/2}}{9e^2} - \frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2} \cdots$$

$$= \frac{8bdn\sqrt{d+ex}}{3e^2} - \frac{4bn(d+ex)^{3/2}}{9e^2} - \frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} + \frac{2(d+ex)^{3/2}(\cdots}{3\cdots}$$

$$= \frac{8bdn\sqrt{d+ex}}{3e^2} - \frac{4bn(d+ex)^{3/2}}{9e^2} - \frac{2d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} + \frac{2(d+ex)^{3/2}(\cdots}{3\cdots}$$

$$= \frac{8bdn\sqrt{d+ex}}{3e^2} - \frac{4bn(d+ex)^{3/2}}{9e^2} - \frac{8bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^2} - \frac{2d\sqrt{d+ex}\,(\cdots}{e\cdots}$$

Mathematica [A]
time = 0.08, size = 80, normalized size = 0.67

$$-\frac{2\left(12bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}\,(6ad-10bdn-3aex+2benx+b(6d-3ex)\log(cx^n))\right)}{9e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

```
[Out] (-2*(12*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(6*a*d -
 10*b*d*n - 3*a*e*x + 2*b*e*n*x + b*(6*d - 3*e*x)*Log[c*x^n])))/(9*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^n))}{\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.49, size = 129, normalized size = 1.08

$$\frac{4}{9}\left(3\,d^{\frac{3}{2}}e^{(-2)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left((xe+d)^{\frac{3}{2}}-6\sqrt{xe+d}\,d\right)e^{(-2)}\right)bn+\frac{2}{3}\left((xe+d)^{\frac{3}{2}}e^{(-2)}-3\sqrt{xe+d}\,de^{(-2)}\right)b\log(cx^n)+\frac{2}{3}\left((xe+d)^{\frac{3}{2}}e^{(-2)}-3\sqrt{xe+d}\,de^{(-2)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")

[Out] 4/9*(3*d^(3/2)*e^(-2)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) - ((x*e + d)^(3/2) - 6*sqrt(x*e + d)*d)*e^(-2))*b*n + 2/3*((x*e + d)^(3 /2)*e^(-2) - 3*sqrt(x*e + d)*d*e^(-2))*b*log(c*x^n) + 2/3*((x*e + d)^(3/2)* e^(-2) - 3*sqrt(x*e + d)*d*e^(-2))*a

Fricas [A]
time = 0.39, size = 196, normalized size = 1.65

$$\left[\frac{2}{9}\left(6\,bd^{\frac{3}{2}}n\log\left(\frac{xe-2\sqrt{xe+d}\sqrt{d}+2\,d}{x}\right)+(10\,bdn-(2\,bn-3\,a)xe-6\,ad+3\,(bxe-2\,bd)\log\left(c\right)+3\,(bnxe-2\,bdn)\log\left(x\right))\sqrt{xe+d}\right)e^{(-2)},\ \frac{2}{9}\left(12\,b\sqrt{-d}\,dn\arctan\left(\frac{\sqrt{xe+d}\sqrt{-d}}{d}\right)+(10\,bdn-(2\,bn-3\,a)xe-6\,ad+3\,(bxe-2\,bd)\log\left(c\right)+3\,(bnxe-2\,bdn)\log\left(x\right))\sqrt{xe+d}\right)e^{(-2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")

[Out] [2/9*(6*b*d^(3/2)*n*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) + (10*b*d* n - (2*b*n - 3*a)*x*e - 6*a*d + 3*(b*x*e - 2*b*d)*log(c) + 3*(b*n*x*e - 2*b *d*n)*log(x))*sqrt(x*e + d))*e^(-2), 2/9*(12*b*sqrt(-d)*d*n*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (10*b*d*n - (2*b*n - 3*a)*x*e - 6*a*d + 3*(b*x*e - 2*b* d)*log(c) + 3*(b*n*x*e - 2*b*d*n)*log(x))*sqrt(x*e + d))*e^(-2)]

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 473 vs. $2(119) = 238$.
time = 75.62, size = 473, normalized size = 3.97

$$\begin{cases} \frac{-\frac{2ad\left(-\frac{d}{\sqrt{d+ex}}-\sqrt{d+ex}\right)}{e}-\frac{2a\left(\frac{d^{2}}{\sqrt{d+ex}}+2d\sqrt{d+ex}-\frac{(d+ex)^{\frac{3}{2}}}{3}\right)}{e}-\frac{2bd\left(-d\left(\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{\sqrt{d+ex}}-\frac{2n\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{d\sqrt{-\frac{1}{d}}}\right)-\sqrt{d+ex}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)-\frac{2n\left(-e\sqrt{d+ex}-\frac{e\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{\sqrt{-\frac{1}{d}}}\right)}{e}\right)}{e}-\frac{2b\left(d^{2}\left(\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{\sqrt{d+ex}}-\frac{2n\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{d\sqrt{-\frac{1}{d}}}\right)-2d\left(-\sqrt{d+ex}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)-\frac{2n\left(-e\sqrt{d+ex}-\frac{e\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{\sqrt{-\frac{1}{d}}}\right)}{e}\right)-\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(-de\sqrt{d+ex}-\frac{de\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{\sqrt{-\frac{1}{d}}}-\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)}{e}}{e} & \text{for}\ e \neq 0 \\ \frac{\frac{ax^{2}}{2}+b\left(-\frac{nx^{2}}{4}+\frac{x^{2}\log\left(cx^{n}\right)}{2}\right)}{\sqrt{d}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)

[Out] Piecewise(((-2*a*d*(-d/sqrt(d + e*x) - sqrt(d + e*x))/e - 2*a*(d**2/sqrt(d + e*x) + 2*d*sqrt(d + e*x) - (d + e*x)**(3/2)/3)/e - 2*b*d*(-d*(log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x) - 2*n*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/ (d*sqrt(-1/d))) - sqrt(d + e*x)*log(c*(-d/e + (d + e*x)/e)**n) - 2*n*(-e*sq rt(d + e*x) - e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d))/e)/e - 2*b*(d**2*(log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x) - 2*n*atan(1/(sqrt(-1/d) *sqrt(d + e*x)))/(d*sqrt(-1/d))) - 2*d*(-sqrt(d + e*x)*log(c*(-d/e + (d + e *x)/e)**n) - 2*n*(-e*sqrt(d + e*x) - e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/s qrt(-1/d))/e) - (d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(-d *e*sqrt(d + e*x) - d*e*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/sqrt(-1/d) - e*(d + e*x)**(3/2)/3)/(3*e))/e)/e, Ne(e, 0)), ((a*x**2/2 + b*(-n*x**2/4 + x**2* log(c*x**n)/2))/sqrt(d), True))

Giac [A]
time = 2.96, size = 145, normalized size = 1.22

$$\frac{8\,bd^2n\arctan\left(\frac{\sqrt{xe+d}}{\sqrt{-d}}\right)e^{(-2)}}{3\,\sqrt{-d}}+\frac{2}{9}\left(3\,(xe+d)^{\frac{3}{2}}bn\log\left(xe\right)-9\,\sqrt{xe+d}\,bdn\log\left(xe\right)-5\,(xe+d)^{\frac{3}{2}}bn+21\,\sqrt{xe+d}\,bdn+3\,(xe+d)^{\frac{3}{2}}b\log\left(c\right)-9\,\sqrt{xe+d}\,bd\log\left(c\right)+3\,(xe+d)^{\frac{3}{2}}a-9\,\sqrt{xe+d}\,ad\right)e^{(-2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] 8/3*b*d^2*n*arctan(sqrt(x*e + d)/sqrt(-d))*e^(-2)/sqrt(-d) + 2/9*(3*(x*e +
d)^(3/2)*b*n*log(x*e) - 9*sqrt(x*e + d)*b*d*n*log(x*e) - 5*(x*e + d)^(3/2)*
b*n + 21*sqrt(x*e + d)*b*d*n + 3*(x*e + d)^(3/2)*b*log(c) - 9*sqrt(x*e + d)
*b*d*log(c) + 3*(x*e + d)^(3/2)*a - 9*sqrt(x*e + d)*a*d)*e^(-2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{d+e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

3.147 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx$

Optimal. Leaf size=69

$$-\frac{4bn\sqrt{d+ex}}{e}+\frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e}+\frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e}$$

```
[Out] 4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)/e-4*b*n*(e*x+d)^(1/2)/e+2*(a+b
*ln(c*x^n))*(e*x+d)^(1/2)/e
```

Rubi [A]
time = 0.02, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2356, 52, 65, 214}

$$\frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e}-\frac{4bn\sqrt{d+ex}}{e}+\frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/Sqrt[d + e*x],x]
```

```
[Out] (-4*b*n*Sqrt[d + e*x])/e + (4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/e
 + (2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx &= \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e} - \frac{(2bn)\int \frac{\sqrt{d+ex}}{x}\,dx}{e} \\
&= -\frac{4bn\sqrt{d+ex}}{e} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e} - \frac{(2bdn)\int \frac{1}{x\sqrt{d+ex}}\,dx}{e} \\
&= -\frac{4bn\sqrt{d+ex}}{e} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e} - \frac{(4bdn)\text{Subst}\left(\int \frac{1}{-\frac{d}{e}+\frac{x^2}{e}}\,dx, x, \sqrt{d+e\right.}{e^2} \\
&= -\frac{4bn\sqrt{d+ex}}{e} + \frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e}
\end{aligned}$$

Mathematica [A]
time = 0.03, size = 55, normalized size = 0.80

$$\frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}\,(a-2bn+b\log(cx^n))}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/Sqrt[d + e*x],x]
```

```
[Out] (4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(a - 2*b*n
+ b*Log[c*x^n]))/e
```

Maple [A]
time = 0.16, size = 61, normalized size = 0.88

method	result	size
derivativedivides	$\frac{2\sqrt{ex+d}\,a+4bn\,\mathrm{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\sqrt{d}+2\ln(c\,x^{n})b\sqrt{ex+d}-4bn\sqrt{ex+d}}{e}$	61
default	$\frac{2\sqrt{ex+d}\,a+4bn\,\mathrm{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\sqrt{d}+2\ln(c\,x^{n})b\sqrt{ex+d}-4bn\sqrt{ex+d}}{e}$	61

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x+d)^(1/2),x,method=_RETURNVERBOSE)
```

```
[Out] 2/e*((e*x+d)^(1/2)*a+2*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)+ln(c*x^n)
*b*(e*x+d)^(1/2)-2*b*n*(e*x+d)^(1/2))
```

Maxima [A]
time = 0.48, size = 84, normalized size = 1.22

$$-2\left(\sqrt{d}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+2\sqrt{xe+d}\right)bne^{(-1)}+2\sqrt{xe+d}\,be^{(-1)}\log\left(cx^{n}\right)+2\sqrt{xe+d}\,ae^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -2*(sqrt(d)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d))) + 2*sq
rt(x*e + d))*b*n*e^(-1) + 2*sqrt(x*e + d)*b*e^(-1)*log(c*x^n) + 2*sqrt(x*e
+ d)*a*e^(-1)
```

Fricas [A]
time = 0.43, size = 119, normalized size = 1.72

$$\left[2\left(b\sqrt{d}\,n\log\left(\frac{xe+2\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)+(bn\log(x)-2\,bn+b\log(c)+a)\sqrt{xe+d}\right)e^{(-1)},-2\left(2\,b\sqrt{-d}\,n\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)-(bn\log(x)-2\,bn+b\log(c)+a)\sqrt{xe+d}\right)e^{(-1)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [2*(b*sqrt(d)*n*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x) + (b*n*log(x)
- 2*b*n + b*log(c) + a)*sqrt(x*e + d))*e^(-1), -2*(2*b*sqrt(-d)*n*arctan(sq
rt(x*e + d)*sqrt(-d)/d) - (b*n*log(x) - 2*b*n + b*log(c) + a)*sqrt(x*e + d)
)*e^(-1)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 252 vs. $2(65) = 130$.

time = 10.99, size = 252, normalized size = 3.65

$$\begin{cases} \frac{-\frac{2ad}{\sqrt{d+ex}} - 2a\left(-\frac{d}{\sqrt{d+ex}} - \sqrt{d+ex}\right) - 2bd\left(\frac{\log\left(cx^n\right)}{\sqrt{d+ex}} - \frac{2n\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{d\sqrt{-\frac{1}{d}}}\right) - 2b\left(-d\left(\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{\sqrt{d+ex}} - \frac{2n\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{d\sqrt{-\frac{1}{d}}}\right) - \sqrt{d+ex}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right) - \frac{2n\left(-e\sqrt{d+ex} - \frac{e\operatorname{atan}\left(\frac{1}{\sqrt{-\frac{1}{d}}\sqrt{d+ex}}\right)}{\sqrt{-\frac{1}{d}}}\right)}{e}\right)}{e} & \text{for } e \neq 0 \\ \frac{ax+b\left(-nx+x\log\left(cx^n\right)\right)}{\sqrt{d}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

```
[Out] Piecewise(((-2*a*d/sqrt(d + e*x) - 2*a*(-d/sqrt(d + e*x) - sqrt(d + e*x)) -
 2*b*d*(log(c*x**n)/sqrt(d + e*x) - 2*n*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/
(d*sqrt(-1/d))) - 2*b*(-d*(log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x) - 2
*n*atan(1/(sqrt(-1/d)*sqrt(d + e*x)))/(d*sqrt(-1/d))) - sqrt(d + e*x)*log(c
*(-d/e + (d + e*x)/e)**n) - 2*n*(-e*sqrt(d + e*x) - e*atan(1/(sqrt(-1/d)*sq
rt(d + e*x)))/sqrt(-1/d))/e))/e, Ne(e, 0)), ((a*x + b*(-n*x + x*log(c*x**n)
))/sqrt(d), True))
```

Giac [A]
time = 3.21, size = 78, normalized size = 1.13

$$-2\left(\left(\frac{2\,d\arctan\left(\frac{\sqrt{xe+d}}{\sqrt{-d}}\right)}{\sqrt{-d}} - \sqrt{xe+d}\,\log\left(x\right) + 2\sqrt{xe+d}\right)bn - \sqrt{xe+d}\,b\log\left(c\right) - \sqrt{xe+d}\,a\right)e^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] -2*((2*d*arctan(sqrt(x*e + d)/sqrt(-d))/sqrt(-d) - sqrt(x*e + d)*log(x) + 2
*sqrt(x*e + d))*b*n - sqrt(x*e + d)*b*log(c) - sqrt(x*e + d)*a)*e^(-1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{d+e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x)^(1/2),x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x)^(1/2), x)
```

3.148 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$

Optimal. Leaf size=152

$$\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}$$

```
[Out] 2*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(1/2)-2*arctanh((e*x+d)^(1/2)/d^(1
/2))*(a+b*ln(c*x^n))/d^(1/2)-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1
/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(
e*x+d)^(1/2)))/d^(1/2)
```

Rubi [A]
time = 0.14, antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {65, 214, 2390, 12, 6131, 6055, 2449, 2352}

$$-\frac{2bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{4bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x]),x]
```

```
[Out] (2*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/Sqrt[d] - (2*ArcTanh[Sqrt[d + e*x]
/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] - (4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d
]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/Sqrt[d] - (2*b*n*PolyLog[2,
1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/Sqrt[d]
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx = -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - (bn)\int -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}\,x}\,dx$$

$$= -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + \frac{(2bn)\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}\,dx}{\sqrt{d}}$$

$$= -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + \frac{(4bn)\text{Subst}\left(\int \frac{x\tanh^{-1}\left(\frac{x}{\sqrt{d}}\right)}{-d+x^2}\,dx, x, \sqrt{d}\right.}{\sqrt{d}}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{(4bn)\text{Subst}}{}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{4bn\tanh^{-1}}{}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{4bn\tanh^{-1}}{}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{4bn\tanh^{-1}}{}$$

Mathematica [A]

time = 0.07, size = 249, normalized size = 1.64

$$\frac{2(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-2(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right)-bn\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)+2\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)+2\text{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right)+bn\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)+2\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right)+2\text{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)}{2\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x]),x]
```

```
[Out] (2*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*(a + b*Log[c*x^n])*L
og[Sqrt[d] + Sqrt[d + e*x]] - b*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d
] - Sqrt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2, 1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + b*n*(Log[Sqrt[d] + Sqrt[d + e*x]]*(Log[S
qrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + 2*PolyL
og[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/(2*Sqrt[d])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] b*integrate((log(c) + log(x^n))/(sqrt(x*e + d)*x), x) + a*log((sqrt(x*e + d
) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/sqrt(d)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/(x^2*e + d*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d)**(1/2),x)
[Out] Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\sqrt{d+e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)), x)
```

3.149 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx$

Optimal. Leaf size=226

$$-\frac{bn\sqrt{d+ex}}{dx}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}-\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx}+\frac{e\tanh^{-1}}{}$$

```
[Out] -b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)-b*e*n*arctanh((e*x+d)^(1/2)/d
^(1/2))^2/d^(3/2)+e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)+
2*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2))
)/d^(3/2)+b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)-b*n*
(e*x+d)^(1/2)/d/x-(a+b*ln(c*x^n))*(e*x+d)^(1/2)/d/x
```

Rubi [A]
time = 0.19, antiderivative size = 226, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {44, 65, 214, 2392, 14, 43, 6131, 6055, 2449, 2352}

$$\frac{ben\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{2ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}-\frac{bn\sqrt{d+ex}}{dx}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x]),x]
```

```
[Out] -((b*n*Sqrt[d + e*x])/(d*x)) - (b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/d^(3/
2) - (b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/d^(3/2) - (Sqrt[d + e*x]*(a +
 b*Log[c*x^n]))/(d*x) + (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]
))/d^(3/2) + (2*b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[
d] - Sqrt[d + e*x])])/d^(3/2) + (b*e*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d]
- Sqrt[d + e*x])])/d^(3/2)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx} + \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} - (bn)\int \cdots$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx} + \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} - (bn)\int \left(\cdots \right.$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx} + \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{(bn)\int \cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{dx} - \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx} + \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n \cdots}{d^{3/2}}$$

$$= -\frac{bn\sqrt{d+ex}}{dx} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} - \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{dx} + \frac{e\tanh^{-1}\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{dx} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} - \frac{\sqrt{d+ex}\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{dx} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} - \frac{\sqrt{d+ex}\cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex}}{dx} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} - \frac{\sqrt{d+ex}\cdots}{\cdots}$$

Mathematica [A]

time = 0.17, size = 392, normalized size = 1.73

$$-\frac{4a\sqrt{d}\sqrt{d+ex}+4b\sqrt{d}\,n\sqrt{d+ex}+4benx\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+4b\sqrt{d}\sqrt{d+ex}\log(cx^n)+2aex\log\left(\sqrt{d}-\sqrt{d+ex}\right)+2bex\log(cx^n)\log\left(\sqrt{d}-\sqrt{d+ex}\right)-benx\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)-2aex\log\left(\sqrt{d}+\sqrt{d+ex}\right)-2bex\log(cx^n)\log\left(\sqrt{d}+\sqrt{d+ex}\right)+benx\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)+2benx\log\left(\sqrt{d}+\sqrt{d+ex}\right)\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)-2benx\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)-2benx\,\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)+2benx\,\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{4d^{3/2}x}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x]),x]
```

```
[Out] -1/4*(4*a*Sqrt[d]*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*Sqrt[d + e*x] + 4*b*e*n*x*A
rcTanh[Sqrt[d + e*x]/Sqrt[d]] + 4*b*Sqrt[d]*Sqrt[d + e*x]*Log[c*x^n] + 2*a*
e*x*Log[Sqrt[d] - Sqrt[d + e*x]] + 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d
+ e*x]] - b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 - 2*a*e*x*Log[Sqrt[d] + Sq
rt[d + e*x]] - 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + b*e*n*x*Lo
g[Sqrt[d] + Sqrt[d + e*x]]^2 + 2*b*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 2*b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]*Lo
g[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 2*b*e*n*x*PolyLog[2, 1/2 - Sqrt[d + e*x]
/(2*Sqrt[d])] + 2*b*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2])/(d^(3/
2)*x)
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a + b\ln\left(c\,x^{n}\right)}{x^{2}\sqrt{ex + d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -1/2*a*(2*sqrt(x*e + d)*e/((x*e + d)*d - d^2) + e*log((sqrt(x*e + d) - sqrt
(d))/(sqrt(x*e + d) + sqrt(d)))/d^(3/2)) + b*integrate((log(c) + log(x^n))/
(sqrt(x*e + d)*x^2), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/(x^3*e + d*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**(1/2),x)
[Out] Integral((a + b*log(c*x**n))/(x**2*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a + b\,\ln(c\,x^n)}{x^2\,\sqrt{d + e\,x}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)), x)
```

3.150 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$

Optimal. Leaf size=304

$$-\frac{bn\sqrt{d+ex}}{4dx^2}+\frac{5ben\sqrt{d+ex}}{8d^2x}+\frac{7be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{5/2}}+\frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{5/2}}-\frac{\sqrt{d+ex}\,(a+b\text{l}}{2dx^2}$$

```
[Out] 7/8*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(5/2)+3/4*b*e^2*n*arctanh((e*x
+d)^(1/2)/d^(1/2))^2/d^(5/2)-3/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln
(c*x^n))/d^(5/2)-3/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d
^(1/2)-(e*x+d)^(1/2)))/d^(5/2)-3/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(
e*x+d)^(1/2)))/d^(5/2)-1/4*b*n*(e*x+d)^(1/2)/d/x^2+5/8*b*e*n*(e*x+d)^(1/2)/
d^2/x-1/2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/d/x^2+3/4*e*(a+b*ln(c*x^n))*(e*x+d)
^(1/2)/d^2/x
```

Rubi [A]
time = 0.24, antiderivative size = 304, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 11, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.478, Rules used = {44, 65, 214, 2392, 12, 14, 43, 6131, 6055, 2449, 2352}

$$-\frac{3be^2n\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4d^{5/2}}-\frac{3e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2dx^2}+\frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{5/2}}+\frac{7be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{5/2}}-\frac{3be^2n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{2d^{5/2}}+\frac{5ben\sqrt{d+ex}}{8d^2x}-\frac{bn\sqrt{d+ex}}{4dx^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x]),x]
```

```
[Out] -1/4*(b*n*Sqrt[d + e*x])/(d*x^2) + (5*b*e*n*Sqrt[d + e*x])/(8*d^2*x) + (7*b
*e^2*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(8*d^(5/2)) + (3*b*e^2*n*ArcTanh[Sqr
t[d + e*x]/Sqrt[d]]^2)/(4*d^(5/2)) - (Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(2*
d*x^2) + (3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(4*d^2*x) - (3*e^2*ArcTanh[
Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/(4*d^(5/2)) - (3*b*e^2*n*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/(2*d^(5
/2)) - (3*b*e^2*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/(4
*d^(5/2))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
```

```
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx = -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2dx^2} + \frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4d^2x} - \frac{3e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{4d^5}$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2dx^2} + \frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4d^2x} - \frac{3e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{4d^5}$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2dx^2} + \frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4d^2x} - \frac{3e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{4d^5}$$

$$= -\frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2dx^2} + \frac{3e\sqrt{d+ex}\,(a+b\log(cx^n))}{4d^2x} - \frac{3e^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{4d^5}$$

$$= -\frac{bn\sqrt{d+ex}}{4dx^2} + \frac{3ben\sqrt{d+ex}}{4d^2x} - \frac{\sqrt{d+ex}\,(a+b\log(cx^n))}{2dx^2} + \frac{3e\sqrt{d+ex}\,(a+b\log}{4d^2x}$$

$$= -\frac{bn\sqrt{d+ex}}{4dx^2} + \frac{5ben\sqrt{d+ex}}{8d^2x} + \frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{5/2}} - \frac{\sqrt{d+ex}\,(a+b\log}{2dx^2}$$

$$= -\frac{bn\sqrt{d+ex}}{4dx^2} + \frac{5ben\sqrt{d+ex}}{8d^2x} + \frac{3be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{4d^{5/2}} + \frac{3be^2n\tanh^{-1}\left(\sqrt{d}\right.}{4d^{5/2}}$$

$$= -\frac{bn\sqrt{d+ex}}{4dx^2} + \frac{5ben\sqrt{d+ex}}{8d^2x} + \frac{7be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{5/2}} + \frac{3be^2n\tanh^{-1}\left(\sqrt{d}\right.}{4d^{5/2}}$$

$$= -\frac{bn\sqrt{d+ex}}{4dx^2} + \frac{5ben\sqrt{d+ex}}{8d^2x} + \frac{7be^2n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{5/2}} + \frac{3be^2n\tanh^{-1}\left(\sqrt{d}\right.}{4d^{5/2}}$$

Mathematica [A]

time = 0.22, size = 501, normalized size = 1.65

$$\frac{-8ad^{3/2}\sqrt{d+ex} - 4bd^{3/2}n\sqrt{d+ex} + 12a\sqrt{d}\,ex\sqrt{d+ex} + 10b\sqrt{d}\,enx\sqrt{d+ex} + 14be^2nx^2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) - 8bd^{3/2}\sqrt{d+ex}\,\log(cx^n) + 12b\sqrt{d}\,ex\sqrt{d+ex}\,\log(cx^n) + 6ae^2x^2\log\left(\sqrt{d}-\sqrt{d+ex}\right) + 6be^2x^2\log(cx^n)\log\left(\sqrt{d}-\sqrt{d+ex}\right) - 3be^2nx^2\log^2\left(\sqrt{d}-\sqrt{d+ex}\right) - 6ae^2x^2\log\left(\sqrt{d}+\sqrt{d+ex}\right) - 6be^2x^2\log(cx^n)\log\left(\sqrt{d}+\sqrt{d+ex}\right) + 3be^2nx^2\log^2\left(\sqrt{d}+\sqrt{d+ex}\right) + 6be^2nx^2\log\left(\sqrt{d}+\sqrt{d+ex}\right)\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right) - 6be^2nx^2\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right) - 6be^2nx^2\mathrm{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right) + 6be^2nx^2\mathrm{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{16d^{5/2}x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x]),x]
```

```
[Out] (-8*a*d^(3/2)*Sqrt[d + e*x] - 4*b*d^(3/2)*n*Sqrt[d + e*x] + 12*a*Sqrt[d]*e*
x*Sqrt[d + e*x] + 10*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 14*b*e^2*n*x^2*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]] - 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 12*b*Sqrt[
d]*e*x*Sqrt[d + e*x]*Log[c*x^n] + 6*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e*x]]
+ 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] - 3*b*e^2*n*x^2*Log[S
qrt[d] - Sqrt[d + e*x]]^2 - 6*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]] - 6*b*
e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + 3*b*e^2*n*x^2*Log[Sqrt[d]
 + Sqrt[d + e*x]]^2 + 6*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1/2 -
Sqrt[d + e*x]/(2*Sqrt[d])] - 6*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d + e*x]]*Log
[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 6*b*e^2*n*x^2*PolyLog[2, 1/2 - Sqrt[d + e
*x]/(2*Sqrt[d])] + 6*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2])
/(16*d^(5/2)*x^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/8*a*(2*(3*(x*e + d)^(3/2)*e^2 - 5*sqrt(x*e + d)*d*e^2)/((x*e + d)^2*d^2 -
 2*(x*e + d)*d^3 + d^4) + 3*e^2*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d
) + sqrt(d)))/d^(5/2)) + b*integrate((log(c) + log(x^n))/(sqrt(x*e + d)*x^3
), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/(x^4*e + d*x^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log{(cx^n)}}{x^3\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**3*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\sqrt{d+e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)), x)
```

3.151 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=194

$$-\frac{44bd^2n\sqrt{d+ex}}{5e^4}+\frac{16bdn(d+ex)^{3/2}}{15e^4}-\frac{4bn(d+ex)^{5/2}}{25e^4}+\frac{64bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e^4}+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}$$

```
[Out] 16/15*b*d*n*(e*x+d)^(3/2)/e^4-4/25*b*n*(e*x+d)^(5/2)/e^4+64/5*b*d^(5/2)*n*a
rctanh((e*x+d)^(1/2)/d^(1/2))/e^4-2*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4+2/5
*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+2*d^3*(a+b*ln(c*x^n))/e^4/(e*x+d)^(1/2)-
44/5*b*d^2*n*(e*x+d)^(1/2)/e^4+6*d^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^4
```

Rubi [A]
time = 0.14, antiderivative size = 194, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {45, 2392, 12, 1634, 65, 214}

$$\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{64bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e^4}-\frac{44bd^2n\sqrt{d+ex}}{5e^4}+\frac{16bdn(d+ex)^{3/2}}{15e^4}-\frac{4bn(d+ex)^{5/2}}{25e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

```
[Out] (-44*b*d^2*n*Sqrt[d + e*x])/(5*e^4) + (16*b*d*n*(d + e*x)^(3/2))/(15*e^4) -
 (4*b*n*(d + e*x)^(5/2))/(25*e^4) + (64*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/S
qrt[d]])/(5*e^4) + (2*d^3*(a + b*Log[c*x^n]))/(e^4*Sqrt[d + e*x]) + (6*d^2*
Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^4 - (2*d*(d + e*x)^(3/2)*(a + b*Log[c*x
^n]))/e^4 + (2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 1634

```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2]) && GtQ[E
xpon[Px, x], 2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}} + \frac{6d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4} - \frac{2d(d+ex)^{3/2}\,(a+b\log(c}{e^4}$$

$$= \frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}} + \frac{6d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4} - \frac{2d(d+ex)^{3/2}\,(a+b\log(c}{e^4}$$

$$= \frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}} + \frac{6d^2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^4} - \frac{2d(d+ex)^{3/2}\,(a+b\log(c}{e^4}$$

$$= -\frac{44bd^2n\sqrt{d+ex}}{5e^4} + \frac{16bdn(d+ex)^{3/2}}{15e^4} - \frac{4bn(d+ex)^{5/2}}{25e^4} + \frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}$$

$$= -\frac{44bd^2n\sqrt{d+ex}}{5e^4} + \frac{16bdn(d+ex)^{3/2}}{15e^4} - \frac{4bn(d+ex)^{5/2}}{25e^4} + \frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}$$

$$= -\frac{44bd^2n\sqrt{d+ex}}{5e^4} + \frac{16bdn(d+ex)^{3/2}}{15e^4} - \frac{4bn(d+ex)^{5/2}}{25e^4} + \frac{64bd^{5/2}n\tanh^{-1}\left(\sqrt{}\right.}{5e^4}$$

Mathematica [A]
time = 0.08, size = 159, normalized size = 0.82

$$\frac{480ad^3 - 592bd^3n + 240ad^2ex - 536bd^2enx - 60ade^2x^2 + 44bde^2nx^2 + 30ae^3x^3 - 12be^3nx^3 + 960bd^{5/2}n\sqrt{d+ex}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 30b(16d^3 + 8d^2ex - 2de^2x^2 + e^3x^3)\log(cx^n)}{75e^4\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

```
[Out] (480*a*d^3 - 592*b*d^3*n + 240*a*d^2*e*x - 536*b*d^2*e*n*x - 60*a*d*e^2*x^2
 + 44*b*d*e^2*n*x^2 + 30*a*e^3*x^3 - 12*b*e^3*n*x^3 + 960*b*d^(5/2)*n*Sqrt[
d + e*x]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 30*b*(16*d^3 + 8*d^2*e*x - 2*d*e^
2*x^2 + e^3*x^3)*Log[c*x^n])/(75*e^4*Sqrt[d + e*x])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(ex+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Maxima [A]
time = 0.50, size = 203, normalized size = 1.05

$$-\frac{4}{75}\left(120\,d^{\frac{5}{2}}e^{(-4)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+\left(3\,(xe+d)^{\frac{5}{2}}-20\,(xe+d)^{\frac{3}{2}}d+165\,\sqrt{xe+d}\,d^{2}\right)e^{(-4)}\right)bn+\frac{2}{5}\left((xe+d)^{\frac{5}{2}}e^{(-4)}-5\,(xe+d)^{\frac{3}{2}}de^{(-4)}+15\,\sqrt{xe+d}\,d^{2}e^{(-4)}+\frac{5\,d^{3}e^{(-4)}}{\sqrt{xe+d}}\right)b\log\left(cx^{n}\right)+\frac{2}{5}\left((xe+d)^{\frac{5}{2}}e^{(-4)}-5\,(xe+d)^{\frac{3}{2}}de^{(-4)}+15\,\sqrt{xe+d}\,d^{2}e^{(-4)}+\frac{5\,d^{3}e^{(-4)}}{\sqrt{xe+d}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -4/75*(120*d^(5/2)*e^(-4)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sq
rt(d))) + (3*(x*e + d)^(5/2) - 20*(x*e + d)^(3/2)*d + 165*sqrt(x*e + d)*d^2
)*e^(-4))*b*n + 2/5*((x*e + d)^(5/2)*e^(-4) - 5*(x*e + d)^(3/2)*d*e^(-4) +
15*sqrt(x*e + d)*d^2*e^(-4) + 5*d^3*e^(-4)/sqrt(x*e + d))*b*log(c*x^n) + 2/
5*((x*e + d)^(5/2)*e^(-4) - 5*(x*e + d)^(3/2)*d*e^(-4) + 15*sqrt(x*e + d)*d
^2*e^(-4) + 5*d^3*e^(-4)/sqrt(x*e + d))*a
```

Fricas [A]
time = 0.43, size = 418, normalized size = 2.15

$$\left[\frac{2\left(240\,(bd^{2}nxe+bd^{3}n)\sqrt{d}\,\log\left(\frac{xe+2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)-(296\,bd^{3}n+3\,(2\,bn-5\,a)x^{3}e^{3}-240\,ad^{3}-2\,(11\,bdn-15\,ad)x^{2}e^{2}+4\,(67\,bd^{2}n-30\,ad^{2})xe-15\,(bx^{3}e^{3}-2\,bdx^{2}e^{2}+8\,bd^{2}xe+16\,bd^{3})\log(c)-15\,(bnx^{3}e^{3}-2\,bdnx^{2}e^{2}+8\,bd^{2}nxe+16\,bd^{3}n)\log(x))\sqrt{xe+d}\right)}{75\,(xe^{5}+de^{4})},\ -\frac{2\left(480\,(bd^{2}nxe+bd^{3}n)\sqrt{-d}\,\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+(296\,bd^{3}n+3\,(2\,bn-5\,a)x^{3}e^{3}-240\,ad^{3}-2\,(11\,bdn-15\,ad)x^{2}e^{2}+4\,(67\,bd^{2}n-30\,ad^{2})xe-15\,(bx^{3}e^{3}-2\,bdx^{2}e^{2}+8\,bd^{2}xe+16\,bd^{3})\log(c)-15\,(bnx^{3}e^{3}-2\,bdnx^{2}e^{2}+8\,bd^{2}nxe+16\,bd^{3}n)\log(x))\sqrt{xe+d}\right)}{75\,(xe^{5}+de^{4})}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [2/75*(240*(b*d^2*n*x*e + b*d^3*n)*sqrt(d)*log((x*e + 2*sqrt(x*e + d)*sqrt(
d) + 2*d)/x) - (296*b*d^3*n + 3*(2*b*n - 5*a)*x^3*e^3 - 240*a*d^3 - 2*(11*b
*d*n - 15*a*d)*x^2*e^2 + 4*(67*b*d^2*n - 30*a*d^2)*x*e - 15*(b*x^3*e^3 - 2*
b*d*x^2*e^2 + 8*b*d^2*x*e + 16*b*d^3)*log(c) - 15*(b*n*x^3*e^3 - 2*b*d*n*x^
2*e^2 + 8*b*d^2*n*x*e + 16*b*d^3*n)*log(x))*sqrt(x*e + d))/(x*e^5 + d*e^4),
 -2/75*(480*(b*d^2*n*x*e + b*d^3*n)*sqrt(-d)*arctan(sqrt(x*e + d)*sqrt(-d)/
d) + (296*b*d^3*n + 3*(2*b*n - 5*a)*x^3*e^3 - 240*a*d^3 - 2*(11*b*d*n - 15*
a*d)*x^2*e^2 + 4*(67*b*d^2*n - 30*a*d^2)*x*e - 15*(b*x^3*e^3 - 2*b*d*x^2*e^
2 + 8*b*d^2*x*e + 16*b*d^3)*log(c) - 15*(b*n*x^3*e^3 - 2*b*d*n*x^2*e^2 + 8*
b*d^2*n*x*e + 16*b*d^3*n)*log(x))*sqrt(x*e + d))/(x*e^5 + d*e^4)]
```

Sympy [A]
time = 26.84, size = 384, normalized size = 1.98

$$\frac{\frac{2ad^{3}}{\sqrt{d+ex}}+6ad^{2}\sqrt{d+ex}-2ad(d+ex)^{\frac{3}{2}}+\frac{2a(d+ex)^{\frac{5}{2}}}{5}-2bd^{3}\cdot\left(\frac{2n\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{\sqrt{d+ex}}\right)+6bd^{2}\left(\sqrt{d+ex}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)-\frac{2n\left(\frac{de\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+e\sqrt{d+ex}\right)}{e}\right)-6bd\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{3}-\frac{2n\left(\frac{d^{2}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)+2b\left(\frac{(d+ex)^{\frac{5}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{5}-\frac{2n\left(\frac{d^{3}e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+d^{2}e\sqrt{d+ex}+\frac{de(d+ex)^{\frac{3}{2}}}{3}+\frac{e(d+ex)^{\frac{5}{2}}}{5}\right)}{5e}\right)}{e^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

```
[Out] (2*a*d**3/sqrt(d + e*x) + 6*a*d**2*sqrt(d + e*x) - 2*a*d*(d + e*x)**(3/2) +
 2*a*(d + e*x)**(5/2)/5 - 2*b*d**3*(2*n*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-
```

```
d) - log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x)) + 6*b*d**2*(sqrt(d + e*x
)*log(c*(-d/e + (d + e*x)/e)**n) - 2*n*(d*e*atan(sqrt(d + e*x)/sqrt(-d))/sq
rt(-d) + e*sqrt(d + e*x))/e) - 6*b*d*((d + e*x)**(3/2)*log(c*(-d/e + (d + e
*x)/e)**n)/3 - 2*n*(d**2*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt
(d + e*x) + e*(d + e*x)**(3/2)/3)/(3*e)) + 2*b*((d + e*x)**(5/2)*log(c*(-d/
e + (d + e*x)/e)**n)/5 - 2*n*(d**3*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d)
+ d**2*e*sqrt(d + e*x) + d*e*(d + e*x)**(3/2)/3 + e*(d + e*x)**(5/2)/5)/(5*
e)))/e**4
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^3/(x*e + d)^(3/2), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

3.152 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=146

$$\frac{20bdn\sqrt{d+ex}}{3e^3}-\frac{4bn(d+ex)^{3/2}}{9e^3}-\frac{32bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^3}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}\,(a+b$$

```
[Out] -4/9*b*n*(e*x+d)^(3/2)/e^3-32/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/
e^3+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3-2*d^2*(a+b*ln(c*x^n))/e^3/(e*x+d)
^(1/2)+20/3*b*d*n*(e*x+d)^(1/2)/e^3-4*d*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^3
```

Rubi [A]
time = 0.11, antiderivative size = 146, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {45, 2392, 12, 911, 1167, 214}

$$-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{32bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^3}+\frac{20bdn\sqrt{d+ex}}{3e^3}-\frac{4bn(d+ex)^{3/2}}{9e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

```
[Out] (20*b*d*n*Sqrt[d + e*x])/(3*e^3) - (4*b*n*(d + e*x)^(3/2))/(9*e^3) - (32*b*
d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(3*e^3) - (2*d^2*(a + b*Log[c*x^n
]))/(e^3*Sqrt[d + e*x]) - (4*d*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^3 + (2*(
d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1167

```
Int[((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
 x_Symbol] :> Int[ExpandIntegrand[(d + e*x^2)^q*(a + b*x^2 + c*x^4)^p, x],
x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e
 + a*e^2, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} + \frac{2(d+ex)^{3/2}\,(a+b\log(}{3e^3}$$

$$= -\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} + \frac{2(d+ex)^{3/2}\,(a+b\log(}{3e^3}$$

$$= -\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} + \frac{2(d+ex)^{3/2}\,(a+b\log(}{3e^3}$$

$$= -\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}\,(a+b\log(cx^n))}{e^3} + \frac{2(d+ex)^{3/2}\,(a+b\log(}{3e^3}$$

$$= \frac{20bdn\sqrt{d+ex}}{3e^3} - \frac{4bn(d+ex)^{3/2}}{9e^3} - \frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}\,(a+b\,l}{e^3}$$

$$= \frac{20bdn\sqrt{d+ex}}{3e^3} - \frac{4bn(d+ex)^{3/2}}{9e^3} - \frac{32bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^3} - \frac{2d^2(a+}{e^3\sqrt{d}}$$

Mathematica [A]
time = 0.07, size = 124, normalized size = 0.85

$$\frac{-48ad^2+56bd^2n-24adex+52bdenx+6ae^2x^2-4be^2nx^2-96bd^{3/2}n\sqrt{d+ex}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-6b(8d^2+4dex-e^2x^2)\log(cx^n)}{9e^3\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

```
[Out] (-48*a*d^2 + 56*b*d^2*n - 24*a*d*e*x + 52*b*d*e*n*x + 6*a*e^2*x^2 - 4*b*e^2
*n*x^2 - 96*b*d^(3/2)*n*Sqrt[d + e*x]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] - 6*b*
(8*d^2 + 4*d*e*x - e^2*x^2)*Log[c*x^n])/(9*e^3*Sqrt[d + e*x])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(ex+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Maxima [A]
time = 0.50, size = 159, normalized size = 1.09

$$\frac{4}{9}\left(12\,d^{\frac{3}{2}}e^{(-3)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)-\left((xe+d)^{\frac{3}{2}}-15\,\sqrt{xe+d}\,d\right)e^{(-3)}\right)bn+\frac{2}{3}\left((xe+d)^{\frac{3}{2}}e^{(-3)}-6\,\sqrt{xe+d}\,de^{(-3)}-\frac{3\,d^2e^{(-3)}}{\sqrt{xe+d}}\right)b\log\left(cx^n\right)+\frac{2}{3}\left((xe+d)^{\frac{3}{2}}e^{(-3)}-6\,\sqrt{xe+d}\,de^{(-3)}-\frac{3\,d^2e^{(-3)}}{\sqrt{xe+d}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

```
[Out] 4/9*(12*d^(3/2)*e^(-3)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(
d))) - ((x*e + d)^(3/2) - 15*sqrt(x*e + d)*d)*e^(-3))*b*n + 2/3*((x*e + d)^
(3/2)*e^(-3) - 6*sqrt(x*e + d)*d*e^(-3) - 3*d^2*e^(-3)/sqrt(x*e + d))*b*log
(c*x^n) + 2/3*((x*e + d)^(3/2)*e^(-3) - 6*sqrt(x*e + d)*d*e^(-3) - 3*d^2*e^
(-3)/sqrt(x*e + d))*a
```

Fricas [A]
time = 0.41, size = 325, normalized size = 2.23

$$\left[\frac{2\left(24\,(bdnxe+bd^2n)\sqrt{d}\,\log\left(\frac{xe-2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)+(28\,bd^2n-(2\,bn-3\,a)x^2e^2-24\,ad^2+2\,(13\,bdn-6\,ad)xe+3\,(bx^2e^2-4\,bdxe-8\,bd^2)\log\left(c\right)+3\,(bnx^2e^2-4\,bdnxe-8\,bd^2n)\log\left(x\right))\sqrt{xe+d}\right)}{9\,(xe^4+de^3)},\ \frac{2\left(48\,(bdnxe+bd^2n)\sqrt{-d}\,\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+(28\,bd^2n-(2\,bn-3\,a)x^2e^2-24\,ad^2+2\,(13\,bdn-6\,ad)xe+3\,(bx^2e^2-4\,bdxe-8\,bd^2)\log\left(c\right)+3\,(bnx^2e^2-4\,bdnxe-8\,bd^2n)\log\left(x\right))\sqrt{xe+d}\right)}{9\,(xe^4+de^3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [2/9*(24*(b*d*n*x*e + b*d^2*n)*sqrt(d)*log((x*e - 2*sqrt(x*e + d)*sqrt(d) +
 2*d)/x) + (28*b*d^2*n - (2*b*n - 3*a)*x^2*e^2 - 24*a*d^2 + 2*(13*b*d*n - 6
*a*d)*x*e + 3*(b*x^2*e^2 - 4*b*d*x*e - 8*b*d^2)*log(c) + 3*(b*n*x^2*e^2 - 4
*b*d*n*x*e - 8*b*d^2*n)*log(x))*sqrt(x*e + d))/(x*e^4 + d*e^3), 2/9*(48*(b*
d*n*x*e + b*d^2*n)*sqrt(-d)*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (28*b*d^2*n
- (2*b*n - 3*a)*x^2*e^2 - 24*a*d^2 + 2*(13*b*d*n - 6*a*d)*x*e + 3*(b*x^2*e^
2 - 4*b*d*x*e - 8*b*d^2)*log(c) + 3*(b*n*x^2*e^2 - 4*b*d*n*x*e - 8*b*d^2*n)
*log(x))*sqrt(x*e + d))/(x*e^4 + d*e^3)]
```

Sympy [A]
time = 20.51, size = 262, normalized size = 1.79

$$\frac{-\frac{2ad^2}{\sqrt{d+ex}}-4ad\sqrt{d+ex}+\frac{2a(d+ex)^{\frac{3}{2}}}{3}+2bd^2\cdot\left(\frac{2n\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{\sqrt{d+ex}}\right)-4bd\left(\sqrt{d+ex}\,\log\left(c(-\frac{d}{e}+\frac{d+ex}{e})^n\right)-\frac{2n\left(\frac{de\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+e\sqrt{d+ex}\right)}{e}\right)+2b\left(\frac{(d+ex)^{\frac{3}{2}}\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^n\right)}{3}-\frac{2n\left(\frac{d^2e\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+de\sqrt{d+ex}+\frac{e(d+ex)^{\frac{3}{2}}}{3}\right)}{3e}\right)}{e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

```
[Out] (-2*a*d**2/sqrt(d + e*x) - 4*a*d*sqrt(d + e*x) + 2*a*(d + e*x)**(3/2)/3 + 2
*b*d**2*(2*n*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) - log(c*(-d/e + (d + e*x
)/e)**n)/sqrt(d + e*x)) - 4*b*d*(sqrt(d + e*x)*log(c*(-d/e + (d + e*x)/e)**
n) - 2*n*(d*e*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + e*sqrt(d + e*x))/e) +
```

```
 2*b*((d + e*x)**(3/2)*log(c*(-d/e + (d + e*x)/e)**n)/3 - 2*n*(d**2*e*atan(
sqrt(d + e*x)/sqrt(-d))/sqrt(-d) + d*e*sqrt(d + e*x) + e*(d + e*x)**(3/2)/3
)/(3*e)))/e**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^2/(x*e + d)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

3.153 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=94

$$-\frac{4bn\sqrt{d+ex}}{e^2}+\frac{8b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}+\frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2}$$

```
[Out] 8*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)/e^2+2*d*(a+b*ln(c*x^n))/e^2/(e
*x+d)^(1/2)-4*b*n*(e*x+d)^(1/2)/e^2+2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^2
```

Rubi [A]
time = 0.06, antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {45, 2392, 12, 81, 65, 214}

$$\frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}-\frac{4bn\sqrt{d+ex}}{e^2}+\frac{8b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

```
[Out] (-4*b*n*Sqrt[d + e*x])/e^2 + (8*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])
/e^2 + (2*d*(a + b*Log[c*x^n]))/(e^2*Sqrt[d + e*x]) + (2*Sqrt[d + e*x]*(a +
 b*Log[c*x^n]))/e^2
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} - (bn)\int \frac{2(2d+ex)}{e^2x\sqrt{d+ex}}\,dx$$

$$= \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} - \frac{(2bn)\int \frac{2d+ex}{x\sqrt{d+ex}}\,dx}{e^2}$$

$$= -\frac{4bn\sqrt{d+ex}}{e^2} + \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} - \frac{(4bdn)\int}{}$$

$$= -\frac{4bn\sqrt{d+ex}}{e^2} + \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + \frac{2\sqrt{d+ex}\,(a+b\log(cx^n))}{e^2} - \frac{(8bdn)\text{Su}}{}$$

$$= -\frac{4bn\sqrt{d+ex}}{e^2} + \frac{8b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e^2} + \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + 2\sqrt{d+}$$

Mathematica [A]
time = 0.05, size = 83, normalized size = 0.88

$$\frac{2\left(2ad-2bdn+aex-2benx+4b\sqrt{d}\,n\sqrt{d+ex}\,\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+b(2d+ex)\log(cx^n)\right)}{e^2\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

```
[Out] (2*(2*a*d - 2*b*d*n + a*e*x - 2*b*e*n*x + 4*b*Sqrt[d]*n*Sqrt[d + e*x]*ArcTa
nh[Sqrt[d + e*x]/Sqrt[d]] + b*(2*d + e*x)*Log[c*x^n]))/(e^2*Sqrt[d + e*x])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln (c\,x^{n}))}{(ex+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Maxima [A]
time = 0.51, size = 113, normalized size = 1.20

$$-4\left(\sqrt{d}\,e^{(-2)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)+\sqrt{xe+d}\,e^{(-2)}\right)bn+2\left(\sqrt{xe+d}\,e^{(-2)}+\frac{de^{(-2)}}{\sqrt{xe+d}}\right)b\log\left(cx^{n}\right)+2\left(\sqrt{xe+d}\,e^{(-2)}+\frac{de^{(-2)}}{\sqrt{xe+d}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -4*(sqrt(d)*e^(-2)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))
 + sqrt(x*e + d)*e^(-2))*b*n + 2*(sqrt(x*e + d)*e^(-2) + d*e^(-2)/sqrt(x*e
+ d))*b*log(c*x^n) + 2*(sqrt(x*e + d)*e^(-2) + d*e^(-2)/sqrt(x*e + d))*a
```

Fricas [A]
time = 0.39, size = 230, normalized size = 2.45

$$\left[\frac{2\left(2\,(bnxe+bdn)\sqrt{d}\,\log\left(\frac{xe+2\,\sqrt{xe+d}\,\sqrt{d}+2\,d}{x}\right)-(2\,bdn+(2\,bn-a)xe-2\,ad-(bxe+2\,bd)\log\left(c\right)-(bnxe+2\,bdn)\log\left(x\right))\sqrt{xe+d}\right)}{xe^{3}+de^{2}},-\frac{2\left(4\,(bnxe+bdn)\sqrt{-d}\,\arctan\left(\frac{\sqrt{xe+d}\,\sqrt{-d}}{d}\right)+(2\,bdn+(2\,bn-a)xe-2\,ad-(bxe+2\,bd)\log\left(c\right)-(bnxe+2\,bdn)\log\left(x\right))\sqrt{xe+d}\right)}{xe^{3}+de^{2}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [2*(2*(b*n*x*e + b*d*n)*sqrt(d)*log((x*e + 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x
) - (2*b*d*n + (2*b*n - a)*x*e - 2*a*d - (b*x*e + 2*b*d)*log(c) - (b*n*x*e
+ 2*b*d*n)*log(x))*sqrt(x*e + d))/(x*e^3 + d*e^2), -2*(4*(b*n*x*e + b*d*n)*
sqrt(-d)*arctan(sqrt(x*e + d)*sqrt(-d)/d) + (2*b*d*n + (2*b*n - a)*x*e - 2*
a*d - (b*x*e + 2*b*d)*log(c) - (b*n*x*e + 2*b*d*n)*log(x))*sqrt(x*e + d))/(
x*e^3 + d*e^2)]
```

Sympy [A]
time = 30.22, size = 153, normalized size = 1.63

$$\frac{\frac{2ad}{\sqrt{d+ex}}+2a\sqrt{d+ex}-2bd\left(\frac{2n\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{\sqrt{d+ex}}\right)+2b\left(\sqrt{d+ex}\,\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)-\frac{2n\left(\frac{de\,\mathrm{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}+e\sqrt{d+ex}\right)}{e}\right)}{e^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

```
[Out] (2*a*d/sqrt(d + e*x) + 2*a*sqrt(d + e*x) - 2*b*d*(2*n*atan(sqrt(d + e*x)/sq
rt(-d))/sqrt(-d) - log(c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x)) + 2*b*(sqr
t(d + e*x)*log(c*(-d/e + (d + e*x)/e)**n) - 2*n*(d*e*atan(sqrt(d + e*x)/sqr
t(-d))/sqrt(-d) + e*sqrt(d + e*x))/e))/e**2
```

Giac [A]
time = 2.31, size = 105, normalized size = 1.12

$$-\frac{8\,bdn\arctan\left(\frac{\sqrt{xe+d}}{\sqrt{-d}}\right)e^{(-2)}}{\sqrt{-d}}+\frac{2\,((xe+d)bn\log(xe)+bdn\log(xe)-3\,(xe+d)bn-bdn+(xe+d)b\log(c)+bd\log(c)+(xe+d)a+ad)e^{(-2)}}{\sqrt{xe+d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

```
[Out] -8*b*d*n*arctan(sqrt(x*e + d)/sqrt(-d))*e^(-2)/sqrt(-d) + 2*((x*e + d)*b*n*
log(x*e) + b*d*n*log(x*e) - 3*(x*e + d)*b*n - b*d*n + (x*e + d)*b*log(c) +
b*d*log(c) + (x*e + d)*a + a*d)*e^(-2)/sqrt(x*e + d)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

3.154 $\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=53

$$-\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}\,e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

```
[Out] -4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e/d^(1/2)-2*(a+b*ln(c*x^n))/e/(e*x+d)
^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2356, 65, 214}

$$-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}\,e}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x)^(3/2),x]
```

```
[Out] (-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[c*x^n])
)/(e*Sqrt[d + e*x])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
```

```
NeQ[q, 1]))
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = -\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}} + \frac{(2bn)\int \frac{1}{x\sqrt{d+ex}}\,dx}{e}$$

$$= -\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}} + \frac{(4bn)\mathrm{Subst}\left(\int \frac{1}{-\frac{d}{e}+\frac{x^2}{e}}\,dx, x, \sqrt{d+ex}\right)}{e^2}$$

$$= -\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}\,e} - \frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

Mathematica [A]
time = 0.03, size = 53, normalized size = 1.00

$$-\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}\,e} - \frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x)^(3/2),x]
[Out] (-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[c*x^n])
)/(e*Sqrt[d + e*x])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{(ex+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
[Out] int((a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

Maxima [A]
time = 0.52, size = 72, normalized size = 1.36

$$\frac{2\,bne^{(-1)}\log\left(\frac{\sqrt{xe+d}-\sqrt{d}}{\sqrt{xe+d}+\sqrt{d}}\right)}{\sqrt{d}} - \frac{2\,be^{(-1)}\log(cx^n)}{\sqrt{xe+d}} - \frac{2\,ae^{(-1)}}{\sqrt{xe+d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

```
[Out] 2*b*n*e^(-1)*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/sqrt(
d) - 2*b*e^(-1)*log(c*x^n)/sqrt(x*e + d) - 2*a*e^(-1)/sqrt(x*e + d)
```

Fricas [A]
time = 0.48, size = 162, normalized size = 3.06

$$\left[\frac{2\left((bnxe+bdn)\sqrt{d}\log\left(\frac{xe-2\sqrt{xe+d}\sqrt{d}+2d}{x}\right)-(bdn\log(x)+bd\log(c)+ad)\sqrt{xe+d}\right)}{dxe^2+d^2e}, \frac{2\left(2(bnxe+bdn)\sqrt{-d}\arctan\left(\frac{\sqrt{xe+d}\sqrt{-d}}{d}\right)-(bdn\log(x)+bd\log(c)+ad)\sqrt{xe+d}\right)}{dxe^2+d^2e}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [2*((b*n*x*e + b*d*n)*sqrt(d)*log((x*e - 2*sqrt(x*e + d)*sqrt(d) + 2*d)/x)
- (b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(x*e + d))/(d*x*e^2 + d^2*e), 2*(2*
(b*n*x*e + b*d*n)*sqrt(-d)*arctan(sqrt(x*e + d)*sqrt(-d)/d) - (b*d*n*log(x)
 + b*d*log(c) + a*d)*sqrt(x*e + d))/(d*x*e^2 + d^2*e)]
```

Sympy [A]
time = 6.46, size = 66, normalized size = 1.25

$$\frac{-\frac{2a}{\sqrt{d+ex}}+2b\left(\frac{2n\operatorname{atan}\left(\frac{\sqrt{d+ex}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\frac{\log\left(c\left(-\frac{d}{e}+\frac{d+ex}{e}\right)^{n}\right)}{\sqrt{d+ex}}\right)}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

```
[Out] (-2*a/sqrt(d + e*x) + 2*b*(2*n*atan(sqrt(d + e*x)/sqrt(-d))/sqrt(-d) - log(
c*(-d/e + (d + e*x)/e)**n)/sqrt(d + e*x)))/e
```

Giac [A]
time = 1.54, size = 57, normalized size = 1.08

$$\frac{4\,bn\arctan\left(\frac{\sqrt{xe+d}}{\sqrt{-d}}\right)e^{(-1)}}{\sqrt{-d}}-\frac{2\,(bn\log(xe)-bn+b\log(c)+a)e^{(-1)}}{\sqrt{xe+d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

```
[Out] 4*b*n*arctan(sqrt(x*e + d)/sqrt(-d))*e^(-1)/sqrt(-d) - 2*(b*n*log(x*e) - b*
n + b*log(c) + a)*e^(-1)/sqrt(x*e + d)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{{\left(d+e\,x\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x)^(3/2),x)
[Out] int((a + b*log(c*x^n))/(d + e*x)^(3/2), x)
```

3.155 $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=201

$$\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}+\frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log($$

```
[Out] 4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)+2*b*n*arctanh((e*x+d)^(1/2)/d^
(1/2))^2/d^(3/2)-2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)-4
*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d
^(3/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)+2*(a+b*
ln(c*x^n))/d/(e*x+d)^(1/2)
```

Rubi [A]
time = 0.23, antiderivative size = 201, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2389, 65, 214, 2390, 12, 6131, 6055, 2449, 2352, 2356}

$$-\frac{2bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}-\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}+\frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}-\frac{4bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x)^(3/2)),x]
```

```
[Out] (4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/d^(3/2) + (2*b*n*ArcTanh[Sqrt[d + e*
x]/Sqrt[d]]^2)/d^(3/2) + (2*(a + b*Log[c*x^n]))/(d*Sqrt[d + e*x]) - (2*ArcT
anh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/d^(3/2) - (4*b*n*ArcTanh[Sqr
t[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/d^(3/2) - (
2*b*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/d^(3/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rule 2389

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x)
, x], x] - Dist[e/d, Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[
{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx}{d}$$

$$= \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} - \frac{(bn)\int -\frac{2\tanh^{-1}\left(\sqrt{d \ldots\right.}}{\sqrt{d}\ldots}}{d}$$

$$= \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{(2bn)\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+\ldots}}{\sqrt{\ldots}}\right.}{x}}{d^{3/2}}$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(\ldots}{d^{3/2}}$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tan\ldots}{}$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tan\ldots}{}$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tan\ldots}{}$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\tan\ldots}{}$$

Mathematica [A]
time = 0.19, size = 295, normalized size = 1.47

$$\frac{8bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + \frac{4\sqrt{d}(a+b\log(cx^n))}{\sqrt{d+ex}} + 2(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right) - 2(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right) - bn\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)+2\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)+2\text{Li}_2\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right) + bn\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)+2\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right)+2\text{Li}_2\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)}{2d^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^(3/2)),x]
```

```
[Out] (8*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + (4*Sqrt[d]*(a + b*Log[c*x^n]))/Sqrt
[d + e*x] + 2*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*(a + b*Lo
g[c*x^n])*Log[Sqrt[d] + Sqrt[d + e*x]] - b*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*
(Log[Sqrt[d] - Sqrt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*P
olyLog[2, 1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + b*n*(Log[Sqrt[d] + Sqrt[d + e
*x]]*(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]
) + 2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/(2*d^(3/2))
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a + b\ln\left(c\,x^{n}\right)}{x\left(ex+d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(e*x+d)^(3/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="maxima")
```

```
[Out] a*(log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/d^(3/2) + 2/(sq
rt(x*e + d)*d)) + b*integrate((log(c) + log(x^n))/((x^2*e + d*x)*sqrt(x*e +
 d)), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/(x^3*e^2 + 2*d*x^2*
e + d^2*x), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x+d)**(3/2),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^(3/2)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^(3/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^(3/2)), x)
```

3.156 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=253

$$-\frac{bn\sqrt{d+ex}}{d^2x}-\frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}}-\frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

```
[Out] -5*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(5/2)-3*b*e*n*arctanh((e*x+d)^(1/
2)/d^(1/2))^2/d^(5/2)+3*e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^
(5/2)+6*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^
(1/2)))/d^(5/2)+3*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(5
/2)-3*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^(1/2)+(-a-b*ln(c*x^n))/d/x/(e*x+d)^(1/2
)-b*n*(e*x+d)^(1/2)/d^2/x
```

Rubi [A]
time = 0.36, antiderivative size = 253, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 13, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.565$, Rules used = {44, 53, 65, 214, 2392, 12, 14, 43, 52, 6131, 6055, 2449, 2352}

$$\frac{3ben\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{5/2}}+\frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}-\frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}}-\frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{6ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}}-\frac{bn\sqrt{d+ex}}{d^2x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^(3/2)),x]
```

```
[Out] -((b*n*Sqrt[d + e*x])/(d^2*x)) - (5*b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/d
^(5/2) - (3*b*e*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/d^(5/2) - (3*e*(a + b*L
og[c*x^n]))/(d^2*Sqrt[d + e*x]) - (a + b*Log[c*x^n])/(d*x*Sqrt[d + e*x]) +
(3*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/d^(5/2) + (6*b*e*n*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/
d^(5/2) + (3*b*e*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/d
^(5/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \frac{2(a+b\log(cx^n))}{dx\sqrt{d+ex}} - \frac{3\sqrt{d+ex}\,(a+b\log(cx^n))}{d^2x} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

$$= \frac{2(a+b\log(cx^n))}{dx\sqrt{d+ex}} - \frac{3\sqrt{d+ex}\,(a+b\log(cx^n))}{d^2x} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

$$= \frac{2(a+b\log(cx^n))}{dx\sqrt{d+ex}} - \frac{3\sqrt{d+ex}\,(a+b\log(cx^n))}{d^2x} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

$$= -\frac{4ben\sqrt{d+ex}}{d^3} + \frac{2(a+b\log(cx^n))}{dx\sqrt{d+ex}} - \frac{3\sqrt{d+ex}\,(a+b\log(cx^n))}{d^2x} + \frac{3e\tanh^{-1}\left(\right.}{}$$

$$= -\frac{bn\sqrt{d+ex}}{d^2x} + \frac{2(a+b\log(cx^n))}{dx\sqrt{d+ex}} - \frac{3\sqrt{d+ex}\,(a+b\log(cx^n))}{d^2x} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d}}{}\right.}{}$$

$$= -\frac{bn\sqrt{d+ex}}{d^2x} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}} + \frac{2(a+b\log(cx^n))}{dx\sqrt{d+ex}} - \frac{3\sqrt{d+ex}\,(a+}{d^2x}$$

$$= -\frac{bn\sqrt{d+ex}}{d^2x} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}} + \frac{2(a+}{dx\sqrt{}}$$

$$= -\frac{bn\sqrt{d+ex}}{d^2x} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}} + \frac{2(a+}{dx\sqrt{}}$$

$$= -\frac{bn\sqrt{d+ex}}{d^2x} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}} + \frac{2(a+}{dx\sqrt{}}$$

Mathematica [A]
time = 0.33, size = 506, normalized size = 2.00

$$2e\left(-\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{bn\left(\frac{1}{\sqrt{d}-\sqrt{d+ex}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\right)}{4d^2}-\frac{bn\left(\frac{1}{\sqrt{d}+\sqrt{d+ex}}+\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\right)}{4d^2}-\frac{a+b\log(cx^n)}{d^2\sqrt{d+ex}}+\frac{a+b\log(cx^n)}{4d^2\left(\sqrt{d}-\sqrt{d+ex}\right)}-\frac{a+b\log(cx^n)}{4d^2\left(\sqrt{d}+\sqrt{d+ex}\right)}-\frac{3(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)}{4d^{5/2}}+\frac{3(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right)}{4d^{5/2}}+\frac{3bn\left(\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)+2\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{\sqrt{d}+\sqrt{d+ex}}{2\sqrt{d}}\right)+2\mathrm{Li}_2\left(\frac{\sqrt{d}-\sqrt{d+ex}}{2\sqrt{d}}\right)\right)}{8d^{5/2}}-\frac{3bn\left(2\log\left(\frac{\sqrt{d}-\sqrt{d+ex}}{2\sqrt{d}}\right)\log\left(\sqrt{d}+\sqrt{d+ex}\right)+\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)+2\mathrm{Li}_2\left(\frac{\sqrt{d}+\sqrt{d+ex}}{2\sqrt{d}}\right)\right)}{8d^{5/2}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^(3/2)),x]
```

```
[Out] 2*e*((-2*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/d^(5/2) + (b*n*((Sqrt[d] - Sqr
t[d + e*x])^(-1) - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]/Sqrt[d]))/(4*d^2) - (b*n*
((Sqrt[d] + Sqrt[d + e*x])^(-1) + ArcTanh[Sqrt[d + e*x]/Sqrt[d]]/Sqrt[d]))/
(4*d^2) - (a + b*Log[c*x^n])/(d^2*Sqrt[d + e*x]) + (a + b*Log[c*x^n])/(4*d^
2*(Sqrt[d] - Sqrt[d + e*x])) - (a + b*Log[c*x^n])/(4*d^2*(Sqrt[d] + Sqrt[d
+ e*x])) - (3*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]])/(4*d^(5/2))
+ (3*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sqrt[d + e*x]])/(4*d^(5/2)) + (3*b*n*
(Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 2*Log[Sqrt[d] - Sqrt[d + e*x]]*Log[(Sqrt[
d] + Sqrt[d + e*x])/(2*Sqrt[d])] + 2*PolyLog[2, (Sqrt[d] - Sqrt[d + e*x])/(
2*Sqrt[d])]))/(8*d^(5/2)) - (3*b*n*(2*Log[(Sqrt[d] - Sqrt[d + e*x])/(2*Sqrt
[d])]*Log[Sqrt[d] + Sqrt[d + e*x]] + Log[Sqrt[d] + Sqrt[d + e*x]]^2 + 2*Pol
yLog[2, (Sqrt[d] + Sqrt[d + e*x])/(2*Sqrt[d])]))/(8*d^(5/2)))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^2\left(ex+d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -1/2*a*(2*(3*(x*e + d)*e - 2*d*e)/((x*e + d)^(3/2)*d^2 - sqrt(x*e + d)*d^3)
 + 3*e*log((sqrt(x*e + d) - sqrt(d))/(sqrt(x*e + d) + sqrt(d)))/d^(5/2)) +
b*integrate((log(c) + log(x^n))/((x^3*e + d*x^2)*sqrt(x*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*a)/(x^4*e^2 + 2*d*x^3*
e + d^2*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{x^{2}\left(d + ex\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**(3/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x*e + d)^(3/2)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^(3/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^(3/2)), x)
```

3.157 $\int \frac{x^2}{(d+ex)(a+b\log(cx^n))} dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{x^2}{(d+ex)(a+b\log(cx^n))},x\right)$$

```
[Out] Unintegrable(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.06, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx$$

Verification is not applicable to the result.

```
[In] Int[x^2/((d + e*x)*(a + b*Log[c*x^n])),x]
[Out] Defer[Int][x^2/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx = \int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx$$

Mathematica [A]
time = 1.56, size = 0, normalized size = 0.00

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[x^2/((d + e*x)*(a + b*Log[c*x^n])),x]
[Out] Integrate[x^2/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^2}{(ex+d)(a+b\ln(c\,x^n))}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
[Out] int(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(x^2/((x*e + d)*(b*log(c*x^n) + a)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(x^2/(a*x*e + a*d + (b*x*e + b*d)*log(c*x^n)), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{(a+b\log(cx^n))(d+ex)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(e*x+d)/(a+b*ln(c*x**n)),x)
[Out] Integral(x**2/((a + b*log(c*x**n))*(d + e*x)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(x^2/((x*e + d)*(b*log(c*x^n) + a)), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x^2}{(a+b\,\ln(c\,x^n))\,(d+e\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/((a + b*log(c*x^n))*(d + e*x)),x)
[Out] int(x^2/((a + b*log(c*x^n))*(d + e*x)), x)
```

3.158 $\int \frac{x}{(d+ex)(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=24

$$\text{Int}\left(\frac{x}{(d+ex)\,(a+b\log\left(cx^n\right))},x\right)$$

```
[Out] Unintegrable(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx$$

Verification is not applicable to the result.

```
[In] Int[x/((d + e*x)*(a + b*Log[c*x^n])),x]
[Out] Defer[Int][x/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{x}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx = \int \frac{x}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx$$

Mathematica [A]
time = 0.98, size = 0, normalized size = 0.00

$$\int \frac{x}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[x/((d + e*x)*(a + b*Log[c*x^n])),x]
[Out] Integrate[x/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{x}{(ex+d)\,(a+b\ln\left(c\,x^n\right))}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(e*x+d)/(a+b*ln(c*x^n)),x)
[Out] int(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(x/((x*e + d)*(b*log(c*x^n) + a)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(x/(a*x*e + a*d + (b*x*e + b*d)*log(c*x^n)), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{(a + b\log(cx^n))(d + ex)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(e*x+d)/(a+b*ln(c*x**n)),x)
[Out] Integral(x/((a + b*log(c*x**n))*(d + e*x)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(x/((x*e + d)*(b*log(c*x^n) + a)), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x}{(a + b\,\ln(c\,x^n))\,(d + e\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/((a + b*log(c*x^n))*(d + e*x)),x)
[Out] int(x/((a + b*log(c*x^n))*(d + e*x)), x)
```

3.159 $\int \frac{1}{(d+ex)(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=23

$$\text{Int}\left(\frac{1}{(d+ex)\,(a+b\log{(cx^n)})},x\right)$$

```
[Out] Unintegrable(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{1}{(d+ex)\,(a+b\log{(cx^n)})}\,dx$$

Verification is not applicable to the result.

```
[In] Int[1/((d + e*x)*(a + b*Log[c*x^n])),x]
```

```
[Out] Defer[Int][1/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{1}{(d+ex)\,(a+b\log{(cx^n)})}\,dx = \int \frac{1}{(d+ex)\,(a+b\log{(cx^n)})}\,dx$$

Mathematica [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{1}{(d+ex)\,(a+b\log{(cx^n)})}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[1/((d + e*x)*(a + b*Log[c*x^n])),x]
```

```
[Out] Integrate[1/((d + e*x)*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{1}{(ex+d)\,(a+b\ln{(c\,x^n)})}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(e*x+d)/(a+b*ln(c*x^n)),x)
[Out] int(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(1/((x*e + d)*(b*log(c*x^n) + a)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(1/(a*x*e + a*d + (b*x*e + b*d)*log(c*x^n)), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{(a + b\log{(cx^n)})\,(d + ex)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x+d)/(a+b*ln(c*x**n)),x)
[Out] Integral(1/((a + b*log(c*x**n))*(d + e*x)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(1/((x*e + d)*(b*log(c*x^n) + a)), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((a + b*log(c*x^n))*(d + e*x)),x)
[Out] int(1/((a + b*log(c*x^n))*(d + e*x)), x)
```

3.160 $\int \frac{1}{x(d+ex)(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

```
[Out] Unintegrable(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification is not applicable to the result.

```
[In] Int[1/(x*(d + e*x)*(a + b*Log[c*x^n])),x]
```

```
[Out] Defer[Int][1/(x*(d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Mathematica [A]
time = 0.29, size = 0, normalized size = 0.00

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[1/(x*(d + e*x)*(a + b*Log[c*x^n])),x]
```

```
[Out] Integrate[1/(x*(d + e*x)*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{1}{x\left(ex+d\right)\left(a+b\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
[Out] int(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(1/((x*e + d)*(b*log(c*x^n) + a)*x), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(1/(a*x^2*e + a*d*x + (b*x^2*e + b*d*x)*log(c*x^n)), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\left(a+b\log\left(cx^{n}\right)\right)\left(d+ex\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(e*x+d)/(a+b*ln(c*x**n)),x)
[Out] Integral(1/(x*(a + b*log(c*x**n))*(d + e*x)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(1/((x*e + d)*(b*log(c*x^n) + a)*x), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{x\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\,\left(d+e\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(a + b*log(c*x^n))*(d + e*x)),x)
[Out] int(1/(x*(a + b*log(c*x^n))*(d + e*x)), x)
```

3.161 $\int \frac{1}{x^2(d+ex)(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=26

$$\mathrm{Int}\left(\frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

```
[Out] Unintegrable(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.06, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification is not applicable to the result.

```
[In] Int[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])),x]
[Out] Defer[Int][1/(x^2*(d + e*x)*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Mathematica [A]
time = 0.59, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])),x]
[Out] Integrate[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2\left(ex+d\right)\left(a+b\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
[Out] int(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(1/((x*e + d)*(b*log(c*x^n) + a)*x^2), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(1/(a*x^3*e + a*d*x^2 + (b*x^3*e + b*d*x^2)*log(c*x^n)), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2\left(a+b\log\left(cx^n\right)\right)\left(d+ex\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(e*x+d)/(a+b*ln(c*x**n)),x)
[Out] Integral(1/(x**2*(a + b*log(c*x**n))*(d + e*x)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(1/((x*e + d)*(b*log(c*x^n) + a)*x^2), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*(a + b*log(c*x^n))*(d + e*x)),x)
[Out] int(1/(x^2*(a + b*log(c*x^n))*(d + e*x)), x)
```

3.162 $\int (fx)^m(d+ex)^3 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=211

$$-\frac{bd^3n(fx)^{1+m}}{f(1+m)^2}-\frac{3bd^2en(fx)^{2+m}}{f^2(2+m)^2}-\frac{3bde^2n(fx)^{3+m}}{f^3(3+m)^2}-\frac{be^3n(fx)^{4+m}}{f^4(4+m)^2}+\frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{3d^2e(fx)^{2+m}}{f}$$

```
[Out] -b*d^3*n*(f*x)^(1+m)/f/(1+m)^2-3*b*d^2*e*n*(f*x)^(2+m)/f^2/(2+m)^2-3*b*d*e^
2*n*(f*x)^(3+m)/f^3/(3+m)^2-b*e^3*n*(f*x)^(4+m)/f^4/(4+m)^2+d^3*(f*x)^(1+m)
*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*(f*x)^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)+3*d*
e^2*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+e^3*(f*x)^(4+m)*(a+b*ln(c*x^n))/f
^4/(4+m)
```

Rubi [A]

time = 0.16, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {45, 2392, 14}

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^3(fx)^{m+4}(a+b\log(cx^n))}{f^4(m+4)}-\frac{bd^3n(fx)^{m+1}}{f(m+1)^2}-\frac{3bd^2en(fx)^{m+2}}{f^2(m+2)^2}-\frac{3bde^2n(fx)^{m+3}}{f^3(m+3)^2}-\frac{be^3n(fx)^{m+4}}{f^4(m+4)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d^3*n*(f*x)^(1 + m))/(f*(1 + m)^2)) - (3*b*d^2*e*n*(f*x)^(2 + m))/(f^2
*(2 + m)^2) - (3*b*d*e^2*n*(f*x)^(3 + m))/(f^3*(3 + m)^2) - (b*e^3*n*(f*x)^
(4 + m))/(f^4*(4 + m)^2) + (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m
)) + (3*d^2*e*(f*x)^(2 + m)*(a + b*Log[c*x^n]))/(f^2*(2 + m)) + (3*d*e^2*(f
*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m)) + (e^3*(f*x)^(4 + m)*(a + b*L
og[c*x^n]))/(f^4*(4 + m))
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
```

```
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m(d+ex)^3\,(a+b\log(cx^n))\,dx = \frac{d^3(fx)^{1+m}\,(a+b\log(cx^n))}{f(1+m)} + \frac{3d^2e(fx)^{2+m}\,(a+b\log(cx^n))}{f^2(2+m)} + \frac{3de^2}{}$$
$$= \frac{d^3(fx)^{1+m}\,(a+b\log(cx^n))}{f(1+m)} + \frac{3d^2e(fx)^{2+m}\,(a+b\log(cx^n))}{f^2(2+m)} + \frac{3de^2}{}$$
$$= -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} - \frac{3bd^2en(fx)^{2+m}}{f^2(2+m)^2} - \frac{3bde^2n(fx)^{3+m}}{f^3(3+m)^2} - \frac{be^3n(fx)^{4+m}}{f^4(4+m)^2}$$

Mathematica [A]
time = 0.38, size = 230, normalized size = 1.09

$$x(fx)^m\left(bn\left(\frac{d^3}{1+m}+\frac{3d^2ex}{2+m}+\frac{3de^2x^2}{3+m}+\frac{e^3x^3}{4+m}\right)\log(x)+\frac{d^3(a+am-bn-b(1+m)n\log(x)+b(1+m)\log(cx^n))}{(1+m)^2}+\frac{3d^2ex(2a+am-bn-b(2+m)n\log(x)+b(2+m)\log(cx^n))}{(2+m)^2}+\frac{3de^2x^2(3a+am-bn-b(3+m)n\log(x)+b(3+m)\log(cx^n))}{(3+m)^2}+\frac{e^3x^3(4a+am-bn-b(4+m)n\log(x)+b(4+m)\log(cx^n))}{(4+m)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(f*x)^m*(b*n*(d^3/(1 + m) + (3*d^2*e*x)/(2 + m) + (3*d*e^2*x^2)/(3 + m) +
 (e^3*x^3)/(4 + m))*Log[x] + (d^3*(a + a*m - b*n - b*(1 + m)*n*Log[x] + b*(
1 + m)*Log[c*x^n]))/(1 + m)^2 + (3*d^2*e*x*(2*a + a*m - b*n - b*(2 + m)*n*L
og[x] + b*(2 + m)*Log[c*x^n]))/(2 + m)^2 + (3*d*e^2*x^2*(3*a + a*m - b*n -
b*(3 + m)*n*Log[x] + b*(3 + m)*Log[c*x^n]))/(3 + m)^2 + (e^3*x^3*(4*a + a*m
 - b*n - b*(4 + m)*n*Log[x] + b*(4 + m)*Log[c*x^n]))/(4 + m)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.46, size = 5021, normalized size = 23.80

method	result	size
risch	Expression too large to display	5021

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [A]
time = 0.30, size = 286, normalized size = 1.36

$$\frac{bf^mx^4e^{(m\log(x)+3)}\log(cx^n)}{m+4}+\frac{3\,bdf^mx^3e^{(m\log(x)+2)}\log(cx^n)}{m+3}+\frac{3\,bd^2f^mx^2e^{(m\log(x)+1)}\log(cx^n)}{m+2}-\frac{bd^3f^mnxx^m}{(m+1)^2}+\frac{af^mx^4e^{(m\log(x)+3)}}{m+4}-\frac{bf^mnx^4e^{(m\log(x)+3)}}{(m+4)^2}+\frac{3\,adf^mx^3e^{(m\log(x)+2)}}{m+3}-\frac{3\,bdf^mnx^3e^{(m\log(x)+2)}}{(m+3)^2}+\frac{3\,ad^2f^mx^2e^{(m\log(x)+1)}}{m+2}-\frac{3\,bd^2f^mnx^2e^{(m\log(x)+1)}}{(m+2)^2}+\frac{(fx)^{m+1}bd^3\log(cx^n)}{f(m+1)}+\frac{(fx)^{m+1}ad^3}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] b*f^m*x^4*e^(m*log(x) + 3)*log(c*x^n)/(m + 4) + 3*b*d*f^m*x^3*e^(m*log(x) +
 2)*log(c*x^n)/(m + 3) + 3*b*d^2*f^m*x^2*e^(m*log(x) + 1)*log(c*x^n)/(m + 2
) - b*d^3*f^m*n*x*x^m/(m + 1)^2 + a*f^m*x^4*e^(m*log(x) + 3)/(m + 4) - b*f^
m*n*x^4*e^(m*log(x) + 3)/(m + 4)^2 + 3*a*d*f^m*x^3*e^(m*log(x) + 2)/(m + 3)
 - 3*b*d*f^m*n*x^3*e^(m*log(x) + 2)/(m + 3)^2 + 3*a*d^2*f^m*x^2*e^(m*log(x)
 + 1)/(m + 2) - 3*b*d^2*f^m*n*x^2*e^(m*log(x) + 1)/(m + 2)^2 + (f*x)^(m + 1
)*b*d^3*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 1023 vs. $2(209) = 418$.

time = 0.39, size = 1023, normalized size = 4.85

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((a*m^7 + 16*a*m^6 + 106*a*m^5 + 376*a*m^4 + 769*a*m^3 + 904*a*m^2 + 564*a*
m - (b*m^6 + 12*b*m^5 + 58*b*m^4 + 144*b*m^3 + 193*b*m^2 + 132*b*m + 36*b)*
n + 144*a)*x^4*e^3 + 3*(a*d*m^7 + 17*a*d*m^6 + 119*a*d*m^5 + 443*a*d*m^4 +
944*a*d*m^3 + 1148*a*d*m^2 + 736*a*d*m + 192*a*d - (b*d*m^6 + 14*b*d*m^5 +
77*b*d*m^4 + 212*b*d*m^3 + 308*b*d*m^2 + 224*b*d*m + 64*b*d)*n)*x^3*e^2 + 3
*(a*d^2*m^7 + 18*a*d^2*m^6 + 134*a*d^2*m^5 + 532*a*d^2*m^4 + 1209*a*d^2*m^3
 + 1562*a*d^2*m^2 + 1056*a*d^2*m + 288*a*d^2 - (b*d^2*m^6 + 16*b*d^2*m^5 +
102*b*d^2*m^4 + 328*b*d^2*m^3 + 553*b*d^2*m^2 + 456*b*d^2*m + 144*b*d^2)*n)
*x^2*e + (a*d^3*m^7 + 19*a*d^3*m^6 + 151*a*d^3*m^5 + 649*a*d^3*m^4 + 1624*a
*d^3*m^3 + 2356*a*d^3*m^2 + 1824*a*d^3*m + 576*a*d^3 - (b*d^3*m^6 + 18*b*d^
3*m^5 + 133*b*d^3*m^4 + 516*b*d^3*m^3 + 1108*b*d^3*m^2 + 1248*b*d^3*m + 576
*b*d^3)*n)*x + ((b*m^7 + 16*b*m^6 + 106*b*m^5 + 376*b*m^4 + 769*b*m^3 + 904
*b*m^2 + 564*b*m + 144*b)*x^4*e^3 + 3*(b*d*m^7 + 17*b*d*m^6 + 119*b*d*m^5 +
 443*b*d*m^4 + 944*b*d*m^3 + 1148*b*d*m^2 + 736*b*d*m + 192*b*d)*x^3*e^2 +
3*(b*d^2*m^7 + 18*b*d^2*m^6 + 134*b*d^2*m^5 + 532*b*d^2*m^4 + 1209*b*d^2*m^
3 + 1562*b*d^2*m^2 + 1056*b*d^2*m + 288*b*d^2)*x^2*e + (b*d^3*m^7 + 19*b*d^
3*m^6 + 151*b*d^3*m^5 + 649*b*d^3*m^4 + 1624*b*d^3*m^3 + 2356*b*d^3*m^2 + 1
824*b*d^3*m + 576*b*d^3)*x)*log(c) + ((b*m^7 + 16*b*m^6 + 106*b*m^5 + 376*b
*m^4 + 769*b*m^3 + 904*b*m^2 + 564*b*m + 144*b)*n*x^4*e^3 + 3*(b*d*m^7 + 17
*b*d*m^6 + 119*b*d*m^5 + 443*b*d*m^4 + 944*b*d*m^3 + 1148*b*d*m^2 + 736*b*d
*m + 192*b*d)*n*x^3*e^2 + 3*(b*d^2*m^7 + 18*b*d^2*m^6 + 134*b*d^2*m^5 + 532
*b*d^2*m^4 + 1209*b*d^2*m^3 + 1562*b*d^2*m^2 + 1056*b*d^2*m + 288*b*d^2)*n*
x^2*e + (b*d^3*m^7 + 19*b*d^3*m^6 + 151*b*d^3*m^5 + 649*b*d^3*m^4 + 1624*b*
d^3*m^3 + 2356*b*d^3*m^2 + 1824*b*d^3*m + 576*b*d^3)*n*x)*log(x))*e^(m*log(
f) + m*log(x))/(m^8 + 20*m^7 + 170*m^6 + 800*m^5 + 2273*m^4 + 3980*m^3 + 41
80*m^2 + 2400*m + 576)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 6156 vs. $2(206) = 412$.
time = 7.51, size = 6156, normalized size = 29.18

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((-a*d**3/(3*x**3) - 3*a*d**2*e/(2*x**2) - 3*a*d*e**2/x + a*e**3*
log(x) + b*d**3*(-n/(9*x**3) - log(c*x**n)/(3*x**3)) + 3*b*d**2*e*(-n/(4*x*
*2) - log(c*x**n)/(2*x**2)) + 3*b*d*e**2*(-n/x - log(c*x**n)/x) - b*e**3*Pi
ecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**4, E
q(m, -4)), ((-a*d**3/(2*x**2) - 3*a*d**2*e/x + 3*a*d*e**2*log(c*x**n)/n + a
*e**3*x - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*e*n/x
- 3*b*d**2*e*log(c*x**n)/x + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x +
 b*e**3*x*log(c*x**n))/f**3, Eq(m, -3)), ((-a*d**3/x + 3*a*d**2*e*log(c*x**
n)/n + 3*a*d*e**2*x + a*e**3*x**2/2 - b*d**3*n/x - b*d**3*log(c*x**n)/x + 3
*b*d**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n)
- b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x**n)/2)/f**2, Eq(m, -2)), ((a*d**3*l
og(c*x**n)/n + 3*a*d**2*e*x + 3*a*d*e**2*x**2/2 + a*e**3*x**3/3 + b*d**3*lo
g(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c*x**n) - 3*b*d*e**2
*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*x**3/9 + b*e**3*x**3*l
og(c*x**n)/3)/f, Eq(m, -1)), (a*d**3*m**7*x*(f*x)**m/(m**8 + 20*m**7 + 170*
m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 19*a*
d**3*m**6*x*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 39
80*m**3 + 4180*m**2 + 2400*m + 576) + 151*a*d**3*m**5*x*(f*x)**m/(m**8 + 20
*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m +
576) + 649*a*d**3*m**4*x*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2
273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 1624*a*d**3*m**3*x*(f*x)
**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m*
*2 + 2400*m + 576) + 2356*a*d**3*m**2*x*(f*x)**m/(m**8 + 20*m**7 + 170*m**6
 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 1824*a*d*
*3*m*x*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m*
*3 + 4180*m**2 + 2400*m + 576) + 576*a*d**3*x*(f*x)**m/(m**8 + 20*m**7 + 17
0*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 3*a
*d**2*e*m**7*x**2*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**
4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 54*a*d**2*e*m**6*x**2*(f*x)**m/
(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 +
 2400*m + 576) + 402*a*d**2*e*m**5*x**2*(f*x)**m/(m**8 + 20*m**7 + 170*m**6
 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 1596*a*d*
*2*e*m**4*x**2*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 +
 3980*m**3 + 4180*m**2 + 2400*m + 576) + 3627*a*d**2*e*m**3*x**2*(f*x)**m/(
m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 +
2400*m + 576) + 4686*a*d**2*e*m**2*x**2*(f*x)**m/(m**8 + 20*m**7 + 170*m**6
```

```
 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 3168*a*d*
*2*e*m*x**2*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 39
80*m**3 + 4180*m**2 + 2400*m + 576) + 864*a*d**2*e*x**2*(f*x)**m/(m**8 + 20
*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m +
576) + 3*a*d*e**2*m**7*x**3*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5
+ 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 51*a*d*e**2*m**6*x**3
*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4
180*m**2 + 2400*m + 576) + 357*a*d*e**2*m**5*x**3*(f*x)**m/(m**8 + 20*m**7
+ 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) +
 1329*a*d*e**2*m**4*x**3*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2
273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 2832*a*d*e**2*m**3*x**3*
(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 41
80*m**2 + 2400*m + 576) + 3444*a*d*e**2*m**2*x**3*(f*x)**m/(m**8 + 20*m**7
+ 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) +
 2208*a*d*e**2*m*x**3*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273
*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 576*a*d*e**2*x**3*(f*x)**m/
(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 +
 2400*m + 576) + a*e**3*m**7*x**4*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800
*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 16*a*e**3*m**6*
x**4*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3
 + 4180*m**2 + 2400*m + 576) + 106*a*e**3*m**5*x**4*(f*x)**m/(m**8 + 20*m**
7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576)
 + 376*a*e**3*m**4*x**4*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 22
73*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 769*a*e**3*m**3*x**4*(f*x
)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m
**2 + 2400*m + 576) + 904*a*e**3*m**2*x**4*(f*x)**m/(m**8 + 20*m**7 + 170*m
**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 564*a*
e**3*m*x**4*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 39
80*m**3 + 4180*m**2 + 2400*m + 576) + 144*a*e**3*x**4*(f*x)**m/(m**8 + 20*m
**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 57
6) + b*d**3*m**7*x*(f*x)**m*log(c*x**n)/(m**8 +...
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 531 vs. 2(209) = 418.
time = 2.51, size = 531, normalized size = 2.52

$$\frac{bf^3f^mx^4x^me^3\log(c)}{f^3m+4f^3}+\frac{af^3f^mx^4x^me^3}{f^3m+4f^3}+\frac{3bdf^2f^mx^3x^me^2\log(c)}{f^2m+3f^2}+\frac{bf^mmnx^4x^me^3\log(x)}{m^2+8m+16}+\frac{3bdf^mmnx^3x^me^2\log(x)}{m^2+6m+9}+\frac{3bd^2f^mmnx^2x^me\log(x)}{m^2+4m+4}+\frac{3adf^2f^mx^3x^me^2}{f^2m+3f^2}+\frac{bd^3f^mmnxx^m\log(x)}{m^2+2m+1}+\frac{4bf^mnx^4x^me^3\log(x)}{m^2+8m+16}+\frac{9bdf^mnx^3x^me^2\log(x)}{m^2+6m+9}+\frac{6bd^2f^mnx^2x^me\log(x)}{m^2+4m+4}-\frac{bf^mnx^4x^me^3}{m^2+8m+16}-\frac{3bdf^mnx^3x^me^2}{m^2+6m+9}-\frac{3bd^2f^mnx^2x^me}{m^2+4m+4}+\frac{3bd^2f^mx^2x^me\log(c)}{m+2}+\frac{bd^3f^mnxx^m\log(x)}{m^2+2m+1}-\frac{bd^3f^mnxx^m}{m^2+2m+1}+\frac{3ad^2f^mx^2x^me}{m+2}+\frac{(fx)^mbd^3x\log(c)}{m+1}+\frac{(fx)^mad^3x}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^3*f^m*x^4*x^m*e^3*log(c)/(f^3*m + 4*f^3) + a*f^3*f^m*x^4*x^m*e^3/(f^3*m
 + 4*f^3) + 3*b*d*f^2*f^m*x^3*x^m*e^2*log(c)/(f^2*m + 3*f^2) + b*f^m*m*n*x^
4*x^m*e^3*log(x)/(m^2 + 8*m + 16) + 3*b*d*f^m*m*n*x^3*x^m*e^2*log(x)/(m^2 +
 6*m + 9) + 3*b*d^2*f^m*m*n*x^2*x^m*e*log(x)/(m^2 + 4*m + 4) + 3*a*d*f^2*f^
```

```
m*x^3*x^m*e^2/(f^2*m + 3*f^2) + b*d^3*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1)
+ 4*b*f^m*n*x^4*x^m*e^3*log(x)/(m^2 + 8*m + 16) + 9*b*d*f^m*n*x^3*x^m*e^2*l
og(x)/(m^2 + 6*m + 9) + 6*b*d^2*f^m*n*x^2*x^m*e*log(x)/(m^2 + 4*m + 4) - b*
f^m*n*x^4*x^m*e^3/(m^2 + 8*m + 16) - 3*b*d*f^m*n*x^3*x^m*e^2/(m^2 + 6*m + 9
) - 3*b*d^2*f^m*n*x^2*x^m*e/(m^2 + 4*m + 4) + 3*b*d^2*f^m*x^2*x^m*e*log(c)/
(m + 2) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^3*f^m*n*x*x^m/(m^2
 + 2*m + 1) + 3*a*d^2*f^m*x^2*x^m*e/(m + 2) + (f*x)^m*b*d^3*x*log(c)/(m + 1
) + (f*x)^m*a*d^3*x/(m + 1)
```

Mupad [**F**]

time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^3 \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

```
[Out] int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^3, x)
```

3.163 $\int (fx)^m(d+ex)^2 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=153

$$-\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}-\frac{2bden(fx)^{2+m}}{f^2(2+m)^2}-\frac{be^2n(fx)^{3+m}}{f^3(3+m)^2}+\frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{2de(fx)^{2+m}(a+b\log(cx^n))}{f^2(2+m)}$$

```
[Out] -b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*(f*x)^(2+m)/f^2/(2+m)^2-b*e^2*n*(f
*x)^(3+m)/f^3/(3+m)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+2*d*e*(f*x)^(
2+m)*(a+b*ln(c*x^n))/f^2/(2+m)+e^2*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)
```

Rubi [A]
time = 0.13, antiderivative size = 153, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = $\{45, 2392, 12, 14\}$

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{e^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}-\frac{bd^2n(fx)^{m+1}}{f(m+1)^2}-\frac{2bden(fx)^{m+2}}{f^2(m+2)^2}-\frac{be^2n(fx)^{m+3}}{f^3(m+3)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d^2*n*(f*x)^(1 + m))/(f*(1 + m)^2)) - (2*b*d*e*n*(f*x)^(2 + m))/(f^2*(
2 + m)^2) - (b*e^2*n*(f*x)^(3 + m))/(f^3*(3 + m)^2) + (d^2*(f*x)^(1 + m)*(a
 + b*Log[c*x^n]))/(f*(1 + m)) + (2*d*e*(f*x)^(2 + m)*(a + b*Log[c*x^n]))/(f
^2*(2 + m)) + (e^2*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)dx = \frac{d^2(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)}+\frac{2de(fx)^{2+m}\left(a+b\log\left(cx^n\right)\right)}{f^2(2+m)}+\frac{e^2(fx$$
$$= \frac{d^2(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)}+\frac{2de(fx)^{2+m}\left(a+b\log\left(cx^n\right)\right)}{f^2(2+m)}+\frac{e^2(fx$$
$$= \frac{d^2(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)}+\frac{2de(fx)^{2+m}\left(a+b\log\left(cx^n\right)\right)}{f^2(2+m)}+\frac{e^2(fx$$
$$= -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}-\frac{2bden(fx)^{2+m}}{f^2(2+m)^2}-\frac{be^2n(fx)^{3+m}}{f^3(3+m)^2}+\frac{d^2(fx)^{1+m}(a+}{f(1+$$

Mathematica [A]
time = 0.20, size = 167, normalized size = 1.09

$$x(fx)^m\left(bn\left(\frac{d^2}{1+m}+\frac{2dex}{2+m}+\frac{e^2x^2}{3+m}\right)\log(x)+\frac{d^2(a+am-bn-b(1+m)n\log(x)+b(1+m)\log\left(cx^n\right))}{(1+m)^2}+\frac{2dex(2a+am-bn-b(2+m)n\log(x)+b(2+m)\log\left(cx^n\right))}{(2+m)^2}+\frac{e^2x^2(3a+am-bn-b(3+m)n\log(x)+b(3+m)\log\left(cx^n\right))}{(3+m)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(f*x)^m*(b*n*(d^2/(1 + m) + (2*d*e*x)/(2 + m) + (e^2*x^2)/(3 + m))*Log[x]
 + (d^2*(a + a*m - b*n - b*(1 + m)*n*Log[x] + b*(1 + m)*Log[c*x^n]))/(1 + m
)^2 + (2*d*e*x*(2*a + a*m - b*n - b*(2 + m)*n*Log[x] + b*(2 + m)*Log[c*x^n]
))/(2 + m)^2 + (e^2*x^2*(3*a + a*m - b*n - b*(3 + m)*n*Log[x] + b*(3 + m)*L
og[c*x^n]))/(3 + m)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.28, size = 2702, normalized size = 17.66

method	result	size
risch	Expression too large to display	2702

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

[Out] b*x*(e^2*m^2*x^2+2*d*e*m^2*x+3*e^2*m*x^2+d^2*m^2+8*d*e*m*x+2*e^2*x^2+5*d^2*
m+6*d*e*x+6*d^2)/(1+m)/(2+m)/(3+m)*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn
(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)
*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/2*x*(24*a*e^2*x^2+72*ln(c)*b*d*e*x+7
2*a*d*e*x-74*b*d^2*m^2*n-120*b*d^2*m*n+136*I*Pi*b*d*e*m^2*x*csgn(I*c)*csgn(
I*c*x^n)^2+72*d^2*b*ln(c)+22*a*d^2*m^4-72*b*d^2*n+72*a*d^2-36*I*Pi*b*d^2*cs
gn(I*c*x^n)^3-26*b*e^2*m^2*n*x^2-88*b*d*e*m^2*n*x-24*b*e^2*m*n*x^2-96*b*d*e
*m*n*x+24*ln(c)*b*e^2*x^2+94*a*d^2*m^3+194*a*d^2*m^2+192*a*d^2*m+2*a*e^2*m^
5*x^2-2*b*d^2*m^4*n+18*a*e^2*m^4*x^2-20*b*d^2*m^3*n+2*ln(c)*b*d^2*m^5+22*ln
(c)*b*d^2*m^4+94*ln(c)*b*d^2*m^3+194*ln(c)*b*d^2*m^2+192*ln(c)*b*d^2*m+2*a*
d^2*m^5+31*I*Pi*b*e^2*m^3*x^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d^2*m^5*csgn
(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d^2*m^5*csgn(I*x^n)*csgn(I*c*x^n)^2+11*I*Pi*b*
d^2*m^4*csgn(I*c)*csgn(I*c*x^n)^2+11*I*Pi*b*d^2*m^4*csgn(I*x^n)*csgn(I*c*x^
n)^2+76*I*Pi*b*d*e*m^3*x*csgn(I*c)*csgn(I*c*x^n)^2+76*I*Pi*b*d*e*m^3*x*csgn
(I*x^n)*csgn(I*c*x^n)^2-51*I*Pi*b*e^2*m^2*x^2*csgn(I*c*x^n)^3+47*I*Pi*b*d^2
*m^3*csgn(I*c)*csgn(I*c*x^n)^2+47*I*Pi*b*d^2*m^3*csgn(I*x^n)*csgn(I*c*x^n)^
2-40*I*Pi*b*e^2*m*x^2*csgn(I*c*x^n)^3-2*I*Pi*b*d*e*m^5*x*csgn(I*c*x^n)^3-12
*b*e^2*m^3*n*x^2+40*a*d*e*m^4*x-76*I*Pi*b*d*e*m^3*x*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-136*I*Pi*b*d*e*m^2*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*P
i*b*e^2*m^4*x^2*csgn(I*c)*csgn(I*c*x^n)^2+136*I*Pi*b*d*e*m^2*x*csgn(I*x^n)*
csgn(I*c*x^n)^2+62*a*e^2*m^3*x^2+102*a*e^2*m^2*x^2+80*a*e^2*m*x^2+152*a*d*e
*m^3*x+272*a*d*e*m^2*x+228*a*d*e*m*x-8*b*e^2*n*x^2+62*ln(c)*b*e^2*m^3*x^2+1
02*ln(c)*b*e^2*m^2*x^2+80*ln(c)*b*e^2*m*x^2-2*b*e^2*m^4*n*x^2+4*a*d*e*m^5*x
+51*I*Pi*b*e^2*m^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+51*I*Pi*b*e^2*m^2*x^2*csgn
(I*x^n)*csgn(I*c*x^n)^2+18*ln(c)*b*e^2*m^4*x^2+2*ln(c)*b*e^2*m^5*x^2-I*Pi*b
*d^2*m^5*csgn(I*c*x^n)^3-11*I*Pi*b*d^2*m^4*csgn(I*c*x^n)^3+36*I*Pi*b*d^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2-47*I*Pi*b*d^2*m^3*csgn(I*c*x^n)^3-97*I*Pi*b*d^2*m
^2*csgn(I*c*x^n)^3-12*I*Pi*b*e^2*x^2*csgn(I*c*x^n)^3-32*b*d*e*m^3*n*x-51*I*
Pi*b*e^2*m^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+114*I*Pi*b*d*e*m*x*csg
n(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*e^2*m^4*x^2*csgn(I*c*x^n)^3-40*I*Pi*b*e^2
*m*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+114*I*Pi*b*d*e*m*x*csgn(I*c)*csg
n(I*c*x^n)^2-31*I*Pi*b*e^2*m^3*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*
Pi*b*e^2*m^4*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d^2*m^5*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)-36*b*d*e*n*x-96*I*Pi*b*d^2*m*csgn(I*c*x^n)^3+36*I*Pi*b
*d^2*csgn(I*c)*csgn(I*c*x^n)^2-11*I*Pi*b*d^2*m^4*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)-20*I*Pi*b*d*e*m^4*x*csgn(I*c*x^n)^3-114*I*Pi*b*d*e*m*x*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-2*I*Pi*b*d*e*m^5*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-20*I*Pi*b*d*e*m^4*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+96*I*Pi*b*d^2
*m*csgn(I*c)*csgn(I*c*x^n)^2+96*I*Pi*b*d^2*m*csgn(I*x^n)*csgn(I*c*x^n)^2-36
*I*Pi*b*d*e*x*csgn(I*c*x^n)^3-36*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)-36*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*e^2*m^5*x^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b*d*e*m^5*x*csgn(I*c)*csgn(I*c*
x^n)^2+2*I*Pi*b*d*e*m^5*x*csgn(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*e^2*m^4*x^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+20*I*Pi*b*d*e*m^4*x*csgn(I*c)*csgn(I*c*
x^n)^2+20*I*Pi*b*d*e*m^4*x*csgn(I*x^n)*csgn(I*c*x^n)^2+12*I*Pi*b*e^2*x^2*cs

```
gn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*b*e^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-31*I*
Pi*b*e^2*m^3*x^2*csgn(I*c*x^n)^3+40*ln(c)*b*d*e*m^4*x+4*ln(c)*b*d*e*m^5*x+1
52*ln(c)*b*d*e*m^3*x+272*ln(c)*b*d*e*m^2*x+228*ln(c)*b*d*e*m*x-4*b*d*e*m^4*
n*x+97*I*Pi*b*d^2*m^2*csgn(I*c)*csgn(I*c*x^n)^2+97*I*Pi*b*d^2*m^2*csgn(I*x^
n)*csgn(I*c*x^n)^2-I*Pi*b*e^2*m^5*x^2*csgn(I*c*x^n)^3-47*I*Pi*b*d^2*m^3*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-136*I*Pi*b*d*e*m^2*x*csgn(I*c*x^n)^3+40*I*
Pi*b*e^2*m*x^2*csgn(I*c)*csgn(I*c*x^n)^2+40*I*Pi*b*e^2*m*x^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2-97*I*Pi*b*d^2*m^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*
e^2*m^5*x^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*e^2*m^5*x^2*csgn(I*x^n)*csgn(I
*c*x^n)^2-114*I*Pi*b*d*e*m*x*csgn(I*c*x^n)^3-12*I*Pi*b*e^2*x^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)-96*I*Pi*b*d^2*m*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+36*I*Pi*b*d*e*x*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*b*d*e*x*csgn(I*x^n)*csgn
(I*c*x^n)^2+31*I*Pi*b*e^2*m^3*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-76*I*Pi*b*d*e
*m^3*x*csgn(I*c*x^n)^3)/(3+m)^2/(1+m)^2/(2+m)^2*exp(1/2*m*(-I*Pi*csgn(I*f*x
)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f
*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [**A**]
time = 0.29, size = 207, normalized size = 1.35

$$\frac{bf^m x^3 e^{(m\log(x)+2)}\log(cx^n)}{m+3} + \frac{2\,bdf^m x^2 e^{(m\log(x)+1)}\log(cx^n)}{m+2} - \frac{bd^2 f^m n x x^m}{(m+1)^2} + \frac{af^m x^3 e^{(m\log(x)+2)}}{m+3} - \frac{bf^m n x^3 e^{(m\log(x)+2)}}{(m+3)^2} + \frac{2\,adf^m x^2 e^{(m\log(x)+1)}}{m+2} - \frac{2\,bdf^m n x^2 e^{(m\log(x)+1)}}{(m+2)^2} + \frac{(fx)^{m+1}\,bd^2\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}\,ad^2}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] b*f^m*x^3*e^(m*log(x) + 2)*log(c*x^n)/(m + 3) + 2*b*d*f^m*x^2*e^(m*log(x) +
 1)*log(c*x^n)/(m + 2) - b*d^2*f^m*n*x*x^m/(m + 1)^2 + a*f^m*x^3*e^(m*log(x
) + 2)/(m + 3) - b*f^m*n*x^3*e^(m*log(x) + 2)/(m + 3)^2 + 2*a*d*f^m*x^2*e^(
m*log(x) + 1)/(m + 2) - 2*b*d*f^m*n*x^2*e^(m*log(x) + 1)/(m + 2)^2 + (f*x)^
(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^2/(f*(m + 1))
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 553 vs. $2(153) = 306$.
time = 0.39, size = 553, normalized size = 3.61

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((a*m^5 + 9*a*m^4 + 31*a*m^3 + 51*a*m^2 + 40*a*m - (b*m^4 + 6*b*m^3 + 13*b*
m^2 + 12*b*m + 4*b)*n + 12*a)*x^3*e^2 + 2*(a*d*m^5 + 10*a*d*m^4 + 38*a*d*m^
3 + 68*a*d*m^2 + 57*a*d*m + 18*a*d - (b*d*m^4 + 8*b*d*m^3 + 22*b*d*m^2 + 24
*b*d*m + 9*b*d)*n)*x^2*e + (a*d^2*m^5 + 11*a*d^2*m^4 + 47*a*d^2*m^3 + 97*a*
d^2*m^2 + 96*a*d^2*m + 36*a*d^2 - (b*d^2*m^4 + 10*b*d^2*m^3 + 37*b*d^2*m^2
+ 60*b*d^2*m + 36*b*d^2)*n)*x + ((b*m^5 + 9*b*m^4 + 31*b*m^3 + 51*b*m^2 + 4
```

```
0*b*m + 12*b)*x^3*e^2 + 2*(b*d*m^5 + 10*b*d*m^4 + 38*b*d*m^3 + 68*b*d*m^2 +
 57*b*d*m + 18*b*d)*x^2*e + (b*d^2*m^5 + 11*b*d^2*m^4 + 47*b*d^2*m^3 + 97*b
*d^2*m^2 + 96*b*d^2*m + 36*b*d^2)*x)*log(c) + ((b*m^5 + 9*b*m^4 + 31*b*m^3
+ 51*b*m^2 + 40*b*m + 12*b)*n*x^3*e^2 + 2*(b*d*m^5 + 10*b*d*m^4 + 38*b*d*m^
3 + 68*b*d*m^2 + 57*b*d*m + 18*b*d)*n*x^2*e + (b*d^2*m^5 + 11*b*d^2*m^4 + 4
7*b*d^2*m^3 + 97*b*d^2*m^2 + 96*b*d^2*m + 36*b*d^2)*n*x)*log(x))*e^(m*log(f
) + m*log(x))/(m^6 + 12*m^5 + 58*m^4 + 144*m^3 + 193*m^2 + 132*m + 36)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 2791 vs. $2(146) = 292$.
time = 5.21, size = 2791, normalized size = 18.24

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x*
*2) - log(c*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piece
wise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**3, Eq(m
, -3)), ((-a*d**2/x + 2*a*d*e*log(c*x**n)/n + a*e**2*x - b*d**2*n/x - b*d**
2*log(c*x**n)/x + b*d*e*log(c*x**n)**2/n - b*e**2*n*x + b*e**2*x*log(c*x**n
))/f**2, Eq(m, -2)), ((a*d**2*log(c*x**n)/n + 2*a*d*e*x + a*e**2*x**2/2 + b
*d**2*log(c*x**n)**2/(2*n) - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n
*x**2/4 + b*e**2*x**2*log(c*x**n)/2)/f, Eq(m, -1)), (a*d**2*m**5*x*(f*x)**m
/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 11*a*d**2*
m**4*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 3
6) + 47*a*d**2*m**3*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m
**2 + 132*m + 36) + 97*a*d**2*m**2*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 1
44*m**3 + 193*m**2 + 132*m + 36) + 96*a*d**2*m*x*(f*x)**m/(m**6 + 12*m**5 +
 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 36*a*d**2*x*(f*x)**m/(m**6 +
 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 2*a*d*e*m**5*x**2*
(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 20
*a*d*e*m**4*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 +
 132*m + 36) + 76*a*d*e*m**3*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*
m**3 + 193*m**2 + 132*m + 36) + 136*a*d*e*m**2*x**2*(f*x)**m/(m**6 + 12*m**
5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 114*a*d*e*m*x**2*(f*x)**m
/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 36*a*d*e*x
**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36)
+ a*e**2*m**5*x**3*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2
 + 132*m + 36) + 9*a*e**2*m**4*x**3*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 14
4*m**3 + 193*m**2 + 132*m + 36) + 31*a*e**2*m**3*x**3*(f*x)**m/(m**6 + 12*m
**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 51*a*e**2*m**2*x**3*(f*
x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 40*a*
e**2*m*x**3*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*
```

```
m + 36) + 12*a*e**2*x**3*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 19
3*m**2 + 132*m + 36) + b*d**2*m**5*x*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 +
 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - b*d**2*m**4*n*x*(f*x)**m/(m*
*6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 11*b*d**2*m**4
*x*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 1
32*m + 36) - 10*b*d**2*m**3*n*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m*
*3 + 193*m**2 + 132*m + 36) + 47*b*d**2*m**3*x*(f*x)**m*log(c*x**n)/(m**6 +
 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - 37*b*d**2*m**2*n*x
*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 9
7*b*d**2*m**2*x*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 +
 193*m**2 + 132*m + 36) - 60*b*d**2*m*n*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**
4 + 144*m**3 + 193*m**2 + 132*m + 36) + 96*b*d**2*m*x*(f*x)**m*log(c*x**n)/
(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - 36*b*d**2*n
*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) +
 36*b*d**2*x*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 19
3*m**2 + 132*m + 36) + 2*b*d*e*m**5*x**2*(f*x)**m*log(c*x**n)/(m**6 + 12*m*
*5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - 2*b*d*e*m**4*n*x**2*(f*x
)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 20*b*d
*e*m**4*x**2*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 19
3*m**2 + 132*m + 36) - 16*b*d*e*m**3*n*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m
**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 76*b*d*e*m**3*x**2*(f*x)**m*log(c
*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - 44*b
*d*e*m**2*n*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 +
 132*m + 36) + 136*b*d*e*m**2*x**2*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 5
8*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - 48*b*d*e*m*n*x**2*(f*x)**m/(m*
*6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 114*b*d*e*m*x*
*2*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 1
32*m + 36) - 18*b*d*e*n*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3
+ 193*m**2 + 132*m + 36) + 36*b*d*e*x**2*(f*x)**m*log(c*x**n)/(m**6 + 12*m*
*5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + b*e**2*m**5*x**3*(f*x)**
m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36)
 - b*e**2*m**4*n*x**3*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m
**2 + 132*m + 36) + 9*b*e**2*m**4*x**3*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5
 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) - 6*b*e**2*m**3*n*x**3*(f*x)
**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 31*b*e*
*2*m**3*x**3*(f*x)**m*log(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 19
3*m**2 + 132*m + 36) - 13*b*e**2*m**2*n*x**3*(f*x)**m/(m**6 + 12*m**5 + 58*
m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 51*b*e**2*m**2*x**3*(f*x)**m*log
(c*x**n)/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 +...
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 374 vs. $2(153) = 306$.

time = 1.98, size = 374, normalized size = 2.44

$$\frac{bf^2f^mx^3x^me^2\log(c)}{f^2m+3f^2}+\frac{bf^mmnx^3x^me^2\log(x)}{m^2+6m+9}+\frac{2bdf^mmnx^2x^me\log(x)}{m^2+4m+4}+\frac{af^2f^mx^3x^me^2}{f^2m+3f^2}+\frac{bd^2f^mmnxx^m\log(x)}{m^2+2m+1}+\frac{3bf^mnx^3x^me^2\log(x)}{m^2+6m+9}+\frac{4bdf^mnx^2x^me\log(x)}{m^2+4m+4}-\frac{bf^mnx^3x^me^2}{m^2+6m+9}-\frac{2bdf^mnx^2x^me}{m^2+4m+4}+\frac{2bdf^mx^2x^me\log(c)}{m+2}+\frac{bd^2f^mnxx^m\log(x)}{m^2+2m+1}-\frac{bd^2f^mnxx^m}{m^2+2m+1}+\frac{2adf^mx^2x^me}{m+2}+\frac{(fx)^mbd^2x\log(c)}{m+1}+\frac{(fx)^mad^2x}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^2*f^m*x^3*x^m*e^2*log(c)/(f^2*m + 3*f^2) + b*f^m*m*n*x^3*x^m*e^2*log(x)
/(m^2 + 6*m + 9) + 2*b*d*f^m*m*n*x^2*x^m*e*log(x)/(m^2 + 4*m + 4) + a*f^2*f
^m*x^3*x^m*e^2/(f^2*m + 3*f^2) + b*d^2*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1)
 + 3*b*f^m*n*x^3*x^m*e^2*log(x)/(m^2 + 6*m + 9) + 4*b*d*f^m*n*x^2*x^m*e*log
(x)/(m^2 + 4*m + 4) - b*f^m*n*x^3*x^m*e^2/(m^2 + 6*m + 9) - 2*b*d*f^m*n*x^2
*x^m*e/(m^2 + 4*m + 4) + 2*b*d*f^m*x^2*x^m*e*log(c)/(m + 2) + b*d^2*f^m*n*x
*x^m*log(x)/(m^2 + 2*m + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + 2*a*d*f^m
*x^2*x^m*e/(m + 2) + (f*x)^m*b*d^2*x*log(c)/(m + 1) + (f*x)^m*a*d^2*x/(m +
1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

```
[Out] int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^2, x)
```

3.164 $\int (fx)^m(d+ex)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=95

$$-\frac{bdn(fx)^{1+m}}{f(1+m)^2}-\frac{ben(fx)^{2+m}}{f^2(2+m)^2}+\frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{e(fx)^{2+m}(a+b\log(cx^n))}{f^2(2+m)}$$

```
[Out] -b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*(f*x)^(2+m)/f^2/(2+m)^2+d*(f*x)^(1+m)*(a
+b*ln(c*x^n))/f/(1+m)+e*(f*x)^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)
```

Rubi [A]
time = 0.06, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {45, 2392}

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}-\frac{bdn(fx)^{m+1}}{f(m+1)^2}-\frac{ben(fx)^{m+2}}{f^2(m+2)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d*n*(f*x)^(1 + m))/(f*(1 + m)^2)) - (b*e*n*(f*x)^(2 + m))/(f^2*(2 + m)
^2) + (d*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (e*(f*x)^(2 + m)*(
a + b*Log[c*x^n]))/(f^2*(2 + m))
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{d(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)} + \frac{e(fx)^{2+m}\left(a+b\log\left(cx^n\right)\right)}{f^2(2+m)} - (bn)\int (\ldots$$

$$= \frac{d(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)} + \frac{e(fx)^{2+m}\left(a+b\log\left(cx^n\right)\right)}{f^2(2+m)} - (bn)\int (\ldots$$

$$= -\frac{bdn(fx)^{1+m}}{f(1+m)^2} - \frac{ben(fx)^{2+m}}{f^2(2+m)^2} + \frac{d(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)} + \frac{e(fx\ldots}{}$$

Mathematica [A]
time = 0.09, size = 88, normalized size = 0.93

$$\frac{x(fx)^m\left(a(2+3m+m^2)\left(d(2+m)+e(1+m)x\right)-bn(d(2+m)^2+e(1+m)^2x)+b(2+3m+m^2)\left(d(2+m)+e(1+m)x\right)\log\left(cx^n\right)\right)}{(1+m)^2(2+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(f*x)^m*(a*(2 + 3*m + m^2)*(d*(2 + m) + e*(1 + m)*x) - b*n*(d*(2 + m)^2
+ e*(1 + m)^2*x) + b*(2 + 3*m + m^2)*(d*(2 + m) + e*(1 + m)*x)*Log[c*x^n]))
/((1 + m)^2*(2 + m)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 1122, normalized size = 11.81

method	result	size
risch	Expression too large to display	1122

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(e*m*x+d*m+e*x+2*d)/(1+m)/(2+m)*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csg
n(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f
)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)-1/2*x*(-16*a*d*m+8*b*d*n-10*a*e*m*x-8
*a*d-I*Pi*b*e*m^3*x*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*e*m^3*x*csgn(I*x^n)*cs
gn(I*c*x^n)^2-4*ln(c)*b*e*x-2*a*d*m^3-4*a*e*x+2*b*e*n*x-8*d*b*ln(c)+8*I*Pi*
b*d*m*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+5*I*Pi*b*d*m^2*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)-5*I*Pi*b*e*m*x*csgn(I*c)*csgn(I*c*x^n)^2-5*I*Pi*b*e*m*x*c
sgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*e*m^2*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)+5*I*Pi*b*e*m*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*e*m^3*x*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-10*ln(c)*b*d*m^2-16*ln(c)*b*d*m-2*ln(c)*b*d
*m^3+2*I*Pi*b*e*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*b*e*m^2*x*csgn
(I*c)*csgn(I*c*x^n)^2-4*I*Pi*b*e*m^2*x*csgn(I*x^n)*csgn(I*c*x^n)^2-2*a*e*m^
3*x+2*b*d*m^2*n-10*a*d*m^2+I*Pi*b*e*m^3*x*csgn(I*c*x^n)^3+I*Pi*b*d*m^3*csgn
```

```
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*b*d*m*n+2*b*e*m^2*n*x+2*I*Pi*b*e*x*csgn(I
*c*x^n)^3-I*Pi*b*d*m^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*e*m^2*x*csgn(I*
c*x^n)^3-5*I*Pi*b*d*m^2*csgn(I*c)*csgn(I*c*x^n)^2+5*I*Pi*b*e*m*x*csgn(I*c*x
^n)^3-8*I*Pi*b*d*m*csgn(I*c)*csgn(I*c*x^n)^2-8*I*Pi*b*d*m*csgn(I*x^n)*csgn(
I*c*x^n)^2-2*I*Pi*b*e*x*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*m^3*csgn(I*c*x^n
)^3+5*I*Pi*b*d*m^2*csgn(I*c*x^n)^3+8*I*Pi*b*d*m*csgn(I*c*x^n)^3-4*I*Pi*b*d*
csgn(I*c)*csgn(I*c*x^n)^2-4*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*d
*csgn(I*c*x^n)^3-5*I*Pi*b*d*m^2*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*Pi*b*e*x*cs
gn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*
Pi*b*d*m^3*csgn(I*c)*csgn(I*c*x^n)^2-8*ln(c)*b*e*m^2*x-10*ln(c)*b*e*m*x-2*l
n(c)*b*e*m^3*x+4*b*e*m*n*x-8*a*e*m^2*x)/(2+m)^2/(1+m)^2*exp(1/2*m*(-I*Pi*cs
gn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*
csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.29, size = 128, normalized size = 1.35

$$\frac{bf^m x^2 e^{(m\log(x)+1)}\log(cx^n)}{m+2} - \frac{bdf^m nxx^m}{(m+1)^2} + \frac{af^m x^2 e^{(m\log(x)+1)}}{m+2} - \frac{bf^m nx^2 e^{(m\log(x)+1)}}{(m+2)^2} + \frac{(fx)^{m+1}bd\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] b*f^m*x^2*e^(m*log(x) + 1)*log(c*x^n)/(m + 2) - b*d*f^m*n*x*x^m/(m + 1)^2 +
 a*f^m*x^2*e^(m*log(x) + 1)/(m + 2) - b*f^m*n*x^2*e^(m*log(x) + 1)/(m + 2)^
2 + (f*x)^(m + 1)*b*d*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1)
)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 225 vs. $2(97) = 194$.
time = 0.39, size = 225, normalized size = 2.37

$$\frac{((am^3+4am^2+5am-(bm^2+2bm+b)n+2a)x^2e+(adm^3+5adm^2+8adm+4ad-(bdm^2+4bdm+4bd)n)x+((bm^3+4bm^2+5bm+2b)x^2e+(bdm^3+5bdm^2+8bdm+4bd)x)\log(c)+((bm^3+4bm^2+5bm+2b)nx^2e+(bdm^3+5bdm^2+8bdm+4bd)nx)\log(x))e^{(m\log(f)+m\log(x))}}{m^4+6m^3+13m^2+12m+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((a*m^3 + 4*a*m^2 + 5*a*m - (b*m^2 + 2*b*m + b)*n + 2*a)*x^2*e + (a*d*m^3 +
 5*a*d*m^2 + 8*a*d*m + 4*a*d - (b*d*m^2 + 4*b*d*m + 4*b*d)*n)*x + ((b*m^3 +
 4*b*m^2 + 5*b*m + 2*b)*x^2*e + (b*d*m^3 + 5*b*d*m^2 + 8*b*d*m + 4*b*d)*x)*
log(c) + ((b*m^3 + 4*b*m^2 + 5*b*m + 2*b)*n*x^2*e + (b*d*m^3 + 5*b*d*m^2 +
8*b*d*m + 4*b*d)*n*x)*log(x))*e^(m*log(f) + m*log(x))/(m^4 + 6*m^3 + 13*m^2
 + 12*m + 4)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 899 vs. $2(87) = 174$.

time = 3.54, size = 899, normalized size = 9.46

$$\begin{cases} \frac{-\frac{ad}{x}+ae\log(x)+bd\left(-\frac{n}{x}-\frac{\log(cx^n)}{x}\right)-be\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)}{f^2} & \text{for } m=-2\\ \frac{\frac{ad\log(cx^n)}{n}+aex+\frac{bd\log(cx^n)^2}{2n}-benx+bex\log(cx^n)}{f} & \text{for } m=-1\\ \frac{adm^3x(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{5adm^2x(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{8admx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{4adx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{aem^3x^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{4aem^2x^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{5aemx^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{2aex^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{bdm^3x(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}-\frac{bdm^2nx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{5bdm^2x(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}-\frac{4bdmnx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{8bdmx(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}-\frac{4bdnx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{4bdx(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}+\frac{bem^3x^2(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}-\frac{bem^2nx^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{4bem^2x^2(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}-\frac{2bemnx^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{5bemx^2(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4}-\frac{benx^2(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{2bex^2(fx)^m\log(cx^n)}{m^4+6m^3+13m^2+12m+4} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(e*x+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewis
e((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**2, Eq(m, -
2)), ((a*d*log(c*x**n)/n + a*e*x + b*d*log(c*x**n)**2/(2*n) - b*e*n*x + b*e
*x*log(c*x**n))/f, Eq(m, -1)), (a*d*m**3*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**
2 + 12*m + 4) + 5*a*d*m**2*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4)
+ 8*a*d*m*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 4*a*d*x*(f*x)**
m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + a*e*m**3*x**2*(f*x)**m/(m**4 + 6*m
**3 + 13*m**2 + 12*m + 4) + 4*a*e*m**2*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m*
*2 + 12*m + 4) + 5*a*e*m*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4)
 + 2*a*e*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + b*d*m**3*x*(f
*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - b*d*m**2*n*x*(f*x
)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 5*b*d*m**2*x*(f*x)**m*log(c*x**
n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - 4*b*d*m*n*x*(f*x)**m/(m**4 + 6*m*
*3 + 13*m**2 + 12*m + 4) + 8*b*d*m*x*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 +
13*m**2 + 12*m + 4) - 4*b*d*n*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m +
4) + 4*b*d*x*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + b*
e*m**3*x**2*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - b*e
*m**2*n*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 4*b*e*m**2*x**
2*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - 2*b*e*m*n*x**
2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 5*b*e*m*x**2*(f*x)**m*log
(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - b*e*n*x**2*(f*x)**m/(m**4 +
 6*m**3 + 13*m**2 + 12*m + 4) + 2*b*e*x**2*(f*x)**m*log(c*x**n)/(m**4 + 6*m
**3 + 13*m**2 + 12*m + 4), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 217 vs. $2(97) =$ 194.

time = 3.70, size = 217, normalized size = 2.28

$$\frac{bf^m mnx^2x^m e\log(x)}{m^2+4m+4}+\frac{bdf^m mnxx^m\log(x)}{m^2+2m+1}+\frac{2\,bf^m nx^2x^m e\log(x)}{m^2+4m+4}-\frac{bf^m nx^2x^m e}{m^2+4m+4}+\frac{bf^m x^2x^m e\log(c)}{m+2}+\frac{bdf^m nxx^m\log(x)}{m^2+2m+1}-\frac{bdf^m nxx^m}{m^2+2m+1}+\frac{af^m x^2x^m e}{m+2}+\frac{(fx)^m\,bdx\log(c)}{m+1}+\frac{(fx)^m\,adx}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^m*m*n*x^2*x^m*e*log(x)/(m^2 + 4*m + 4) + b*d*f^m*m*n*x*x^m*log(x)/(m^2
+ 2*m + 1) + 2*b*f^m*n*x^2*x^m*e*log(x)/(m^2 + 4*m + 4) - b*f^m*n*x^2*x^m*e
/(m^2 + 4*m + 4) + b*f^m*x^2*x^m*e*log(c)/(m + 2) + b*d*f^m*n*x*x^m*log(x)/
(m^2 + 2*m + 1) - b*d*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*f^m*x^2*x^m*e/(m + 2)
 + (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n))*(d + e*x),x)
[Out] int((f*x)^m*(a + b*log(c*x^n))*(d + e*x), x)
```

3.165 $\int (fx)^m (a+b\log(cx^n))\,dx$

Optimal. Leaf size=46

$$-\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

```
[Out] -b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Rubi [A]
time = 0.01, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2341}

$$\frac{(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}-\frac{bn(fx)^{m+1}}{f(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/(
f*(1 + m))
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (fx)^m (a+b\log(cx^n))\,dx=-\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

Mathematica [A]
time = 0.01, size = 32, normalized size = 0.70

$$\frac{x(fx)^m(a+am-bn+b(1+m)\log(cx^n))}{(1+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 371, normalized size = 8.07

method	result
risch	$\frac{b x \,\mathrm{e}^{\frac{m\left(-i\pi \mathrm{csgn}(i f x)^{3}+i\pi \mathrm{csgn}(i f x)^{2}\mathrm{csgn}(i f)+i\pi \mathrm{csgn}(i f x)^{2}\mathrm{csgn}(i x)-i\pi \,\mathrm{csgn}(i f x)\mathrm{csgn}(i f)\mathrm{csgn}(i x)+2\ln(x)+2\ln(f)\right)}{2}}\ln(x^{n})}{1+m}-\frac{\left(i\pi b\,\mathrm{csgn}(i c)\mathrm{csg}\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b/(1+m)*x*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*
csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f
)))*ln(x^n)-1/2*(I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m-I*Pi*b*csgn(I
*c)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*c*
x^n)^3*m+I*csgn(I*c*x^n)*csgn(I*x^n)*csgn(I*c)*b*Pi-I*csgn(I*c*x^n)^2*csgn(
I*c)*b*Pi-I*csgn(I*c*x^n)^2*csgn(I*x^n)*b*Pi+I*csgn(I*c*x^n)^3*b*Pi-2*b*ln(
c)*m-2*b*ln(c)-2*a*m+2*b*n-2*a)/(1+m)^2*x*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*
Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*cs
gn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.29, size = 57, normalized size = 1.24

$$-\frac{b f^{m} n x x^{m}}{(m+1)^{2}}+\frac{(f x)^{m+1} b \log(c x^{n})}{f(m+1)}+\frac{(f x)^{m+1} a}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^(
m + 1)*a/(f*(m + 1))
```

Fricas [A]
time = 0.36, size = 52, normalized size = 1.13

$$\frac{((bm+b)nx\log(x)+(bm+b)x\log(c)+(am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^{2}+2m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f)
 + m*log(x))/(m^2 + 2*m + 1)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(37) = 74$.
time = 4.95, size = 141, normalized size = 3.07

$$\begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m \log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m \log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
+ b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*m
+ 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise((a
*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**
n))**2/(2*b*n), True))/f, True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(46) = 92$.
time = 2.49, size = 95, normalized size = 2.07

$$\frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log(c)}{m+1} + \frac{(fx)^m ax}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m*a
*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (f\,x)^m\,(a + b\,\ln(c\,x^n))\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(a + b*log(c*x^n)), x)
```

3.166 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{(fx)^m\,(a+b\log\left(cx^n\right))}{d+ex},x\right)$$

```
[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{d+ex}\,dx$$

Verification is not applicable to the result.

```
[In] Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x), x]
```

Rubi steps

$$\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{d+ex}\,dx = \int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{d+ex}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 72 vs. 2(26) = 52.
time = 0.07, size = 72, normalized size = 2.77

$$\frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,1+m,1+m;2+m,2+m;-\frac{ex}{d}\right)+(1+m)\,{}_2F_1\left(1,1+m;2+m;-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)\right)}{d(1+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x),x]
```

```
[Out] (x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, 1 + m, 1 + m}, {2 + m, 2 + m}, -((e
*x)/d)]) + (1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, -((e*x)/d)]*(a + b*Lo
g[c*x^n])))/(d*(1 + m)^2)
```

Maple [A]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\,(a+b\ln\left(c\,x^n\right))}{ex+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x*e + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

```
[Out] integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(x*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m (a + b\log (cx^n))}{d + ex}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x+d),x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+e\,x} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x),x)
[Out] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.167 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex)^2}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{(fx)^m\,(a+b\log\left(cx^n\right))}{(d+ex)^2},x\right)$$

```
[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{(d+ex)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2, x]
```

Rubi steps

$$\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{(d+ex)^2}\,dx=\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{(d+ex)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 72 vs. 2(26) = 52.
time = 0.06, size = 72, normalized size = 2.77

$$\frac{x(fx)^m\left(-bn\,{}_3F_2\left(2,1+m,1+m;2+m,2+m;-\frac{ex}{d}\right)+(1+m)\,{}_2F_1\left(2,1+m;2+m;-\frac{ex}{d}\right)(a+b\log\left(cx^n\right))\right)}{d^2(1+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
[Out] (x*(f*x)^m*(-(b*n*HypergeometricPFQ[{2, 1 + m, 1 + m}, {2 + m, 2 + m}, -((e
*x)/d)]) + (1 + m)*Hypergeometric2F1[2, 1 + m, 2 + m, -((e*x)/d)]*(a + b*Lo
g[c*x^n])))/(d^2*(1 + m)^2)
```

Maple [A]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{\left(fx\right)^{m}\left(a+b\ln\left(c\,x^{n}\right)\right)}{\left(ex+d\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
[Out] int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x*e + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
[Out] integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(x^2*e^2 + 2*d*x*e + d^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\,(a+b\log{(cx^n)})}{(d+ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x+d)**2,x)
[Out] Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\left(d+e\,x\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x)^2,x)
[Out] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.168 $\int x(a+bx)^m \log(cx^n)\,dx$

Optimal. Leaf size=18

$$\text{Int}(x(a+bx)^m \log(cx^n), x)$$

[Out] Unintegrable(x*(b*x+a)^m*ln(c*x^n),x)

Rubi [A]
time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int x(a+bx)^m \log(cx^n)\,dx$$

Verification is not applicable to the result.

[In] Int[x*(a + b*x)^m*Log[c*x^n],x]

[Out] Defer[Int][x*(a + b*x)^m*Log[c*x^n], x]

Rubi steps

$$\int x(a+bx)^m \log(cx^n)\,dx = \int x(a+bx)^m \log(cx^n)\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 173 vs. 2(18) = 36.
time = 0.17, size = 173, normalized size = 9.61

$$\frac{(a+bx)^m\left(1+\frac{bx}{a}\right)^{-m}\left(-n\left(2abx\left(1+\frac{bx}{a}\right)^m+b^2x^2\left(1+\frac{bx}{a}\right)^m+a^2\left(-1+\left(1+\frac{bx}{a}\right)^m\right)\right)+ab(2+m)nx\,{}_3F_2\left(1,1,-1-m;2,2;-\frac{bx}{a}\right)+\left(abmx\left(1+\frac{bx}{a}\right)^m+b^2(1+m)x^2\left(1+\frac{bx}{a}\right)^m-a^2\left(-1+\left(1+\frac{bx}{a}\right)^m\right)\right)\log(cx^n)\right)}{b^2(1+m)(2+m)}$$

Antiderivative was successfully verified.

[In] Integrate[x*(a + b*x)^m*Log[c*x^n],x]

[Out] ((a + b*x)^m*(-(n*(2*a*b*x*(1 + (b*x)/a)^m + b^2*x^2*(1 + (b*x)/a)^m + a^2*(-1 + (1 + (b*x)/a)^m))) + a*b*(2 + m)*n*x*HypergeometricPFQ[{1, 1, -1 - m}, {2, 2}, -((b*x)/a)] + (a*b*m*x*(1 + (b*x)/a)^m + b^2*(1 + m)*x^2*(1 + (b*x)/a)^m - a^2*(-1 + (1 + (b*x)/a)^m))*Log[c*x^n]))/(b^2*(1 + m)*(2 + m)*(1 + (b*x)/a)^m)

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int x(bx+a)^m \ln(c\,x^n)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(b*x+a)^m*ln(c*x^n),x)
```

```
[Out] int(x*(b*x+a)^m*ln(c*x^n),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="maxima")
```

```
[Out] (b^2*(m + 1)*x^2 + a*b*m*x - a^2)*(b*x + a)^m*log(x^n)/((m^2 + 3*m + 2)*b^2
) + integrate(-(a*b*m*n*x + (m*n - (m^2 + 3*m + 2)*log(c) + n)*b^2*x^2 - a^
2*n)*(b*x + a)^m/x, x)/((m^2 + 3*m + 2)*b^2)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="fricas")
```

```
[Out] integral((b*x + a)^m*x*log(c*x^n), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int x(a+bx)^m \log(cx^n)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(b*x+a)**m*ln(c*x**n),x)
```

```
[Out] Integral(x*(a + b*x)**m*log(c*x**n), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="giac")
```

```
[Out] integrate((b*x + a)^m*x*log(c*x^n), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.06

$$\int x\,\ln\left(c\,x^n\right)\,{\left(a+b\,x\right)}^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(c*x^n)*(a + b*x)^m,x)
[Out] int(x*log(c*x^n)*(a + b*x)^m, x)
```

3.169 $\int (a+bx)^m \log(cx^n)\,dx$

Optimal. Leaf size=68

$$\frac{n(a+bx)^{2+m}\,{}_2F_1\left(1,2+m;3+m;1+\frac{bx}{a}\right)}{ab\left(2+3m+m^2\right)}+\frac{(a+bx)^{1+m}\log(cx^n)}{b(1+m)}$$

```
[Out] n*(b*x+a)^(2+m)*hypergeom([1, 2+m],[3+m],1+b*x/a)/a/b/(m^2+3*m+2)+(b*x+a)^(
1+m)*ln(c*x^n)/b/(1+m)
```

Rubi [A]
time = 0.02, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}=0.143$, Rules used = {2356, 67}

$$\frac{(a+bx)^{m+1}\log(cx^n)}{b(m+1)}+\frac{n(a+bx)^{m+2}\,{}_2F_1\left(1,m+2;m+3;\frac{bx}{a}+1\right)}{ab\left(m^2+3m+2\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x)^m*Log[c*x^n],x]
```

```
[Out] (n*(a + b*x)^(2 + m)*Hypergeometric2F1[1, 2 + m, 3 + m, 1 + (b*x)/a])/(a*b*
(2 + 3*m + m^2)) + ((a + b*x)^(1 + m)*Log[c*x^n])/(b*(1 + m))
```

Rule 67

```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[((c + d*x
)^(n + 1)/(d*(n + 1)*(-d/(b*c))^m))*Hypergeometric2F1[-m, n + 1, n + 2, 1 +
 d*(x/c)], x] /; FreeQ[{b, c, d, m, n}, x] &&  !IntegerQ[n] && (IntegerQ[m]
 || GtQ[-d/(b*c), 0])
```

Rule 2356

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Dist[b*n*(p/(e*(q + 1))), Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
-1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &&
 NeQ[q, 1]))
```

Rubi steps

$$\begin{aligned}\int (a+bx)^m\log(cx^n)\,dx &= \frac{(a+bx)^{1+m}\log(cx^n)}{b(1+m)}-\frac{n\int\frac{(a+bx)^{1+m}}{x}\,dx}{b(1+m)}\\ &= \frac{n(a+bx)^{2+m}\,{}_2F_1\left(1,2+m;3+m;1+\frac{bx}{a}\right)}{ab\left(2+3m+m^2\right)}+\frac{(a+bx)^{1+m}\log(cx^n)}{b(1+m)}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 61, normalized size = 0.90

$$\frac{(a+bx)^{1+m}\left(n(a+bx)\,{}_2F_1\left(1,2+m;3+m;1+\frac{bx}{a}\right)+a(2+m)\log\left(cx^n\right)\right)}{ab(1+m)(2+m)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x)^m*Log[c*x^n],x]
```

```
[Out] ((a + b*x)^(1 + m)*(n*(a + b*x)*Hypergeometric2F1[1, 2 + m, 3 + m, 1 + (b*x
)/a] + a*(2 + m)*Log[c*x^n]))/(a*b*(1 + m)*(2 + m))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int (bx+a)^m \ln\left(c\,x^n\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x+a)^m*ln(c*x^n),x)
```

```
[Out] int((b*x+a)^m*ln(c*x^n),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)^m*log(c*x^n),x, algorithm="maxima")
```

```
[Out] (b*x + a)*(b*x + a)^m*log(x^n)/(b*(m + 1)) + integrate((((m + 1)*log(c) - n
)*b*x - a*n)*(b*x + a)^m/x, x)/(b*(m + 1))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)^m*log(c*x^n),x, algorithm="fricas")
```

```
[Out] integral((b*x + a)^m*log(c*x^n), x)
```

Sympy [A]
time = 14.38, size = 252, normalized size = 3.71

$$-n\left(\begin{cases} a^{m}x & \text{for}\ (b=0\wedge m\neq -1)\vee b=0 \\ -\frac{b^{2}b^{m}m\left(\frac{a}{b}+x\right)^{2}\left(\frac{a}{b}+x\right)^{m}\Phi\left(1+\frac{bx}{a},1,m+2\right)\Gamma(m+2)}{abm\Gamma(m+3)+ab\Gamma(m+3)}-\frac{2b^{2}b^{m}\left(\frac{a}{b}+x\right)^{2}\left(\frac{a}{b}+x\right)^{m}\Phi\left(1+\frac{bx}{a},1,m+2\right)\Gamma(m+2)}{abm\Gamma(m+3)+ab\Gamma(m+3)} & \text{for}\ m>-\infty\wedge m<\infty\wedge m\neq -1 \\ \frac{\begin{cases} -\operatorname{Li}_{2}\left(\frac{bxe^{i\pi}}{a}\right) & \text{for}\ \frac{1}{|x|}<1\wedge |x|<1 \\ \log(a)\log(x)-\operatorname{Li}_{2}\left(\frac{bxe^{i\pi}}{a}\right) & \text{for}\ |x|<1 \\ -\log(a)\log\left(\frac{1}{x}\right)-\operatorname{Li}_{2}\left(\frac{bxe^{i\pi}}{a}\right) & \text{for}\ \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(a)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(a)-\operatorname{Li}_{2}\left(\frac{bxe^{i\pi}}{a}\right) & \text{otherwise} \end{cases}}{b} & \text{otherwise} \end{cases}\right)+\left(\begin{cases} a^{m}x & \text{for}\ b=0 \\ \frac{\begin{cases} \frac{(a+bx)^{m+1}}{m+1} & \text{for}\ m\neq -1 \\ \log(a+bx) & \text{otherwise} \end{cases}}{b} & \text{otherwise} \end{cases}\right)\log(cx^{n})$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)**m*ln(c*x**n),x)
```

```
[Out] -n*Piecewise((a**m*x, Eq(b, 0) | (Eq(b, 0) & Ne(m, -1))), (-b**2*b**m*m*(a/
b + x)**2*(a/b + x)**m*lerchphi(1 + b*x/a, 1, m + 2)*gamma(m + 2)/(a*b*m*ga
mma(m + 3) + a*b*gamma(m + 3)) - 2*b**2*b**m*(a/b + x)**2*(a/b + x)**m*lerc
hphi(1 + b*x/a, 1, m + 2)*gamma(m + 2)/(a*b*m*gamma(m + 3) + a*b*gamma(m +
3)), (m > -oo) & (m < oo) & Ne(m, -1)), (Piecewise((-polylog(2, b*x*exp_pol
ar(I*pi)/a), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(a)*log(x) - polylog(2, b*
x*exp_polar(I*pi)/a), Abs(x) < 1), (-log(a)*log(1/x) - polylog(2, b*x*exp_p
olar(I*pi)/a), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(
a) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(a) - polylog(2, b*x*exp_pol
ar(I*pi)/a), True))/b, True)) + Piecewise((a**m*x, Eq(b, 0)), (Piecewise(((
a + b*x)**(m + 1)/(m + 1), Ne(m, -1)), (log(a + b*x), True))/b, True))*log(
c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)^m*log(c*x^n),x, algorithm="giac")
```

```
[Out] integrate((b*x + a)^m*log(c*x^n), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \ln\left(c\,x^n\right)\,{\left(a+b\,x\right)}^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x^n)*(a + b*x)^m,x)
```

```
[Out] int(log(c*x^n)*(a + b*x)^m, x)
```

3.170 $\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx$

Optimal. Leaf size=20

$$\text{Int}\left(\frac{(a+bx)^m \log(cx^n)}{x}, x\right)$$

[Out] Unintegrable((b*x+a)^m*ln(c*x^n)/x,x)

Rubi [A]
time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx$$

Verification is not applicable to the result.

[In] Int[((a + b*x)^m*Log[c*x^n])/x,x]

[Out] Defer[Int][((a + b*x)^m*Log[c*x^n])/x, x]

Rubi steps

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{(a+bx)^m \log(cx^n)}{x} \, dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 89 vs. 2(20) = 40.
time = 0.04, size = 89, normalized size = 4.45

$$\frac{\left(1+\frac{a}{bx}\right)^{-m} (a+bx)^m \left(-n\,{}_3F_2\left(-m,-m,-m;1-m,1-m;-\frac{a}{bx}\right)+m\,{}_2F_1\left(-m,-m;1-m;-\frac{a}{bx}\right)\log(cx^n)\right)}{m^2}$$

Antiderivative was successfully verified.

[In] Integrate[((a + b*x)^m*Log[c*x^n])/x,x]

[Out] ((a + b*x)^m*(-(n*HypergeometricPFQ[{-m, -m, -m}, {1 - m, 1 - m}, -(a/(b*x)
)]) + m*Hypergeometric2F1[-m, -m, 1 - m, -(a/(b*x))]*Log[c*x^n]))/(m^2*(1 +
 a/(b*x))^m)

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(bx+a)^m \ln(c\,x^n)}{x} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x+a)^m*ln(c*x^n)/x,x)
```

```
[Out] int((b*x+a)^m*ln(c*x^n)/x,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="maxima")
```

```
[Out] integrate((b*x + a)^m*log(c*x^n)/x, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="fricas")
```

```
[Out] integral((b*x + a)^m*log(c*x^n)/x, x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+bx)^m \log{(cx^n)}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)**m*ln(c*x**n)/x,x)
```

```
[Out] Integral((a + b*x)**m*log(c*x**n)/x, x)
```

Giac [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="giac")
```

```
[Out] Exception raised: RuntimeError >> An error occurred running a Giac command:
INPUT:sage2OUTPUT:Simplification assuming sageVARa near 0Simplification ass
```

```
uming sageVARa near 0Unable to divide, perhaps due to rounding error%%%{1,[
0,1,0]%%%
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.05

$$\int \frac{\ln \left(c\,x^n\right)\,\left(a+b\,x\right)^m}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((log(c*x^n)*(a + b*x)^m)/x,x)
```

```
[Out] int((log(c*x^n)*(a + b*x)^m)/x, x)
```

3.171 $\int x^5(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=48

$$-\frac{1}{36}bdnx^6-\frac{1}{64}benx^8+\frac{1}{24}\left(4dx^6+3ex^8\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/36*b*d*n*x^6-1/64*b*e*n*x^8+1/24*(3*e*x^8+4*d*x^6)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.095$, Rules used = {14, 2371}

$$\frac{1}{24}\left(4dx^6+3ex^8\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{36}bdnx^6-\frac{1}{64}benx^8$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/36*(b*d*n*x^6) - (b*e*n*x^8)/64 + ((4*d*x^6 + 3*e*x^8)*(a + b*Log[c*x^n]
))/24
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^5\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx&=\frac{1}{24}\left(4dx^6+3ex^8\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\left(\frac{dx^5}{6}+\frac{ex^7}{8}\right)\,dx\\&=-\frac{1}{36}bdnx^6-\frac{1}{64}benx^8+\frac{1}{24}\left(4dx^6+3ex^8\right)\left(a+b\log\left(cx^n\right)\right)\end{aligned}$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.44

$$\frac{1}{6}adx^6-\frac{1}{36}bdnx^6+\frac{1}{8}aex^8-\frac{1}{64}benx^8+\frac{1}{6}bdx^6\log\left(cx^n\right)+\frac{1}{8}bex^8\log\left(cx^n\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (a*d*x^6)/6 - (b*d*n*x^6)/36 + (a*e*x^8)/8 - (b*e*n*x^8)/64 + (b*d*x^6*Log[
c*x^n])/6 + (b*e*x^8*Log[c*x^n])/8
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.41, size = 266, normalized size = 5.54

method	result
risch	$\frac{b\,x^6(3e\,x^2+4d)\ln(x^n)}{24} - \frac{i\pi be\,x^8\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{16} + \frac{i\pi be\,x^8\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{16} + \frac{i\pi be\,x^8\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{16} -$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/24*b*x^6*(3*e*x^2+4*d)*ln(x^n)-1/16*I*Pi*b*e*x^8*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+1/16*I*Pi*b*e*x^8*csgn(I*c)*csgn(I*c*x^n)^2+1/16*I*Pi*b*e*x^8*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/16*I*Pi*b*e*x^8*csgn(I*c*x^n)^3+1/8*ln(c)*b*e*
x^8-1/64*b*e*n*x^8+1/8*x^8*a*e-1/12*I*Pi*b*d*x^6*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+1/12*I*Pi*b*d*x^6*csgn(I*c)*csgn(I*c*x^n)^2+1/12*I*Pi*b*d*x^6*csg
n(I*x^n)*csgn(I*c*x^n)^2-1/12*I*Pi*b*d*x^6*csgn(I*c*x^n)^3+1/6*ln(c)*b*d*x^
6-1/36*b*d*n*x^6+1/6*x^6*a*d
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.25

$$-\frac{1}{64}\,bnx^8e + \frac{1}{8}\,bx^8e\log\left(cx^n\right) + \frac{1}{8}\,ax^8e - \frac{1}{36}\,bdnx^6 + \frac{1}{6}\,bdx^6\log\left(cx^n\right) + \frac{1}{6}\,adx^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/64*b*n*x^8*e + 1/8*b*x^8*e*log(c*x^n) + 1/8*a*x^8*e - 1/36*b*d*n*x^6 + 1
/6*b*d*x^6*log(c*x^n) + 1/6*a*d*x^6
```

Fricas [A]
time = 0.39, size = 71, normalized size = 1.48

$$-\frac{1}{64}\,(bn-8\,a)x^8e - \frac{1}{36}\,(bdn-6\,ad)x^6 + \frac{1}{24}\left(3\,bx^8e+4\,bdx^6\right)\log\left(c\right) + \frac{1}{24}\left(3\,bnx^8e+4\,bdnx^6\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/64*(b*n - 8*a)*x^8*e - 1/36*(b*d*n - 6*a*d)*x^6 + 1/24*(3*b*x^8*e + 4*b*
d*x^6)*log(c) + 1/24*(3*b*n*x^8*e + 4*b*d*n*x^6)*log(x)
```

Sympy [A]
time = 1.37, size = 66, normalized size = 1.38

$$\frac{adx^6}{6} + \frac{aex^8}{8} - \frac{bdnx^6}{36} + \frac{bdx^6\log\left(cx^n\right)}{6} - \frac{benx^8}{64} + \frac{bex^8\log\left(cx^n\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**6/6 + a*e*x**8/8 - b*d*n*x**6/36 + b*d*x**6*log(c*x**n)/6 - b*e*n*x*
*8/64 + b*e*x**8*log(c*x**n)/8
```

Giac [A]
time = 1.60, size = 73, normalized size = 1.52

$$\frac{1}{8}\,bnx^8e\log\left(x\right) - \frac{1}{64}\,bnx^8e + \frac{1}{8}\,bx^8e\log\left(c\right) + \frac{1}{8}\,ax^8e + \frac{1}{6}\,bdnx^6\log\left(x\right) - \frac{1}{36}\,bdnx^6 + \frac{1}{6}\,bdx^6\log\left(c\right) + \frac{1}{6}\,adx^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/8*b*n*x^8*e*log(x) - 1/64*b*n*x^8*e + 1/8*b*x^8*e*log(c) + 1/8*a*x^8*e +
1/6*b*d*n*x^6*log(x) - 1/36*b*d*n*x^6 + 1/6*b*d*x^6*log(c) + 1/6*a*d*x^6
```

Mupad [B]
time = 3.42, size = 51, normalized size = 1.06

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^8}{8}+\frac{b\,d\,x^6}{6}\right)+\frac{d\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{e\,x^8\,\left(8\,a-b\,n\right)}{64}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d*x^6)/6 + (b*e*x^8)/8) + (d*x^6*(6*a - b*n))/36 + (e*x^8*(8
*a - b*n))/64
```

3.172 $\int x^3(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=48

$$-\frac{1}{16}bdnx^4-\frac{1}{36}benx^6+\frac{1}{12}\left(3dx^4+2ex^6\right)(a+b\log(cx^n))$$

```
[Out] -1/16*b*d*n*x^4-1/36*b*e*n*x^6+1/12*(2*e*x^6+3*d*x^4)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.095$, Rules used = {14, 2371}

$$\frac{1}{12}\left(3dx^4+2ex^6\right)(a+b\log(cx^n))-\frac{1}{16}bdnx^4-\frac{1}{36}benx^6$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d*n*x^4) - (b*e*n*x^6)/36 + ((3*d*x^4 + 2*e*x^6)*(a + b*Log[c*x^n]
))/12
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^3\left(d+ex^2\right)(a+b\log(cx^n))\,dx&=\frac{1}{12}\left(3dx^4+2ex^6\right)(a+b\log(cx^n))-(bn)\int\left(\frac{dx^3}{4}+\frac{ex^5}{6}\right)dx\\&=-\frac{1}{16}bdnx^4-\frac{1}{36}benx^6+\frac{1}{12}\left(3dx^4+2ex^6\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.44

$$\frac{1}{4}adx^4-\frac{1}{16}bdnx^4+\frac{1}{6}aex^6-\frac{1}{36}benx^6+\frac{1}{4}bdx^4\log(cx^n)+\frac{1}{6}bex^6\log(cx^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (a*d*x^4)/4 - (b*d*n*x^4)/16 + (a*e*x^6)/6 - (b*e*n*x^6)/36 + (b*d*x^4*Log[
c*x^n])/4 + (b*e*x^6*Log[c*x^n])/6
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 266, normalized size = 5.54

method	result
risch	$\frac{b x^4 (2e x^2+3d) \ln(x^n)}{12} - \frac{i\pi be\, x^6 \mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\, x^n)}{12} + \frac{i\pi be\, x^6 \mathrm{csgn}(ic)\mathrm{csgn}(ic\, x^n)^2}{12} + \frac{i\pi be\, x^6 \mathrm{csgn}(ix^n)\mathrm{csgn}(ic\, x^n)^2}{12}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/12*b*x^4*(2*e*x^2+3*d)*ln(x^n)-1/12*I*Pi*b*e*x^6*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+1/12*I*Pi*b*e*x^6*csgn(I*c)*csgn(I*c*x^n)^2+1/12*I*Pi*b*e*x^6*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/12*I*Pi*b*e*x^6*csgn(I*c*x^n)^3+1/6*ln(c)*b*e*
x^6-1/36*b*e*n*x^6+1/6*x^6*a*e-1/8*I*Pi*b*d*x^4*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+1/8*I*Pi*b*d*x^4*csgn(I*c)*csgn(I*c*x^n)^2+1/8*I*Pi*b*d*x^4*csgn(I
*x^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b*d*x^4*csgn(I*c*x^n)^3+1/4*ln(c)*b*d*x^4-1/
16*b*d*n*x^4+1/4*x^4*a*d
```

Maxima [A]
time = 0.28, size = 60, normalized size = 1.25

$$-\frac{1}{36}\,bnx^6e+\frac{1}{6}\,bx^6e\log\left(cx^n\right)+\frac{1}{6}\,ax^6e-\frac{1}{16}\,bdnx^4+\frac{1}{4}\,bdx^4\log\left(cx^n\right)+\frac{1}{4}\,adx^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*n*x^6*e + 1/6*b*x^6*e*log(c*x^n) + 1/6*a*x^6*e - 1/16*b*d*n*x^4 + 1
/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4
```

Fricas [A]
time = 0.37, size = 71, normalized size = 1.48

$$-\frac{1}{36}\,(bn-6\,a)x^6e-\frac{1}{16}\,(bdn-4\,ad)x^4+\frac{1}{12}\left(2\,bx^6e+3\,bdx^4\right)\log\left(c\right)+\frac{1}{12}\left(2\,bnx^6e+3\,bdnx^4\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/36*(b*n - 6*a)*x^6*e - 1/16*(b*d*n - 4*a*d)*x^4 + 1/12*(2*b*x^6*e + 3*b*
d*x^4)*log(c) + 1/12*(2*b*n*x^6*e + 3*b*d*n*x^4)*log(x)
```

Sympy [A]
time = 0.67, size = 66, normalized size = 1.38

$$\frac{adx^4}{4} + \frac{aex^6}{6} - \frac{bdnx^4}{16} + \frac{bdx^4\log(cx^n)}{4} - \frac{benx^6}{36} + \frac{bex^6\log(cx^n)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**4/4 + a*e*x**6/6 - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 - b*e*n*x*
*6/36 + b*e*x**6*log(c*x**n)/6
```

Giac [A]
time = 2.36, size = 73, normalized size = 1.52

$$\frac{1}{6}bnx^6e\log(x) - \frac{1}{36}bnx^6e + \frac{1}{6}bx^6e\log(c) + \frac{1}{6}ax^6e + \frac{1}{4}bdnx^4\log(x) - \frac{1}{16}bdnx^4 + \frac{1}{4}bdx^4\log(c) + \frac{1}{4}adx^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/6*b*n*x^6*e*log(x) - 1/36*b*n*x^6*e + 1/6*b*x^6*e*log(c) + 1/6*a*x^6*e +
1/4*b*d*n*x^4*log(x) - 1/16*b*d*n*x^4 + 1/4*b*d*x^4*log(c) + 1/4*a*d*x^4
```

Mupad [B]
time = 3.39, size = 51, normalized size = 1.06

$$\ln(c\,x^n)\,\left(\frac{b\,e\,x^6}{6} + \frac{b\,d\,x^4}{4}\right) + \frac{d\,x^4\,(4\,a - b\,n)}{16} + \frac{e\,x^6\,(6\,a - b\,n)}{36}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d*x^4)/4 + (b*e*x^6)/6) + (d*x^4*(4*a - b*n))/16 + (e*x^6*(6
*a - b*n))/36
```

3.173 $\int x(d+ex^2)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=47

$$-\frac{1}{4}bdnx^2-\frac{1}{16}benx^4+\frac{1}{4}\left(2dx^2+ex^4\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/4*b*d*n*x^2-1/16*b*e*n*x^4+1/4*(e*x^4+2*d*x^2)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {14, 2371, 12}

$$\frac{1}{4}\left(2dx^2+ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bdnx^2-\frac{1}{16}benx^4$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d*n*x^2) - (b*e*n*x^4)/16 + ((2*d*x^2 + e*x^4)*(a + b*Log[c*x^n]))/
4
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x(d+ex^2)\,(a+b\log(cx^n))\,dx = \frac{1}{4}(2dx^2+ex^4)\,(a+b\log(cx^n)) - (bn)\int \frac{1}{4}x(2d+ex^2)\,dx$$
$$= \frac{1}{4}(2dx^2+ex^4)\,(a+b\log(cx^n)) - \frac{1}{4}(bn)\int x(2d+ex^2)\,dx$$
$$= \frac{1}{4}(2dx^2+ex^4)\,(a+b\log(cx^n)) - \frac{1}{4}(bn)\int (2dx+ex^3)\,dx$$
$$= -\frac{1}{4}bdnx^2 - \frac{1}{16}benx^4 + \frac{1}{4}(2dx^2+ex^4)\,(a+b\log(cx^n))$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.47

$$\frac{1}{2}adx^2 - \frac{1}{4}bdnx^2 + \frac{1}{4}aex^4 - \frac{1}{16}benx^4 + \frac{1}{2}bdx^2\log(cx^n) + \frac{1}{4}bex^4\log(cx^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (a*d*x^2)/2 - (b*d*n*x^2)/4 + (a*e*x^4)/4 - (b*e*n*x^4)/16 + (b*d*x^2*Log[c
*x^n])/2 + (b*e*x^4*Log[c*x^n])/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 2346, normalized size = 49.91

method	result	size
risch	Expression too large to display	2346

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*(e*x^2+d)^2*b/e*ln(x^n)+1/16*(16*x^4*a^2*e^2-8*Pi^2*b^2*d*e*x^2*csgn(I*
c*x^n)^6+4*I*Pi*b^2*e^2*n*x^4*csgn(I*c*x^n)^3-16*I*Pi*a*b*e^2*x^4*csgn(I*c*
x^n)^3+16*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+16*I*Pi*a*b*d^2*csgn(I*x^n
)*csgn(I*c*x^n)^2-12*I*Pi*b^2*d*e*n*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+32*I*Pi
*a*b*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+32*I*Pi*a*b*d*e*x^2*csgn(I*x^n)*csgn
(I*c*x^n)^2-32*Pi^2*b^2*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-4*I*P
i*b^2*e^2*n*x^4*csgn(I*c)*csgn(I*c*x^n)^2+16*I*Pi*a*b*e^2*x^4*csgn(I*c)*csg
n(I*c*x^n)^2+32*a^2*d*e*x^2-16*b^2*d^2*ln(c)*n-4*Pi^2*b^2*e^2*x^4*csgn(I*c*
x^n)^6+8*I*ln(x)*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-16*I*Pi*l
n(c)*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*b^2*e^2*n*x^4*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+16*d^2*b^2*ln(c)^2+16*a^2*d^2+16*I*Pi*ln
(c)*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^2+16*I*Pi*ln(c)*b^2*d^2*csgn(I*x^n)*csg
```

```
n(I*c*x^n)^2+16*I*Pi*ln(c)*b^2*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*b
^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*ln(x)*b^2*d^2*n^2+32*d^2*a*b
*ln(c)+16*I*Pi*ln(c)*b^2*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-8*Pi^2*b^2*d*e*x
^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+16*Pi^2*b^2*d*e*x^2*csgn(I*c)^
2*csgn(I*x^n)*csgn(I*c*x^n)^3+16*Pi^2*b^2*d*e*x^2*csgn(I*c)*csgn(I*x^n)^2*c
sgn(I*c*x^n)^3-16*I*Pi*ln(c)*b^2*e^2*x^4*csgn(I*c*x^n)^3-4*Pi^2*b^2*d^2*csg
n(I*x^n)^2*csgn(I*c*x^n)^4+4*b^2*d^2*n^2+32*ln(c)^2*b^2*d*e*x^2-4*I*Pi*b^2*
e^2*n*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+16*I*Pi*a*b*e^2*x^4*csgn(I*x^n)*csgn(
I*c*x^n)^2-32*I*Pi*ln(c)*b^2*d*e*x^2*csgn(I*c*x^n)^3-16*I*Pi*ln(c)*b^2*d^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-8*I*ln(x)*Pi*b^2*d^2*n*csgn(I*c)*csgn(I
*c*x^n)^2-8*I*ln(x)*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-16*ln(x)*a*b*d
^2*n+b^2*e^2*n^2*x^4-4*Pi^2*b^2*d^2*csgn(I*c*x^n)^6-16*I*Pi*a*b*d^2*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+12*I*Pi*b^2*d*e*n*x^2*csgn(I*c*x^n)^3-16*b*d^2
*n*a-32*I*Pi*a*b*d*e*x^2*csgn(I*c*x^n)^3-16*ln(x)*ln(c)*b^2*d^2*n+16*ln(c)^
2*b^2*e^2*x^4-12*I*Pi*b^2*d*e*n*x^2*csgn(I*c)*csgn(I*c*x^n)^2-24*b*n*a*d*e*
x^2-32*I*Pi*a*b*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-32*I*Pi*ln(c)*b
^2*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*Pi^2*b^2*e^2*x^4*csgn(I*c)
^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+8*Pi^2*b^2*e^2*x^4*csgn(I*c)^2*csgn(I*x^n)
*csgn(I*c*x^n)^3+8*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3
-16*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-8*a*b*e^2*n*x^4-
16*I*Pi*a*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+32*I*Pi*ln(c)*b^2*d
*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+32*I*Pi*ln(c)*b^2*d*e*x^2*csgn(I*x^n)*csgn
(I*c*x^n)^2+8*I*ln(x)*Pi*b^2*d^2*n*csgn(I*c*x^n)^3-8*Pi^2*b^2*d*e*x^2*csgn(
I*x^n)^2*csgn(I*c*x^n)^4+16*Pi^2*b^2*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5+4*
b^2*d*e*n^2*x^2-16*I*Pi*a*b*d^2*csgn(I*c*x^n)^3+8*Pi^2*b^2*e^2*x^4*csgn(I*x
^n)*csgn(I*c*x^n)^5-4*Pi^2*b^2*e^2*x^4*csgn(I*c)^2*csgn(I*c*x^n)^4-16*I*Pi*
ln(c)*b^2*d^2*csgn(I*c*x^n)^3+8*I*Pi*b^2*d^2*n*csgn(I*c*x^n)^3+8*Pi^2*b^2*e
^2*x^4*csgn(I*c)*csgn(I*c*x^n)^5-4*Pi^2*b^2*e^2*x^4*csgn(I*x^n)^2*csgn(I*c*
x^n)^4-4*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+8*Pi^2*b^2*
d^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+8*Pi^2*b^2*d^2*csgn(I*c)*csgn(I
*x^n)^2*csgn(I*c*x^n)^3-16*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
^4-4*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^4+8*Pi^2*b^2*d^2*csgn(I*x^n)*cs
gn(I*c*x^n)^5-8*Pi^2*b^2*d*e*x^2*csgn(I*c)^2*csgn(I*c*x^n)^4+16*Pi^2*b^2*d*
e*x^2*csgn(I*c)*csgn(I*c*x^n)^5-24*ln(c)*b^2*d*e*n*x^2+64*ln(c)*a*b*d*e*x^2
+8*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5+12*I*Pi*b^2*d*e*n*x^2*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)-8*ln(c)*b^2*e^2*n*x^4+32*ln(c)*a*b*e^2*x^4-8*I*Pi*
b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^2-8*I*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x
^n)^2)/e/(-2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2+2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*b*Pi*csgn(I*c*x^n)
^3+4*b*ln(c)-b*n+4*a)
```

Maxima [A]
time = 0.28, size = 60, normalized size = 1.28

$$-\frac{1}{16}\,bnx^4e+\frac{1}{4}\,bx^4e\log\left(cx^n\right)+\frac{1}{4}\,ax^4e-\frac{1}{4}\,bdnx^2+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*n*x^4*e + 1/4*b*x^4*e*log(c*x^n) + 1/4*a*x^4*e - 1/4*b*d*n*x^2 + 1/
2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2
```

Fricas [A]
time = 0.41, size = 69, normalized size = 1.47

$$-\frac{1}{16}(bn-4a)x^4e-\frac{1}{4}(bdn-2ad)x^2+\frac{1}{4}\left(bx^4e+2bdx^2\right)\log(c)+\frac{1}{4}\left(bnx^4e+2bdnx^2\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/16*(b*n - 4*a)*x^4*e - 1/4*(b*d*n - 2*a*d)*x^2 + 1/4*(b*x^4*e + 2*b*d*x^
2)*log(c) + 1/4*(b*n*x^4*e + 2*b*d*n*x^2)*log(x)
```

Sympy [A]
time = 0.29, size = 66, normalized size = 1.40

$$\frac{adx^2}{2}+\frac{aex^4}{4}-\frac{bdnx^2}{4}+\frac{bdx^2\log(cx^n)}{2}-\frac{benx^4}{16}+\frac{bex^4\log(cx^n)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**2/2 + a*e*x**4/4 - b*d*n*x**2/4 + b*d*x**2*log(c*x**n)/2 - b*e*n*x**
4/16 + b*e*x**4*log(c*x**n)/4
```

Giac [A]
time = 2.34, size = 73, normalized size = 1.55

$$\frac{1}{4}bnx^4e\log(x)-\frac{1}{16}bnx^4e+\frac{1}{4}bx^4e\log(c)+\frac{1}{4}ax^4e+\frac{1}{2}bdnx^2\log(x)-\frac{1}{4}bdnx^2+\frac{1}{2}bdx^2\log(c)+\frac{1}{2}adx^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/4*b*n*x^4*e*log(x) - 1/16*b*n*x^4*e + 1/4*b*x^4*e*log(c) + 1/4*a*x^4*e +
1/2*b*d*n*x^2*log(x) - 1/4*b*d*n*x^2 + 1/2*b*d*x^2*log(c) + 1/2*a*d*x^2
```

Mupad [B]
time = 3.39, size = 51, normalized size = 1.09

$$\ln(c\,x^n)\left(\frac{b\,e\,x^4}{4}+\frac{b\,d\,x^2}{2}\right)+\frac{d\,x^2\,(2\,a-b\,n)}{4}+\frac{e\,x^4\,(4\,a-b\,n)}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d*x^2)/2 + (b*e*x^4)/4) + (d*x^2*(2*a - b*n))/4 + (e*x^4*(4*
a - b*n))/16
```

3.174 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=52

$$-\frac{1}{4}benx^2+\frac{1}{2}ex^2(a+b\log(cx^n))+\frac{d(a+b\log(cx^n))^2}{2bn}$$

```
[Out] -1/4*b*e*n*x^2+1/2*e*x^2*(a+b*ln(c*x^n))+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Rubi [A]
time = 0.04, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.190$, Rules used = {14, 2393, 2338, 2341}

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{1}{2}ex^2(a+b\log(cx^n))-\frac{1}{4}benx^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/4*(b*e*n*x^2) + (e*x^2*(a + b*Log[c*x^n]))/2 + (d*(a + b*Log[c*x^n])^2)/
(2*b*n)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
```

```
Q[r]))
```

Rubi steps

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = \int \left(\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))\right)dx$$
$$= d\int \frac{a+b\log(cx^n)}{x}\,dx + e\int x(a+b\log(cx^n))\,dx$$
$$= -\frac{1}{4}benx^2+\frac{1}{2}ex^2(a+b\log(cx^n))+\frac{d(a+b\log(cx^n))^2}{2bn}$$

Mathematica [A]
time = 0.01, size = 57, normalized size = 1.10

$$\frac{1}{2}aex^2-\frac{1}{4}benx^2+ad\log(x)+\frac{1}{2}bex^2\log(cx^n)+\frac{bd\log^2(cx^n)}{2n}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (a*e*x^2)/2 - (b*e*n*x^2)/4 + a*d*Log[x] + (b*e*x^2*Log[c*x^n])/2 + (b*d*Lo
g[c*x^n]^2)/(2*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.07, size = 257, normalized size = 4.94

method	result
risch	$\left(\frac{be\,x^2}{2}+bd\ln(x)\right)\ln(x^n)-\frac{bdn\ln(x)^2}{2}-\frac{i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{4}+\frac{i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{4}+\frac{i\pi be\,x^2}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] (1/2*b*e*x^2+b*d*ln(x))*ln(x^n)-1/2*b*d*n*ln(x)^2-1/4*I*Pi*b*e*x^2*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/4*
I*Pi*b*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I*Pi*b*e*x^2*csgn(I*c*x^n)^3+1
/2*ln(c)*b*e*x^2-1/4*b*e*n*x^2+1/2*a*e*x^2-1/2*I*ln(x)*Pi*b*d*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)+1/2*I*ln(x)*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*l
n(x)*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(x)*Pi*b*d*csgn(I*c*x^n)^3+
ln(x)*ln(c)*b*d+ln(x)*a*d
```

Maxima [A]
time = 0.29, size = 52, normalized size = 1.00

$$-\frac{1}{4}\,bnx^2e+\frac{1}{2}\,bx^2e\log\left(cx^n\right)+\frac{1}{2}\,ax^2e+\frac{bd\log\left(cx^n\right)^2}{2\,n}+ad\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*x^2*e + 1/2*b*x^2*e*log(c*x^n) + 1/2*a*x^2*e + 1/2*b*d*log(c*x^n)^
2/n + a*d*log(x)
```

Fricas [A]
time = 0.45, size = 57, normalized size = 1.10

$$\frac{1}{2}\,bx^2e\log\left(c\right)+\frac{1}{2}\,bdn\log\left(x\right)^2-\frac{1}{4}\,(bn-2\,a)x^2e+\frac{1}{2}\,\left(bnx^2e+2\,bd\log\left(c\right)+2\,ad\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*b*x^2*e*log(c) + 1/2*b*d*n*log(x)^2 - 1/4*(b*n - 2*a)*x^2*e + 1/2*(b*n*
x^2*e + 2*b*d*log(c) + 2*a*d)*log(x)
```

Sympy [A]
time = 0.31, size = 78, normalized size = 1.50

$$\begin{cases}\frac{ad\log\left(cx^n\right)}{n}+\frac{aex^2}{2}+\frac{bd\log\left(cx^n\right)^2}{2n}-\frac{benx^2}{4}+\frac{bex^2\log\left(cx^n\right)}{2} & \text{for}\ n\neq 0\\ \left(a+b\log\left(c\right)\right)\left(d\log\left(x\right)+\frac{ex^2}{2}\right) & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise((a*d*log(c*x**n)/n + a*e*x**2/2 + b*d*log(c*x**n)**2/(2*n) - b*e*
n*x**2/4 + b*e*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(d*log(x) + e
*x**2/2), True))
```

Giac [A]
time = 2.27, size = 60, normalized size = 1.15

$$\frac{1}{2}\,bnx^2e\log\left(x\right)-\frac{1}{4}\,bnx^2e+\frac{1}{2}\,bx^2e\log\left(c\right)+\frac{1}{2}\,bdn\log\left(x\right)^2+\frac{1}{2}\,ax^2e+bd\log\left(c\right)\log\left(x\right)+ad\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*n*x^2*e*log(x) - 1/4*b*n*x^2*e + 1/2*b*x^2*e*log(c) + 1/2*b*d*n*log(x
)^2 + 1/2*a*x^2*e + b*d*log(c)*log(x) + a*d*log(x)
```

Mupad [B]
time = 3.34, size = 48, normalized size = 0.92

$$a\,d\,\ln\left(x\right)+\frac{e\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{b\,e\,x^2\,\ln\left(c\,x^n\right)}{2}+\frac{b\,d\ln\left(c\,x^n\right)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)*(a + b*log(c*x^n)))/x,x)
```

```
[Out] a*d*log(x) + (e*x^2*(2*a - b*n))/4 + (b*e*x^2*log(c*x^n))/2 + (b*d*log(c*x^
n)^2)/(2*n)
```

3.175 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=52

$$-\frac{bdn}{4x^2}-\frac{d(a+b\log(cx^n))}{2x^2}+\frac{e(a+b\log(cx^n))^2}{2bn}$$

```
[Out] -1/4*b*d*n/x^2-1/2*d*(a+b*ln(c*x^n))/x^2+1/2*e*(a+b*ln(c*x^n))^2/b/n
```

Rubi [A]
time = 0.04, antiderivative size = 54, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {14, 2372, 2338}

$$-\frac{d(a+b\log(cx^n))}{2x^2}+e\log(x)\left(a+b\log(cx^n)\right)-\frac{bdn}{4x^2}-\frac{1}{2}ben\log^2(x)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d*n)/x^2 - (b*e*n*Log[x]^2)/2 - (d*(a + b*Log[c*x^n]))/(2*x^2) + e*
Log[x]*(a + b*Log[c*x^n])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}dx = -\frac{1}{2}\left(\frac{d}{x^2}-2e\log(x)\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d}{2x^3}+\frac{e\log(x)}{x}\right)dx$$
$$= -\frac{bdn}{4x^2}-\frac{1}{2}\left(\frac{d}{x^2}-2e\log(x)\right)(a+b\log(cx^n))-(ben)\int\frac{\log(x)}{x}dx$$
$$= -\frac{bdn}{4x^2}-\frac{1}{2}ben\log^2(x)-\frac{1}{2}\left(\frac{d}{x^2}-2e\log(x)\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.01, size = 57, normalized size = 1.10

$$-\frac{ad}{2x^2}-\frac{bdn}{4x^2}+ae\log(x)-\frac{bd\log(cx^n)}{2x^2}+\frac{be\log^2(cx^n)}{2n}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/2*(a*d)/x^2 - (b*d*n)/(4*x^2) + a*e*Log[x] - (b*d*Log[c*x^n])/(2*x^2) +
(b*e*Log[c*x^n]^2)/(2*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.07, size = 266, normalized size = 5.12

method	result
risch	$-\frac{b(-2e\ln(x)x^2+d)\ln(x^n)}{2x^2}-\frac{2i\ln(x)\pi be\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)x^2-2i\ln(x)\pi be\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2x^2-2i\ln(x)\pi be\,\mathrm{csgn}(ix^n}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(-2*e*ln(x)*x^2+d)/x^2*ln(x^n)-1/4*(2*I*ln(x)*Pi*b*e*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^2-2*I*ln(x)*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^2-2*I
*ln(x)*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^2+2*I*ln(x)*Pi*b*e*csgn(I*c*x^n
)^3*x^2-I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d*csgn(I*c)*csg
n(I*c*x^n)^2+I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d*csgn(I*c*x^n)^3+
2*b*e*n*ln(x)^2*x^2-4*ln(x)*ln(c)*b*e*x^2-4*ln(x)*a*e*x^2+2*d*b*ln(c)+b*d*n
+2*a*d)/x^2
```

Maxima [A]
time = 0.27, size = 51, normalized size = 0.98

$$\frac{be\log(cx^n)^2}{2\,n}+ae\log(x)-\frac{bdn}{4\,x^2}-\frac{bd\log(cx^n)}{2\,x^2}-\frac{ad}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] 1/2*b*e*log(c*x^n)^2/n + a*e*log(x) - 1/4*b*d*n/x^2 - 1/2*b*d*log(c*x^n)/x^
2 - 1/2*a*d/x^2
```

Fricas [A]
time = 0.45, size = 62, normalized size = 1.19

$$\frac{2\,bnx^2e\log\left(x\right)^2-bdn-2\,bd\log\left(c\right)-2\,ad+2\left(2\,bx^2e\log\left(c\right)+2\,ax^2e-bdn\right)\log\left(x\right)}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] 1/4*(2*b*n*x^2*e*log(x)^2 - b*d*n - 2*b*d*log(c) - 2*a*d + 2*(2*b*x^2*e*log
(c) + 2*a*x^2*e - b*d*n)*log(x))/x^2
```

Sympy [A]
time = 2.43, size = 63, normalized size = 1.21

$$-\frac{ad}{2x^2}+ae\log\left(x\right)+bd\left(-\frac{n}{4x^2}-\frac{\log\left(cx^n\right)}{2x^2}\right)-be\left(\begin{cases}-\log\left(c\right)\log\left(x\right) & \text{for}\ n=0\\ -\frac{\log\left(cx^n\right)^2}{2n} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] -a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2*x**2)) - b*e
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Giac [A]
time = 3.98, size = 63, normalized size = 1.21

$$\frac{2\,bnx^2e\log\left(x\right)^2+4\,bx^2e\log\left(c\right)\log\left(x\right)+4\,ax^2e\log\left(x\right)-2\,bdn\log\left(x\right)-bdn-2\,bd\log\left(c\right)-2\,ad}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] 1/4*(2*b*n*x^2*e*log(x)^2 + 4*b*x^2*e*log(c)*log(x) + 4*a*x^2*e*log(x) - 2*
b*d*n*log(x) - b*d*n - 2*b*d*log(c) - 2*a*d)/x^2
```

Mupad [B]
time = 3.40, size = 66, normalized size = 1.27

$$\ln\left(x\right)\,\left(a\,e+\frac{b\,e\,n}{2}\right)-\frac{\frac{a\,d}{2}+\frac{b\,d\,n}{4}}{x^2}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{2}+\frac{b\,d}{2}\right)}{x^2}+\frac{b\,e\,\ln\left(c\,x^n\right)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] log(x)*(a*e + (b*e*n)/2) - ((a*d)/2 + (b*d*n)/4)/x^2 - (log(c*x^n)*((b*d)/2
 + (b*e*x^2)/2))/x^2 + (b*e*log(c*x^n)^2)/(2*n)
```

3.176 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5} dx$

Optimal. Leaf size=57

$$-\frac{bdn}{16x^4}-\frac{ben}{4x^2}-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

```
[Out] -1/16*b*d*n/x^4-1/4*b*e*n/x^2-1/4*d*(a+b*ln(c*x^n))/x^4-1/2*e*(a+b*ln(c*x^n
))/x^2
```

Rubi [A]
time = 0.03, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {14, 2372, 12}

$$-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}-\frac{bdn}{16x^4}-\frac{ben}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d*n)/x^4 - (b*e*n)/(4*x^2) - (d*(a + b*Log[c*x^n]))/(4*x^4) - (e*(
a + b*Log[c*x^n]))/(2*x^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{1}{4}\left(\frac{d}{x^4}+\frac{2e}{x^2}\right)(a+b\log(cx^n)) - (bn)\int \frac{-d-2ex^2}{4x^5}\,dx$$
$$= -\frac{1}{4}\left(\frac{d}{x^4}+\frac{2e}{x^2}\right)(a+b\log(cx^n)) - \frac{1}{4}(bn)\int \frac{-d-2ex^2}{x^5}\,dx$$
$$= -\frac{1}{4}\left(\frac{d}{x^4}+\frac{2e}{x^2}\right)(a+b\log(cx^n)) - \frac{1}{4}(bn)\int \left(-\frac{d}{x^5}-\frac{2e}{x^3}\right)dx$$
$$= -\frac{bdn}{16x^4} - \frac{ben}{4x^2} - \frac{1}{4}\left(\frac{d}{x^4}+\frac{2e}{x^2}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.21

$$-\frac{ad}{4x^4} - \frac{bdn}{16x^4} - \frac{ae}{2x^2} - \frac{ben}{4x^2} - \frac{bd\log(cx^n)}{4x^4} - \frac{be\log(cx^n)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/4*(a*d)/x^4 - (b*d*n)/(16*x^4) - (a*e)/(2*x^2) - (b*e*n)/(4*x^2) - (b*d*
Log[c*x^n])/(4*x^4) - (b*e*Log[c*x^n])/(2*x^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 248, normalized size = 4.35

method	result
risch	$-\frac{b(2e\,x^2+d)\ln(x^n)}{4x^4} - \frac{-4i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+4i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+4i\pi be\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-4i\pi b}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(2*e*x^2+d)/x^4*ln(x^n)-1/16*(-4*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+4*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*b*e*x^2*csgn(
I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*b*e*x^2*csgn(I*c*x^n)^3+8*ln(c)*b*e*x^2+4*b*e
*n*x^2+8*a*e*x^2-2*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b*d*
csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*Pi*b*d
*csgn(I*c*x^n)^3+4*d*b*ln(c)+b*d*n+4*a*d)/x^4
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.05

$$-\frac{bne}{4\,x^2} - \frac{be\log(cx^n)}{2\,x^2} - \frac{ae}{2\,x^2} - \frac{bdn}{16\,x^4} - \frac{bd\log(cx^n)}{4\,x^4} - \frac{ad}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*e/x^2 - 1/2*b*e*log(c*x^n)/x^2 - 1/2*a*e/x^2 - 1/16*b*d*n/x^4 - 1/
4*b*d*log(c*x^n)/x^4 - 1/4*a*d/x^4
```

Fricas [A]
time = 0.40, size = 62, normalized size = 1.09

$$-\frac{4\,(bn+2\,a)x^2e+bdn+4\,ad+4\,(2\,bx^2e+bd)\log\left(c\right)+4\,(2\,bnx^2e+bdn)\log\left(x\right)}{16\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] -1/16*(4*(b*n + 2*a)*x^2*e + b*d*n + 4*a*d + 4*(2*b*x^2*e + b*d)*log(c) + 4
*(2*b*n*x^2*e + b*d*n)*log(x))/x^4
```

Sympy [A]
time = 0.56, size = 68, normalized size = 1.19

$$-\frac{ad}{4x^4}-\frac{ae}{2x^2}-\frac{bdn}{16x^4}-\frac{bd\log\left(cx^n\right)}{4x^4}-\frac{ben}{4x^2}-\frac{be\log\left(cx^n\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] -a*d/(4*x**4) - a*e/(2*x**2) - b*d*n/(16*x**4) - b*d*log(c*x**n)/(4*x**4) -
 b*e*n/(4*x**2) - b*e*log(c*x**n)/(2*x**2)
```

Giac [A]
time = 2.70, size = 65, normalized size = 1.14

$$-\frac{8\,bnx^2e\log\left(x\right)+4\,bnx^2e+8\,bx^2e\log\left(c\right)+8\,ax^2e+4\,bdn\log\left(x\right)+bdn+4\,bd\log\left(c\right)+4\,ad}{16\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

```
[Out] -1/16*(8*b*n*x^2*e*log(x) + 4*b*n*x^2*e + 8*b*x^2*e*log(c) + 8*a*x^2*e + 4*
b*d*n*log(x) + b*d*n + 4*b*d*log(c) + 4*a*d)/x^4
```

Mupad [B]
time = 3.38, size = 51, normalized size = 0.89

$$-\frac{\left(2\,a\,e+b\,e\,n\right)\,x^2+a\,d+\frac{b\,d\,n}{4}}{4\,x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{2}+\frac{b\,d}{4}\right)}{x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)*(a + b*log(c*x^n)))/x^5,x)
```

```
[Out] - (a*d + x^2*(2*a*e + b*e*n) + (b*d*n)/4)/(4*x^4) - (log(c*x^n)*((b*d)/4 +
(b*e*x^2)/2))/x^4
```

3.177 $\int x^4(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=48

$$-\frac{1}{25}bdnx^5-\frac{1}{49}benx^7+\frac{1}{35}\left(7dx^5+5ex^7\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/25*b*d*n*x^5-1/49*b*e*n*x^7+1/35*(5*e*x^7+7*d*x^5)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.095$, Rules used = {14, 2371}

$$\frac{1}{35}\left(7dx^5+5ex^7\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{25}bdnx^5-\frac{1}{49}benx^7$$

Antiderivative was successfully verified.

```
[In] Int[x^4*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d*n*x^5) - (b*e*n*x^7)/49 + ((7*d*x^5 + 5*e*x^7)*(a + b*Log[c*x^n]
))/35
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^4\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx&=\frac{1}{35}\left(7dx^5+5ex^7\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\left(\frac{dx^4}{5}+\frac{ex^6}{7}\right)\,dx\\&=-\frac{1}{25}bdnx^5-\frac{1}{49}benx^7+\frac{1}{35}\left(7dx^5+5ex^7\right)\left(a+b\log\left(cx^n\right)\right)\end{aligned}$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.44

$$\frac{1}{5}adx^5-\frac{1}{25}bdnx^5+\frac{1}{7}aex^7-\frac{1}{49}benx^7+\frac{1}{5}bdx^5\log\left(cx^n\right)+\frac{1}{7}bex^7\log\left(cx^n\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (a*d*x^5)/5 - (b*d*n*x^5)/25 + (a*e*x^7)/7 - (b*e*n*x^7)/49 + (b*d*x^5*Log[
c*x^n])/5 + (b*e*x^7*Log[c*x^n])/7
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 266, normalized size = 5.54

method	result
risch	$\frac{b\,x^{5}\left(5 e\,x^{2}+7 d\right)\ln\left(x^{n}\right)}{35}-\frac{i \pi b e\,x^{7} \mathrm{csgn}\left(i c\right) \mathrm{csgn}\left(i x^{n}\right) \mathrm{csgn}\left(i c\,x^{n}\right)}{14}+\frac{i \pi b e\,x^{7} \mathrm{csgn}\left(i c\right) \mathrm{csgn}\left(i c\,x^{n}\right)^{2}}{14}+\frac{i \pi b e\,x^{7} \mathrm{csgn}\left(i x^{n}\right) \mathrm{csgn}\left(i c\,x^{n}\right)^{2}}{14}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/35*b*x^5*(5*e*x^2+7*d)*ln(x^n)-1/14*I*Pi*b*e*x^7*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+1/14*I*Pi*b*e*x^7*csgn(I*c)*csgn(I*c*x^n)^2+1/14*I*Pi*b*e*x^7*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/14*I*Pi*b*e*x^7*csgn(I*c*x^n)^3+1/7*ln(c)*b*e*
x^7-1/49*b*e*n*x^7+1/7*x^7*a*e-1/10*I*Pi*b*d*x^5*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+1/10*I*Pi*b*d*x^5*csgn(I*c)*csgn(I*c*x^n)^2+1/10*I*Pi*b*d*x^5*csg
n(I*x^n)*csgn(I*c*x^n)^2-1/10*I*Pi*b*d*x^5*csgn(I*c*x^n)^3+1/5*ln(c)*b*d*x^
5-1/25*b*d*n*x^5+1/5*x^5*a*d
```

Maxima [A]
time = 0.29, size = 60, normalized size = 1.25

$$-\frac{1}{49}\,bnx^{7}e+\frac{1}{7}\,bx^{7}e\log\left(cx^{n}\right)+\frac{1}{7}\,ax^{7}e-\frac{1}{25}\,bdnx^{5}+\frac{1}{5}\,bdx^{5}\log\left(cx^{n}\right)+\frac{1}{5}\,adx^{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/49*b*n*x^7*e + 1/7*b*x^7*e*log(c*x^n) + 1/7*a*x^7*e - 1/25*b*d*n*x^5 + 1
/5*b*d*x^5*log(c*x^n) + 1/5*a*d*x^5
```

Fricas [A]
time = 0.38, size = 71, normalized size = 1.48

$$-\frac{1}{49}\,(bn-7\,a)x^{7}e-\frac{1}{25}\,(bdn-5\,ad)x^{5}+\frac{1}{35}\,\left(5\,bx^{7}e+7\,bdx^{5}\right)\log\left(c\right)+\frac{1}{35}\,\left(5\,bnx^{7}e+7\,bdnx^{5}\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/49*(b*n - 7*a)*x^7*e - 1/25*(b*d*n - 5*a*d)*x^5 + 1/35*(5*b*x^7*e + 7*b*
d*x^5)*log(c) + 1/35*(5*b*n*x^7*e + 7*b*d*n*x^5)*log(x)
```

Sympy [A]
time = 0.93, size = 66, normalized size = 1.38

$$\frac{adx^5}{5} + \frac{aex^7}{7} - \frac{bdnx^5}{25} + \frac{bdx^5\log\left(cx^n\right)}{5} - \frac{benx^7}{49} + \frac{bex^7\log\left(cx^n\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**5/5 + a*e*x**7/7 - b*d*n*x**5/25 + b*d*x**5*log(c*x**n)/5 - b*e*n*x*
*7/49 + b*e*x**7*log(c*x**n)/7
```

Giac [A]
time = 3.44, size = 73, normalized size = 1.52

$$\frac{1}{7}bnx^7e\log\left(x\right) - \frac{1}{49}bnx^7e + \frac{1}{7}bx^7e\log\left(c\right) + \frac{1}{7}ax^7e + \frac{1}{5}bdnx^5\log\left(x\right) - \frac{1}{25}bdnx^5 + \frac{1}{5}bdx^5\log\left(c\right) + \frac{1}{5}adx^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/7*b*n*x^7*e*log(x) - 1/49*b*n*x^7*e + 1/7*b*x^7*e*log(c) + 1/7*a*x^7*e +
1/5*b*d*n*x^5*log(x) - 1/25*b*d*n*x^5 + 1/5*b*d*x^5*log(c) + 1/5*a*d*x^5
```

Mupad [B]
time = 3.35, size = 51, normalized size = 1.06

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^7}{7} + \frac{b\,d\,x^5}{5}\right) + \frac{d\,x^5\,\left(5\,a - b\,n\right)}{25} + \frac{e\,x^7\,\left(7\,a - b\,n\right)}{49}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d*x^5)/5 + (b*e*x^7)/7) + (d*x^5*(5*a - b*n))/25 + (e*x^7*(7
*a - b*n))/49
```

3.178 $\int x^2(d+ex^2)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=48

$$-\frac{1}{9}bdnx^3-\frac{1}{25}benx^5+\frac{1}{15}\left(5dx^3+3ex^5\right)(a+b\log(cx^n))$$

```
[Out] -1/9*b*d*n*x^3-1/25*b*e*n*x^5+1/15*(3*e*x^5+5*d*x^3)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.095$, Rules used = {14, 2371}

$$\frac{1}{15}\left(5dx^3+3ex^5\right)(a+b\log(cx^n))-\frac{1}{9}bdnx^3-\frac{1}{25}benx^5$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d*n*x^3) - (b*e*n*x^5)/25 + ((5*d*x^3 + 3*e*x^5)*(a + b*Log[c*x^n])
)/15
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^2\left(d+ex^2\right)(a+b\log(cx^n))\,dx&=\frac{1}{15}\left(5dx^3+3ex^5\right)(a+b\log(cx^n))-(bn)\int\left(\frac{dx^2}{3}+\frac{ex^4}{5}\right)dx\\&=-\frac{1}{9}bdnx^3-\frac{1}{25}benx^5+\frac{1}{15}\left(5dx^3+3ex^5\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.44

$$\frac{1}{3}adx^3-\frac{1}{9}bdnx^3+\frac{1}{5}aex^5-\frac{1}{25}benx^5+\frac{1}{3}bdx^3\log(cx^n)+\frac{1}{5}bex^5\log(cx^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (a*d*x^3)/3 - (b*d*n*x^3)/9 + (a*e*x^5)/5 - (b*e*n*x^5)/25 + (b*d*x^3*Log[c
*x^n])/3 + (b*e*x^5*Log[c*x^n])/5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 266, normalized size = 5.54

method	result
risch	$\frac{b\,x^{3}\left(3e\,x^{2}+5d\right)\ln\left(x^{n}\right)}{15}-\frac{i\pi b e\,x^{5}\operatorname{csgn}\left(ic\right)\operatorname{csgn}\left(i x^{n}\right)\operatorname{csgn}\left(ic\,x^{n}\right)}{10}+\frac{i\pi b e\,x^{5}\operatorname{csgn}\left(ic\right)\operatorname{csgn}\left(ic\,x^{n}\right)^{2}}{10}+\frac{i\pi b e\,x^{5}\operatorname{csgn}\left(i x^{n}\right)\operatorname{csgn}\left(ic\,x^{n}\right)^{2}}{10}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/15*b*x^3*(3*e*x^2+5*d)*ln(x^n)-1/10*I*Pi*b*e*x^5*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+1/10*I*Pi*b*e*x^5*csgn(I*c)*csgn(I*c*x^n)^2+1/10*I*Pi*b*e*x^5*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/10*I*Pi*b*e*x^5*csgn(I*c*x^n)^3+1/5*ln(c)*b*e*
x^5-1/25*b*e*n*x^5+1/5*x^5*a*e-1/6*I*Pi*b*d*x^3*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+1/6*I*Pi*b*d*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*d*x^3*csgn(I
*x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*d*x^3*csgn(I*c*x^n)^3+1/3*ln(c)*b*d*x^3-1/
9*b*d*n*x^3+1/3*x^3*a*d
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.25

$$-\frac{1}{25}\,bnx^{5}e+\frac{1}{5}\,bx^{5}e\log\left(cx^{n}\right)+\frac{1}{5}\,ax^{5}e-\frac{1}{9}\,bdnx^{3}+\frac{1}{3}\,bdx^{3}\log\left(cx^{n}\right)+\frac{1}{3}\,adx^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*n*x^5*e + 1/5*b*x^5*e*log(c*x^n) + 1/5*a*x^5*e - 1/9*b*d*n*x^3 + 1/
3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3
```

Fricas [A]
time = 0.37, size = 71, normalized size = 1.48

$$-\frac{1}{25}\,(bn-5\,a)x^{5}e-\frac{1}{9}\,(bdn-3\,ad)x^{3}+\frac{1}{15}\,\left(3\,bx^{5}e+5\,bdx^{3}\right)\log\left(c\right)+\frac{1}{15}\,\left(3\,bnx^{5}e+5\,bdnx^{3}\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/25*(b*n - 5*a)*x^5*e - 1/9*(b*d*n - 3*a*d)*x^3 + 1/15*(3*b*x^5*e + 5*b*d
*x^3)*log(c) + 1/15*(3*b*n*x^5*e + 5*b*d*n*x^3)*log(x)
```

Sympy [A]
time = 0.42, size = 66, normalized size = 1.38

$$\frac{adx^3}{3} + \frac{aex^5}{5} - \frac{bdnx^3}{9} + \frac{bdx^3\log(cx^n)}{3} - \frac{benx^5}{25} + \frac{bex^5\log(cx^n)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x**3/3 + a*e*x**5/5 - b*d*n*x**3/9 + b*d*x**3*log(c*x**n)/3 - b*e*n*x**
5/25 + b*e*x**5*log(c*x**n)/5
```

Giac [A]
time = 2.66, size = 73, normalized size = 1.52

$$\frac{1}{5}bnx^5e\log(x) - \frac{1}{25}bnx^5e + \frac{1}{5}bx^5e\log(c) + \frac{1}{5}ax^5e + \frac{1}{3}bdnx^3\log(x) - \frac{1}{9}bdnx^3 + \frac{1}{3}bdx^3\log(c) + \frac{1}{3}adx^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/5*b*n*x^5*e*log(x) - 1/25*b*n*x^5*e + 1/5*b*x^5*e*log(c) + 1/5*a*x^5*e +
1/3*b*d*n*x^3*log(x) - 1/9*b*d*n*x^3 + 1/3*b*d*x^3*log(c) + 1/3*a*d*x^3
```

Mupad [B]
time = 3.31, size = 51, normalized size = 1.06

$$\ln(c\,x^n)\,\left(\frac{b\,e\,x^5}{5} + \frac{b\,d\,x^3}{3}\right) + \frac{d\,x^3\,(3\,a - b\,n)}{9} + \frac{e\,x^5\,(5\,a - b\,n)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d*x^3)/3 + (b*e*x^5)/5) + (d*x^3*(3*a - b*n))/9 + (e*x^5*(5*
a - b*n))/25
```

3.179 $\int (d+ex^2)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=48

$$-bdnx-\frac{1}{9}benx^3+dx(a+b\log(cx^n))+\frac{1}{3}ex^3(a+b\log(cx^n))$$

```
[Out] -b*d*n*x-1/9*b*e*n*x^3+d*x*(a+b*ln(c*x^n))+1/3*e*x^3*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.01, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2350}

$$dx(a+b\log(cx^n))+\frac{1}{3}ex^3(a+b\log(cx^n))-bdnx-\frac{1}{9}benx^3$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d*n*x) - (b*e*n*x^3)/9 + d*x*(a + b*Log[c*x^n]) + (e*x^3*(a + b*Log[c*x
^n]))/3
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex^2)(a+b\log(cx^n))\,dx &= \frac{1}{3}(3dx+ex^3)(a+b\log(cx^n))-(bn)\int\left(d+\frac{ex^2}{3}\right)dx\\ &= -bdnx-\frac{1}{9}benx^3+\frac{1}{3}(3dx+ex^3)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.00, size = 55, normalized size = 1.15

$$adx-bdnx+\frac{1}{3}aex^3-\frac{1}{9}benx^3+bdx\log(cx^n)+\frac{1}{3}bex^3\log(cx^n)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x^2)*(a + b*Log[c*x^n]),x]

[Out] a*d*x - b*d*n*x + (a*e*x^3)/3 - (b*e*n*x^3)/9 + b*d*x*Log[c*x^n] + (b*e*x^3*Log[c*x^n])/3

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 247, normalized size = 5.15

method	result
risch	$\frac{bx(e\,x^2+3d)\ln(x^n)}{3} - \frac{i\pi be\,x^3 \mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{6} + \frac{i\pi be\,x^3 \mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{6} + \frac{i\pi be\,x^3 \mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{6} - i\pi$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)

[Out] 1/3*b*x*(e*x^2+3*d)*ln(x^n)-1/6*I*Pi*b*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/6*I*Pi*b*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*e*x^3*csgn(I*c*x^n)^3-1/2*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x+1/2*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*x+1/2*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*x-1/2*I*Pi*b*d*csgn(I*c*x^n)^3*x+1/3*ln(c)*b*e*x^3-1/9*b*e*n*x^3+1/3*x^3*a*e+ln(c)*b*d*x-b*d*n*x+x*a*d

Maxima [A]
time = 0.28, size = 52, normalized size = 1.08

$$-\frac{1}{9}\,bnx^3e + \frac{1}{3}\,bx^3e\log\left(cx^n\right) + \frac{1}{3}\,ax^3e - bdnx + bdx\log\left(cx^n\right) + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")

[Out] -1/9*b*n*x^3*e + 1/3*b*x^3*e*log(c*x^n) + 1/3*a*x^3*e - b*d*n*x + b*d*x*log(c*x^n) + a*d*x

Fricas [A]
time = 0.41, size = 63, normalized size = 1.31

$$-\frac{1}{9}\,(bn-3\,a)x^3e - (bdn-ad)x + \frac{1}{3}\,\left(bx^3e + 3\,bdx\right)\log\left(c\right) + \frac{1}{3}\,\left(bnx^3e + 3\,bdnx\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")

[Out] -1/9*(b*n - 3*a)*x^3*e - (b*d*n - a*d)*x + 1/3*(b*x^3*e + 3*b*d*x)*log(c) + 1/3*(b*n*x^3*e + 3*b*d*n*x)*log(x)

Sympy [A]
time = 0.19, size = 56, normalized size = 1.17

$$adx + \frac{aex^3}{3} - bdnx + bdx\log\left(cx^n\right) - \frac{benx^3}{9} + \frac{bex^3\log\left(cx^n\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d*x + a*e*x**3/3 - b*d*n*x + b*d*x*log(c*x**n) - b*e*n*x**3/9 + b*e*x**3*
log(c*x**n)/3
```

Giac [A]
time = 4.82, size = 62, normalized size = 1.29

$$\frac{1}{3}bnx^3e\log\left(x\right)-\frac{1}{9}bnx^3e+\frac{1}{3}bx^3e\log\left(c\right)+\frac{1}{3}ax^3e+bdnx\log\left(x\right)-bdnx+bdx\log\left(c\right)+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/3*b*n*x^3*e*log(x) - 1/9*b*n*x^3*e + 1/3*b*x^3*e*log(c) + 1/3*a*x^3*e + b
*d*n*x*log(x) - b*d*n*x + b*d*x*log(c) + a*d*x
```

Mupad [B]
time = 3.31, size = 43, normalized size = 0.90

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^3}{3}+b\,d\,x\right)+d\,x\,\left(a-b\,n\right)+\frac{e\,x^3\,\left(3\,a-b\,n\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^2)*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*(b*d*x + (b*e*x^3)/3) + d*x*(a - b*n) + (e*x^3*(3*a - b*n))/9
```

3.180 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2} dx$

Optimal. Leaf size=44

$$-\frac{bdn}{x} - benx - \frac{d(a+b\log(cx^n))}{x} + ex(a+b\log(cx^n))$$

```
[Out] -b*d*n/x-b*e*n*x-d*(a+b*ln(c*x^n))/x+e*x*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {14, 2372}

$$-\frac{d(a+b\log(cx^n))}{x} + ex(a+b\log(cx^n)) - \frac{bdn}{x} - benx$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d*n)/x) - b*e*n*x - (d*(a + b*Log[c*x^n]))/x + e*x*(a + b*Log[c*x^n])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2} dx &= -\left(\frac{d}{x} - ex\right)(a+b\log(cx^n)) - (bn)\int \left(e - \frac{d}{x^2}\right) dx \\
&= -\frac{bdn}{x} - benx - \left(\frac{d}{x} - ex\right)(a+b\log(cx^n))
\end{aligned}$$

Mathematica [A]
time = 0.01, size = 49, normalized size = 1.11

$$-\frac{ad}{x} - \frac{bdn}{x} + aex - benx - \frac{bd\log(cx^n)}{x} + bex\log(cx^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((a*d)/x) - (b*d*n)/x + a*e*x - b*e*n*x - (b*d*Log[c*x^n])/x + b*e*x*Log[c
*x^n]
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 249, normalized size = 5.66

method	result
risch	$-\frac{b(-e x^2+d)\ln(x^n)}{x} - \frac{i\pi be x^2 \mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic x^n) - i\pi be x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic x^n)^2 - i\pi be x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic x^n)^2 + i\pi be x^2$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b*(-e*x^2+d)/x*ln(x^n)-1/2*(I*Pi*b*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)-I*Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*e*x^2*csgn(I*x^n)*csgn(I*c
*x^n)^2+I*Pi*b*e*x^2*csgn(I*c*x^n)^3-I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n
)^2-I*Pi*b*d*csgn(I*c*x^n)^3-2*ln(c)*b*e*x^2+2*b*e*n*x^2-2*a*e*x^2+2*d*b*ln
(c)+2*b*d*n+2*a*d)/x
```

Maxima [A]
time = 0.29, size = 52, normalized size = 1.18

$$-bnxe + bxe\log(cx^n) + axe - \frac{bdn}{x} - \frac{bd\log(cx^n)}{x} - \frac{ad}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] -b*n*x*e + b*x*e*log(c*x^n) + a*x*e - b*d*n/x - b*d*log(c*x^n)/x - a*d/x
```

Fricas [A]
time = 0.40, size = 60, normalized size = 1.36

$$-\frac{(bn-a)x^2e + bdn + ad - (bx^2e - bd)\log(c) - (bnx^2e - bdn)\log(x)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] -((b*n - a)*x^2*e + b*d*n + a*d - (b*x^2*e - b*d)*log(c) - (b*n*x^2*e - b*d
*n)*log(x))/x
```

Sympy [A]
time = 0.23, size = 46, normalized size = 1.05

$$-\frac{ad}{x} + aex - \frac{bdn}{x} - \frac{bd\log{(cx^n)}}{x} - benx + bex\log{(cx^n)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] -a*d/x + a*e*x - b*d*n/x - b*d*log(c*x**n)/x - b*e*n*x + b*e*x*log(c*x**n)
```

Giac [A]
time = 5.74, size = 62, normalized size = 1.41

$$\frac{bnx^2e\log{(x)} - bnx^2e + bx^2e\log{(c)} + ax^2e - bdn\log{(x)} - bdn - bd\log{(c)} - ad}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] (b*n*x^2*e*log(x) - b*n*x^2*e + b*x^2*e*log(c) + a*x^2*e - b*d*n*log(x) - b
*d*n - b*d*log(c) - a*d)/x
```

Mupad [B]
time = 3.34, size = 51, normalized size = 1.16

$$e\,x\,(a-b\,n) - \ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2+b\,d}{x} - 2\,b\,e\,x\right) - \frac{a\,d+b\,d\,n}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)*(a + b*log(c*x^n)))/x^2,x)
```

```
[Out] e*x*(a - b*n) - log(c*x^n)*((b*d + b*e*x^2)/x - 2*b*e*x) - (a*d + b*d*n)/x
```

3.181 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=53

$$-\frac{bdn}{9x^3}-\frac{ben}{x}-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

```
[Out] -1/9*b*d*n/x^3-b*e*n/x-1/3*d*(a+b*ln(c*x^n))/x^3-e*(a+b*ln(c*x^n))/x
```

Rubi [A]
time = 0.03, antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {14, 2372, 12}

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}-\frac{bdn}{9x^3}-\frac{ben}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d*n)/x^3 - (b*e*n)/x - (d*(a + b*Log[c*x^n]))/(3*x^3) - (e*(a + b*L
og[c*x^n]))/x
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{1}{3}\left(\frac{d}{x^3}+\frac{3e}{x}\right)(a+b\log(cx^n)) - (bn)\int \frac{-d-3ex^2}{3x^4}\,dx$$
$$= -\frac{1}{3}\left(\frac{d}{x^3}+\frac{3e}{x}\right)(a+b\log(cx^n)) - \frac{1}{3}(bn)\int \frac{-d-3ex^2}{x^4}\,dx$$
$$= -\frac{1}{3}\left(\frac{d}{x^3}+\frac{3e}{x}\right)(a+b\log(cx^n)) - \frac{1}{3}(bn)\int \left(-\frac{d}{x^4}-\frac{3e}{x^2}\right)dx$$
$$= -\frac{bdn}{9x^3} - \frac{ben}{x} - \frac{1}{3}\left(\frac{d}{x^3}+\frac{3e}{x}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.01, size = 63, normalized size = 1.19

$$-\frac{ad}{3x^3} - \frac{bdn}{9x^3} - \frac{ae}{x} - \frac{ben}{x} - \frac{bd\log(cx^n)}{3x^3} - \frac{be\log(cx^n)}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/3*(a*d)/x^3 - (b*d*n)/(9*x^3) - (a*e)/x - (b*e*n)/x - (b*d*Log[c*x^n])/(
3*x^3) - (b*e*Log[c*x^n])/x
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 249, normalized size = 4.70

method	result
risch	$-\frac{b(3e\,x^2+d)\ln(x^n)}{3x^3} - \frac{-9i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+9i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+9i\pi be\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-9i\pi b}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(3*e*x^2+d)/x^3*ln(x^n)-1/18*(-9*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+9*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b*e*x^2*csgn(
I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*e*x^2*csgn(I*c*x^n)^3+18*ln(c)*b*e*x^2+18*b
*e*n*x^2+18*a*e*x^2-3*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi*b
*d*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*
b*d*csgn(I*c*x^n)^3+6*d*b*ln(c)+2*b*d*n+6*a*d)/x^3
```

Maxima [A]
time = 0.27, size = 60, normalized size = 1.13

$$-\frac{bne}{x} - \frac{be\log(cx^n)}{x} - \frac{ae}{x} - \frac{bdn}{9\,x^3} - \frac{bd\log(cx^n)}{3\,x^3} - \frac{ad}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] -b*n*e/x - b*e*log(c*x^n)/x - a*e/x - 1/9*b*d*n/x^3 - 1/3*b*d*log(c*x^n)/x^
3 - 1/3*a*d/x^3
```

Fricas [A]
time = 0.39, size = 60, normalized size = 1.13

$$-\frac{9\,(bn+a)x^2e+bdn+3\,ad+3\,(3\,bx^2e+bd)\log\left(c\right)+3\,(3\,bnx^2e+bdn)\log\left(x\right)}{9\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/9*(9*(b*n + a)*x^2*e + b*d*n + 3*a*d + 3*(3*b*x^2*e + b*d)*log(c) + 3*(3
*b*n*x^2*e + b*d*n)*log(x))/x^3
```

Sympy [A]
time = 0.41, size = 58, normalized size = 1.09

$$-\frac{ad}{3x^3}-\frac{ae}{x}-\frac{bdn}{9x^3}-\frac{bd\log\left(cx^n\right)}{3x^3}-\frac{ben}{x}-\frac{be\log\left(cx^n\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d/(3*x**3) - a*e/x - b*d*n/(9*x**3) - b*d*log(c*x**n)/(3*x**3) - b*e*n/x
 - b*e*log(c*x**n)/x
```

Giac [A]
time = 4.67, size = 65, normalized size = 1.23

$$-\frac{9\,bnx^2e\log\left(x\right)+9\,bnx^2e+9\,bx^2e\log\left(c\right)+9\,ax^2e+3\,bdn\log\left(x\right)+bdn+3\,bd\log\left(c\right)+3\,ad}{9\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] -1/9*(9*b*n*x^2*e*log(x) + 9*b*n*x^2*e + 9*b*x^2*e*log(c) + 9*a*x^2*e + 3*b
*d*n*log(x) + b*d*n + 3*b*d*log(c) + 3*a*d)/x^3
```

Mupad [B]
time = 3.63, size = 51, normalized size = 0.96

$$-\frac{\left(3\,a\,e+3\,b\,e\,n\right)\,x^2+a\,d+\frac{b\,d\,n}{3}}{3\,x^3}-\frac{\ln\left(c\,x^n\right)\,\left(b\,e\,x^2+\frac{b\,d}{3}\right)}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] - (a*d + x^2*(3*a*e + 3*b*e*n) + (b*d*n)/3)/(3*x^3) - (log(c*x^n)*((b*d)/3
+ b*e*x^2))/x^3
```

3.182 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=57

$$-\frac{bdn}{25x^5}-\frac{ben}{9x^3}-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

```
[Out] -1/25*b*d*n/x^5-1/9*b*e*n/x^3-1/5*d*(a+b*ln(c*x^n))/x^5-1/3*e*(a+b*ln(c*x^n
))/x^3
```

Rubi [A]
time = 0.03, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {14, 2372, 12}

$$-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}-\frac{bdn}{25x^5}-\frac{ben}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d*n)/x^5 - (b*e*n)/(9*x^3) - (d*(a + b*Log[c*x^n]))/(5*x^5) - (e*(
a + b*Log[c*x^n]))/(3*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{1}{15}\left(\frac{3d}{x^5}+\frac{5e}{x^3}\right)(a+b\log(cx^n)) - (bn)\int \frac{-3d-5ex^2}{15x^6}\,dx$$
$$= -\frac{1}{15}\left(\frac{3d}{x^5}+\frac{5e}{x^3}\right)(a+b\log(cx^n)) - \frac{1}{15}(bn)\int \frac{-3d-5ex^2}{x^6}\,dx$$
$$= -\frac{1}{15}\left(\frac{3d}{x^5}+\frac{5e}{x^3}\right)(a+b\log(cx^n)) - \frac{1}{15}(bn)\int \left(-\frac{3d}{x^6}-\frac{5e}{x^4}\right)dx$$
$$= -\frac{bdn}{25x^5} - \frac{ben}{9x^3} - \frac{1}{15}\left(\frac{3d}{x^5}+\frac{5e}{x^3}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.01, size = 69, normalized size = 1.21

$$-\frac{ad}{5x^5} - \frac{bdn}{25x^5} - \frac{ae}{3x^3} - \frac{ben}{9x^3} - \frac{bd\log(cx^n)}{5x^5} - \frac{be\log(cx^n)}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/5*(a*d)/x^5 - (b*d*n)/(25*x^5) - (a*e)/(3*x^3) - (b*e*n)/(9*x^3) - (b*d*
Log[c*x^n])/(5*x^5) - (b*e*Log[c*x^n])/(3*x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 251, normalized size = 4.40

method	result
risch	$-\frac{b(5e\,x^2+3d)\,\ln(x^n)}{15x^5} - \frac{-75i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+75i\pi be\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+75i\pi be\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/15*b*(5*e*x^2+3*d)/x^5*ln(x^n)-1/450*(-75*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+75*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+75*I*Pi*b*e*x^
2*csgn(I*x^n)*csgn(I*c*x^n)^2-75*I*Pi*b*e*x^2*csgn(I*c*x^n)^3+150*ln(c)*b*e
*x^2+50*b*e*n*x^2+150*a*e*x^2-45*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+45*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+45*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x
^n)^2-45*I*Pi*b*d*csgn(I*c*x^n)^3+90*d*b*ln(c)+18*b*d*n+90*a*d)/x^5
```

Maxima [A]
time = 0.29, size = 60, normalized size = 1.05

$$-\frac{bne}{9\,x^3} - \frac{be\log(cx^n)}{3\,x^3} - \frac{ae}{3\,x^3} - \frac{bdn}{25\,x^5} - \frac{bd\log(cx^n)}{5\,x^5} - \frac{ad}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*e/x^3 - 1/3*b*e*log(c*x^n)/x^3 - 1/3*a*e/x^3 - 1/25*b*d*n/x^5 - 1/
5*b*d*log(c*x^n)/x^5 - 1/5*a*d/x^5
```

Fricas [A]
time = 0.38, size = 65, normalized size = 1.14

$$-\frac{25\,(bn+3\,a)x^2e+9\,bdn+45\,ad+15\,(5\,bx^2e+3\,bd)\log\left(c\right)+15\,(5\,bnx^2e+3\,bdn)\log\left(x\right)}{225\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/225*(25*(b*n + 3*a)*x^2*e + 9*b*d*n + 45*a*d + 15*(5*b*x^2*e + 3*b*d)*lo
g(c) + 15*(5*b*n*x^2*e + 3*b*d*n)*log(x))/x^5
```

Sympy [A]
time = 0.75, size = 68, normalized size = 1.19

$$-\frac{ad}{5x^5}-\frac{ae}{3x^3}-\frac{bdn}{25x^5}-\frac{bd\log\left(cx^n\right)}{5x^5}-\frac{ben}{9x^3}-\frac{be\log\left(cx^n\right)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] -a*d/(5*x**5) - a*e/(3*x**3) - b*d*n/(25*x**5) - b*d*log(c*x**n)/(5*x**5) -
 b*e*n/(9*x**3) - b*e*log(c*x**n)/(3*x**3)
```

Giac [A]
time = 3.63, size = 66, normalized size = 1.16

$$-\frac{75\,bnx^2e\log\left(x\right)+25\,bnx^2e+75\,bx^2e\log\left(c\right)+75\,ax^2e+45\,bdn\log\left(x\right)+9\,bdn+45\,bd\log\left(c\right)+45\,ad}{225\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] -1/225*(75*b*n*x^2*e*log(x) + 25*b*n*x^2*e + 75*b*x^2*e*log(c) + 75*a*x^2*e
 + 45*b*d*n*log(x) + 9*b*d*n + 45*b*d*log(c) + 45*a*d)/x^5
```

Mupad [B]
time = 3.61, size = 53, normalized size = 0.93

$$-\frac{\left(5\,a\,e+\frac{5\,b\,e\,n}{3}\right)\,x^2+3\,a\,d+\frac{3\,b\,d\,n}{5}}{15\,x^5}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{3}+\frac{b\,d}{5}\right)}{x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)*(a + b*log(c*x^n)))/x^6,x)
```

```
[Out] - (3*a*d + x^2*(5*a*e + (5*b*e*n)/3) + (3*b*d*n)/5)/(15*x^5) - (log(c*x^n)*
((b*d)/5 + (b*e*x^2)/3))/x^5
```

3.183 $\int x^5(d+ex^2)^2 (a+b\log(cx^n)) \, dx$

Optimal. Leaf size=74

$$-\frac{1}{36}bd^2nx^6-\frac{1}{32}bdenx^8-\frac{1}{100}be^2nx^{10}+\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))$$

```
[Out] -1/36*b*d^2*n*x^6-1/32*b*d*e*n*x^8-1/100*b*e^2*n*x^10+1/60*(6*e^2*x^10+15*d
*e*x^8+10*d^2*x^6)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {272, 45, 2371, 12, 14}

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{36}bd^2nx^6-\frac{1}{32}bdenx^8-\frac{1}{100}be^2nx^{10}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/36*(b*d^2*n*x^6) - (b*d*e*n*x^8)/32 - (b*e^2*n*x^10)/100 + ((10*d^2*x^6
+ 15*d*e*x^8 + 6*e^2*x^10)*(a + b*Log[c*x^n]))/60
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^5\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{60}x^5\left(10d^2\right.\\ &= \frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{60}(bn)\int x^5\left(10d^2\right.\\ &= \frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{60}(bn)\int\left(10d^2x^5\right.\\ &= -\frac{1}{36}bd^2nx^6-\frac{1}{32}bdenx^8-\frac{1}{100}be^2nx^{10}+\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2\right.\end{aligned}$$

Mathematica [A]
time = 0.03, size = 84, normalized size = 1.14

$$\frac{x^6\left(-200bd^2n-225bdenx^2-72be^2nx^4+1200d^2\left(a+b\log\left(cx^n\right)\right)+1800dex^2\left(a+b\log\left(cx^n\right)\right)+720e^2x^4\left(a+b\log\left(cx^n\right)\right)\right)}{7200}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^6*(-200*b*d^2*n - 225*b*d*e*n*x^2 - 72*b*e^2*n*x^4 + 1200*d^2*(a + b*Log
[c*x^n]) + 1800*d*e*x^2*(a + b*Log[c*x^n]) + 720*e^2*x^4*(a + b*Log[c*x^n])
))/7200
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 2.02, size = 434, normalized size = 5.86

method	result
risch	$\frac{b\,x^6\left(6e^2x^4+15de\,x^2+10d^2\right)\ln\left(x^n\right)}{60}+\frac{i\pi b\,e^2x^{10}\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{20}-\frac{i\pi b\,e^2x^{10}\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{20}+\frac{i\pi b\,d^2x^6\operatorname{csgn}(i\ldots}{\ldots}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/60*b*x^6*(6*e^2*x^4+15*d*e*x^2+10*d^2)*ln(x^n)+1/20*I*Pi*b*e^2*x^10*csgn(
I*c)*csgn(I*c*x^n)^2-1/20*I*Pi*b*e^2*x^10*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+1/12*I*Pi*b*d^2*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b*d*e*x^8*csgn(
```

```
I*c*x^n)^3+1/10*ln(c)*b*e^2*x^10-1/100*b*e^2*n*x^10+1/10*x^10*a*e^2+1/8*I*P
i*b*d*e*x^8*csgn(I*c)*csgn(I*c*x^n)^2+1/8*I*Pi*b*d*e*x^8*csgn(I*x^n)*csgn(I
*c*x^n)^2-1/12*I*Pi*b*d^2*x^6*csgn(I*c*x^n)^3-1/20*I*Pi*b*e^2*x^10*csgn(I*c
*x^n)^3+1/4*ln(c)*b*d*e*x^8-1/32*b*d*e*n*x^8+1/4*a*d*e*x^8-1/12*I*Pi*b*d^2*
x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/12*I*Pi*b*d^2*x^6*csgn(I*c)*csgn(
I*c*x^n)^2-1/8*I*Pi*b*d*e*x^8*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/20*I*Pi
*b*e^2*x^10*csgn(I*x^n)*csgn(I*c*x^n)^2+1/6*ln(c)*b*d^2*x^6-1/36*b*d^2*n*x^
6+1/6*x^6*a*d^2
```

Maxima [A]
time = 0.29, size = 100, normalized size = 1.35

$$-\frac{1}{100}\,bnx^{10}e^2+\frac{1}{10}\,bx^{10}e^2\log\left(cx^n\right)+\frac{1}{10}\,ax^{10}e^2-\frac{1}{32}\,bdnx^8e+\frac{1}{4}\,bdx^8e\log\left(cx^n\right)+\frac{1}{4}\,adx^8e-\frac{1}{36}\,bd^2nx^6+\frac{1}{6}\,bd^2x^6\log\left(cx^n\right)+\frac{1}{6}\,ad^2x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/100*b*n*x^10*e^2 + 1/10*b*x^10*e^2*log(c*x^n) + 1/10*a*x^10*e^2 - 1/32*b
*d*n*x^8*e + 1/4*b*d*x^8*e*log(c*x^n) + 1/4*a*d*x^8*e - 1/36*b*d^2*n*x^6 +
1/6*b*d^2*x^6*log(c*x^n) + 1/6*a*d^2*x^6
```

Fricas [A]
time = 0.38, size = 114, normalized size = 1.54

$$-\frac{1}{100}\,(bn-10\,a)x^{10}e^2-\frac{1}{32}\,(bdn-8\,ad)x^8e-\frac{1}{36}\,(bd^2n-6\,ad^2)x^6+\frac{1}{60}\,(6\,bx^{10}e^2+15\,bdx^8e+10\,bd^2x^6)\log\left(c\right)+\frac{1}{60}\,(6\,bnx^{10}e^2+15\,bdnx^8e+10\,bd^2nx^6)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/100*(b*n - 10*a)*x^10*e^2 - 1/32*(b*d*n - 8*a*d)*x^8*e - 1/36*(b*d^2*n -
 6*a*d^2)*x^6 + 1/60*(6*b*x^10*e^2 + 15*b*d*x^8*e + 10*b*d^2*x^6)*log(c) +
1/60*(6*b*n*x^10*e^2 + 15*b*d*n*x^8*e + 10*b*d^2*n*x^6)*log(x)
```

Sympy [A]
time = 2.48, size = 116, normalized size = 1.57

$$\frac{ad^2x^6}{6}+\frac{adex^8}{4}+\frac{ae^2x^{10}}{10}-\frac{bd^2nx^6}{36}+\frac{bd^2x^6\log\left(cx^n\right)}{6}-\frac{bdenx^8}{32}+\frac{bdex^8\log\left(cx^n\right)}{4}-\frac{be^2nx^{10}}{100}+\frac{be^2x^{10}\log\left(cx^n\right)}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**6/6 + a*d*e*x**8/4 + a*e**2*x**10/10 - b*d**2*n*x**6/36 + b*d**2*
x**6*log(c*x**n)/6 - b*d*e*n*x**8/32 + b*d*e*x**8*log(c*x**n)/4 - b*e**2*n*
x**10/100 + b*e**2*x**10*log(c*x**n)/10
```

Giac [A]
time = 4.84, size = 123, normalized size = 1.66

$$\frac{1}{10}\,bnx^{10}e^2\log\left(x\right)-\frac{1}{100}\,bnx^{10}e^2+\frac{1}{10}\,bx^{10}e^2\log\left(c\right)+\frac{1}{4}\,bdnx^8e\log\left(x\right)+\frac{1}{10}\,ax^{10}e^2-\frac{1}{32}\,bdnx^8e+\frac{1}{4}\,bdx^8e\log\left(c\right)+\frac{1}{4}\,adx^8e+\frac{1}{6}\,bd^2nx^6\log\left(x\right)-\frac{1}{36}\,bd^2nx^6+\frac{1}{6}\,bd^2x^6\log\left(c\right)+\frac{1}{6}\,ad^2x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/10*b*n*x^10*e^2*log(x) - 1/100*b*n*x^10*e^2 + 1/10*b*x^10*e^2*log(c) + 1/
4*b*d*n*x^8*e*log(x) + 1/10*a*x^10*e^2 - 1/32*b*d*n*x^8*e + 1/4*b*d*x^8*e*l
og(c) + 1/4*a*d*x^8*e + 1/6*b*d^2*n*x^6*log(x) - 1/36*b*d^2*n*x^6 + 1/6*b*d
^2*x^6*log(c) + 1/6*a*d^2*x^6
```

Mupad [B]
time = 3.70, size = 82, normalized size = 1.11

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^6}{6}+\frac{b\,d\,e\,x^8}{4}+\frac{b\,e^2\,x^{10}}{10}\right)+\frac{d^2\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{e^2\,x^{10}\,\left(10\,a-b\,n\right)}{100}+\frac{d\,e\,x^8\,\left(8\,a-b\,n\right)}{32}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^2*x^6)/6 + (b*e^2*x^10)/10 + (b*d*e*x^8)/4) + (d^2*x^6*(6*
a - b*n))/36 + (e^2*x^10*(10*a - b*n))/100 + (d*e*x^8*(8*a - b*n))/32
```

3.184 $\int x^3(d+ex^2)^2 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=74

$$-\frac{1}{16}bd^2nx^4-\frac{1}{18}bdenx^6-\frac{1}{64}be^2nx^8+\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))$$

```
[Out] -1/16*b*d^2*n*x^4-1/18*b*d*e*n*x^6-1/64*b*e^2*n*x^8+1/24*(3*e^2*x^8+8*d*e*x
^6+6*d^2*x^4)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {272, 45, 2371, 12, 14}

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)(a+b\log(cx^n))-\frac{1}{16}bd^2nx^4-\frac{1}{18}bdenx^6-\frac{1}{64}be^2nx^8$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d^2*n*x^4) - (b*d*e*n*x^6)/18 - (b*e^2*n*x^8)/64 + ((6*d^2*x^4 + 8
*d*e*x^6 + 3*e^2*x^8)*(a + b*Log[c*x^n]))/24
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^3 \left(d+ex^2\right)^2 \left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int \frac{1}{24}x^3\left(6d^2+8\right.$$

$$=\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{24}(bn)\int x^3\left(6d^2+8\right.$$

$$=\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{24}(bn)\int \left(6d^2x^3+8\right.$$

$$=-\frac{1}{16}bd^2nx^4-\frac{1}{18}bdenx^6-\frac{1}{64}be^2nx^8+\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)($$

Mathematica [A]
time = 0.03, size = 87, normalized size = 1.18

$$\frac{1}{576}x^4\left(24a\left(6d^2+8dex^2+3e^2x^4\right)-bn\left(36d^2+32dex^2+9e^2x^4\right)+24b\left(6d^2+8dex^2+3e^2x^4\right)\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^4*(24*a*(6*d^2 + 8*d*e*x^2 + 3*e^2*x^4) - b*n*(36*d^2 + 32*d*e*x^2 + 9*e
^2*x^4) + 24*b*(6*d^2 + 8*d*e*x^2 + 3*e^2*x^4)*Log[c*x^n]))/576
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 1.27, size = 434, normalized size = 5.86

method	result
risch	$\frac{b\,x^4\left(3e^2x^4+8de\,x^2+6d^2\right)\ln\left(x^n\right)}{24}+\frac{i\pi b\,d^2x^4\operatorname{csgn}\left(ix^n\right)\operatorname{csgn}\left(ic\,x^n\right)^2}{8}-\frac{i\pi b\,e^2x^8\operatorname{csgn}\left(ic\right)\operatorname{csgn}\left(ix^n\right)\operatorname{csgn}\left(ic\,x^n\right)}{16}+\frac{i\pi b\,e^2x^8\operatorname{csgn}\left(ic\right)\mathrm{c}}{16}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/24*b*x^4*(3*e^2*x^4+8*d*e*x^2+6*d^2)*ln(x^n)+1/8*I*Pi*b*d^2*x^4*csgn(I*x^
n)*csgn(I*c*x^n)^2-1/16*I*Pi*b*e^2*x^8*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+
1/16*I*Pi*b*e^2*x^8*csgn(I*c)*csgn(I*c*x^n)^2-1/8*I*Pi*b*d^2*x^4*csgn(I*c*x
^n)^3+1/8*ln(c)*b*e^2*x^8-1/64*b*e^2*n*x^8+1/8*x^8*a*e^2+1/6*I*Pi*b*d*e*x^6
```

```
*csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*d*e*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-1
/16*I*Pi*b*e^2*x^8*csgn(I*c*x^n)^3+1/8*I*Pi*b*d^2*x^4*csgn(I*c)*csgn(I*c*x^
n)^2+1/3*ln(c)*b*d*e*x^6-1/18*b*d*e*n*x^6+1/3*a*d*e*x^6-1/8*I*Pi*b*d^2*x^4*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/6*I*Pi*b*d*e*x^6*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+1/16*I*Pi*b*e^2*x^8*csgn(I*x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*
d*e*x^6*csgn(I*c*x^n)^3+1/4*ln(c)*b*d^2*x^4-1/16*b*d^2*n*x^4+1/4*x^4*a*d^2
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.35

$$-\frac{1}{64}\,bnx^8e^2+\frac{1}{8}\,bx^8e^2\log\left(cx^n\right)+\frac{1}{8}\,ax^8e^2-\frac{1}{18}\,bdnx^6e+\frac{1}{3}\,bdx^6e\log\left(cx^n\right)+\frac{1}{3}\,adx^6e-\frac{1}{16}\,bd^2nx^4+\frac{1}{4}\,bd^2x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/64*b*n*x^8*e^2 + 1/8*b*x^8*e^2*log(c*x^n) + 1/8*a*x^8*e^2 - 1/18*b*d*n*x
^6*e + 1/3*b*d*x^6*e*log(c*x^n) + 1/3*a*d*x^6*e - 1/16*b*d^2*n*x^4 + 1/4*b*
d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4
```

Fricas [A]
time = 0.37, size = 114, normalized size = 1.54

$$-\frac{1}{64}\,(bn-8\,a)x^8e^2-\frac{1}{18}\,(bdn-6\,ad)x^6e-\frac{1}{16}\,\left(bd^2n-4\,ad^2\right)x^4+\frac{1}{24}\,\left(3\,bx^8e^2+8\,bdx^6e+6\,bd^2x^4\right)\log\left(c\right)+\frac{1}{24}\,\left(3\,bnx^8e^2+8\,bdnx^6e+6\,bd^2nx^4\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/64*(b*n - 8*a)*x^8*e^2 - 1/18*(b*d*n - 6*a*d)*x^6*e - 1/16*(b*d^2*n - 4*
a*d^2)*x^4 + 1/24*(3*b*x^8*e^2 + 8*b*d*x^6*e + 6*b*d^2*x^4)*log(c) + 1/24*(
3*b*n*x^8*e^2 + 8*b*d*n*x^6*e + 6*b*d^2*n*x^4)*log(x)
```

Sympy [A]
time = 1.28, size = 116, normalized size = 1.57

$$\frac{ad^2x^4}{4}+\frac{adex^6}{3}+\frac{ae^2x^8}{8}-\frac{bd^2nx^4}{16}+\frac{bd^2x^4\log\left(cx^n\right)}{4}-\frac{bdenx^6}{18}+\frac{bdex^6\log\left(cx^n\right)}{3}-\frac{be^2nx^8}{64}+\frac{be^2x^8\log\left(cx^n\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**4/4 + a*d*e*x**6/3 + a*e**2*x**8/8 - b*d**2*n*x**4/16 + b*d**2*x*
*4*log(c*x**n)/4 - b*d*e*n*x**6/18 + b*d*e*x**6*log(c*x**n)/3 - b*e**2*n*x*
*8/64 + b*e**2*x**8*log(c*x**n)/8
```

Giac [A]
time = 3.24, size = 123, normalized size = 1.66

$$\frac{1}{8}\,bnx^8e^2\log\left(x\right)-\frac{1}{64}\,bnx^8e^2+\frac{1}{8}\,bx^8e^2\log\left(c\right)+\frac{1}{3}\,bdnx^6e\log\left(x\right)+\frac{1}{8}\,ax^8e^2-\frac{1}{18}\,bdnx^6e+\frac{1}{3}\,bdx^6e\log\left(c\right)+\frac{1}{3}\,adx^6e+\frac{1}{4}\,bd^2nx^4\log\left(x\right)-\frac{1}{16}\,bd^2nx^4+\frac{1}{4}\,bd^2x^4\log\left(c\right)+\frac{1}{4}\,ad^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/8*b*n*x^8*e^2*log(x) - 1/64*b*n*x^8*e^2 + 1/8*b*x^8*e^2*log(c) + 1/3*b*d*
n*x^6*e*log(x) + 1/8*a*x^8*e^2 - 1/18*b*d*n*x^6*e + 1/3*b*d*x^6*e*log(c) +
1/3*a*d*x^6*e + 1/4*b*d^2*n*x^4*log(x) - 1/16*b*d^2*n*x^4 + 1/4*b*d^2*x^4*l
og(c) + 1/4*a*d^2*x^4
```

Mupad [B]
time = 3.65, size = 82, normalized size = 1.11

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^4}{4}+\frac{b\,d\,e\,x^6}{3}+\frac{b\,e^2\,x^8}{8}\right)+\frac{d^2\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{e^2\,x^8\,\left(8\,a-b\,n\right)}{64}+\frac{d\,e\,x^6\,\left(6\,a-b\,n\right)}{18}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^2*x^4)/4 + (b*e^2*x^8)/8 + (b*d*e*x^6)/3) + (d^2*x^4*(4*a
- b*n))/16 + (e^2*x^8*(8*a - b*n))/64 + (d*e*x^6*(6*a - b*n))/18
```

3.185 $\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=76

$$-\frac{1}{4}bd^2nx^2-\frac{1}{8}bdenx^4-\frac{1}{36}be^2nx^6-\frac{bd^3n\log(x)}{6e}+\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}$$

```
[Out] -1/4*b*d^2*n*x^2-1/8*b*d*e*n*x^4-1/36*b*e^2*n*x^6-1/6*b*d^3*n*ln(x)/e+1/6*(
e*x^2+d)^3*(a+b*ln(c*x^n))/e
```

Rubi [A]
time = 0.05, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {267, 2371, 12, 272, 45}

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bd^3n\log(x)}{6e}-\frac{1}{4}bd^2nx^2-\frac{1}{8}bdenx^4-\frac{1}{36}be^2nx^6$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d^2*n*x^2) - (b*d*e*n*x^4)/8 - (b*e^2*n*x^6)/36 - (b*d^3*n*Log[x])/
(6*e) + ((d + e*x^2)^3*(a + b*Log[c*x^n]))/(6*e)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 267

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
```

```
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}
\int x\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)}{6e}-(bn)\int\frac{\left(d+ex^2\right)^3}{6ex}\,dx\\
&= \frac{\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)}{6e}-\frac{(bn)\int\frac{\left(d+ex^2\right)^3}{x}\,dx}{6e}\\
&= \frac{\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)}{6e}-\frac{(bn)\text{Subst}\left(\int\frac{(d+ex)^3}{x}\,dx,x,x^2\right)}{12e}\\
&= \frac{\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)}{6e}-\frac{(bn)\text{Subst}\left(\int\left(3d^2e+\frac{d^3}{x}+3de^2x+e^3x\right.\right.}{12e}\\
&= -\frac{1}{4}bd^2nx^2-\frac{1}{8}bdenx^4-\frac{1}{36}be^2nx^6-\frac{bd^3n\log(x)}{6e}+\frac{\left(d+ex^2\right)^3(a+b}{6e}
\end{aligned}$$

Mathematica [A]
time = 0.03, size = 85, normalized size = 1.12

$$\frac{1}{72}x^2\left(12a\left(3d^2+3dex^2+e^2x^4\right)-bn\left(18d^2+9dex^2+2e^2x^4\right)+12b\left(3d^2+3dex^2+e^2x^4\right)\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(12*a*(3*d^2 + 3*d*e*x^2 + e^2*x^4) - b*n*(18*d^2 + 9*d*e*x^2 + 2*e^2*
x^4) + 12*b*(3*d^2 + 3*d*e*x^2 + e^2*x^4)*Log[c*x^n]))/72
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 434, normalized size = 5.71

method	result
risch	$\frac{\left(e\,x^2+d\right)^3 b\ln(x^n)}{6e}+\frac{i\pi b\,d^2x^2\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2}{4}-\frac{i\pi b\,d^2x^2\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)}{4}-\frac{i\pi b\,d^2x^2\text{csgn}(ic\,x^n)^3}{4}+\frac{ie^2\pi b}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*(e*x^2+d)^3*b/e*ln(x^n)+1/4*I*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-
1/4*I*Pi*b*d^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4*I*Pi*b*d^2*x^2*c
sgn(I*c*x^n)^3+1/12*I*e^2*Pi*b*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I*e*Pi*b
*d*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/12*I*e^2*Pi*b*x^6*csgn(I*c*x^n
)^3+1/4*I*Pi*b*d^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+1/4*I*e*Pi*b*d*x^4*csgn(I*
c)*csgn(I*c*x^n)^2+1/6*ln(c)*b*e^2*x^6-1/4*I*e*Pi*b*d*x^4*csgn(I*c*x^n)^3-1
/12*I*e^2*Pi*b*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I*e*Pi*b*d*x^4*c
sgn(I*x^n)*csgn(I*c*x^n)^2+1/12*I*e^2*Pi*b*x^6*csgn(I*c)*csgn(I*c*x^n)^2-1/
36*b*e^2*n*x^6+1/6*x^6*a*e^2+1/2*ln(c)*b*d*e*x^4-1/8*b*d*e*n*x^4+1/2*x^4*a*
d*e+1/2*ln(c)*b*d^2*x^2-1/4*b*d^2*n*x^2-1/6*b*d^3*n*ln(x)/e+1/2*x^2*a*d^2
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.32

$$-\frac{1}{36}\,bnx^6e^2+\frac{1}{6}\,bx^6e^2\log\left(cx^n\right)+\frac{1}{6}\,ax^6e^2-\frac{1}{8}\,bdnx^4e+\frac{1}{2}\,bdx^4e\log\left(cx^n\right)+\frac{1}{2}\,adx^4e-\frac{1}{4}\,bd^2nx^2+\frac{1}{2}\,bd^2x^2\log\left(cx^n\right)+\frac{1}{2}\,ad^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*n*x^6*e^2 + 1/6*b*x^6*e^2*log(c*x^n) + 1/6*a*x^6*e^2 - 1/8*b*d*n*x^
4*e + 1/2*b*d*x^4*e*log(c*x^n) + 1/2*a*d*x^4*e - 1/4*b*d^2*n*x^2 + 1/2*b*d^
2*x^2*log(c*x^n) + 1/2*a*d^2*x^2
```

Fricas [A]
time = 0.38, size = 112, normalized size = 1.47

$$-\frac{1}{36}\left(bn-6\,a\right)x^6e^2-\frac{1}{8}\left(bdn-4\,ad\right)x^4e-\frac{1}{4}\left(bd^2n-2\,ad^2\right)x^2+\frac{1}{6}\left(bx^6e^2+3\,bdx^4e+3\,bd^2x^2\right)\log\left(c\right)+\frac{1}{6}\left(bnx^6e^2+3\,bdnx^4e+3\,bd^2nx^2\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/36*(b*n - 6*a)*x^6*e^2 - 1/8*(b*d*n - 4*a*d)*x^4*e - 1/4*(b*d^2*n - 2*a*
d^2)*x^2 + 1/6*(b*x^6*e^2 + 3*b*d*x^4*e + 3*b*d^2*x^2)*log(c) + 1/6*(b*n*x^
6*e^2 + 3*b*d*n*x^4*e + 3*b*d^2*n*x^2)*log(x)
```

Sympy [A]
time = 0.63, size = 116, normalized size = 1.53

$$\frac{ad^2x^2}{2}+\frac{adex^4}{2}+\frac{ae^2x^6}{6}-\frac{bd^2nx^2}{4}+\frac{bd^2x^2\log\left(cx^n\right)}{2}-\frac{bdenx^4}{8}+\frac{bdex^4\log\left(cx^n\right)}{2}-\frac{be^2nx^6}{36}+\frac{be^2x^6\log\left(cx^n\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**2/2 + a*d*e*x**4/2 + a*e**2*x**6/6 - b*d**2*n*x**2/4 + b*d**2*x**
2*log(c*x**n)/2 - b*d*e*n*x**4/8 + b*d*e*x**4*log(c*x**n)/2 - b*e**2*n*x**6
/36 + b*e**2*x**6*log(c*x**n)/6
```

Giac [A]
time = 6.88, size = 123, normalized size = 1.62

$$\frac{1}{6}\,bnx^6e^2\log\left(x\right) - \frac{1}{36}\,bnx^6e^2 + \frac{1}{6}\,bx^6e^2\log\left(c\right) + \frac{1}{2}\,bdnx^4e\log\left(x\right) + \frac{1}{6}\,ax^6e^2 - \frac{1}{8}\,bdnx^4e + \frac{1}{2}\,bdx^4e\log\left(c\right) + \frac{1}{2}\,adx^4e + \frac{1}{2}\,bd^2nx^2\log\left(x\right) - \frac{1}{4}\,bd^2nx^2 + \frac{1}{2}\,bd^2x^2\log\left(c\right) + \frac{1}{2}\,ad^2x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/6*b*n*x^6*e^2*log(x) - 1/36*b*n*x^6*e^2 + 1/6*b*x^6*e^2*log(c) + 1/2*b*d*
n*x^4*e*log(x) + 1/6*a*x^6*e^2 - 1/8*b*d*n*x^4*e + 1/2*b*d*x^4*e*log(c) + 1
/2*a*d*x^4*e + 1/2*b*d^2*n*x^2*log(x) - 1/4*b*d^2*n*x^2 + 1/2*b*d^2*x^2*log
(c) + 1/2*a*d^2*x^2
```

Mupad [B]
time = 3.63, size = 82, normalized size = 1.08

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^2}{2}+\frac{b\,d\,e\,x^4}{2}+\frac{b\,e^2\,x^6}{6}\right)+\frac{d^2\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^2\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{d\,e\,x^4\,\left(4\,a-b\,n\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^2*x^2)/2 + (b*e^2*x^6)/6 + (b*d*e*x^4)/2) + (d^2*x^2*(2*a
- b*n))/4 + (e^2*x^6*(6*a - b*n))/36 + (d*e*x^4*(4*a - b*n))/8
```

3.186 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=89

$$-\frac{1}{2}bdenx^2-\frac{1}{16}be^2nx^4-\frac{1}{2}bd^2n\log^2(x)+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))+d^2\log(x)(a+b\log(cx^n))$$

```
[Out] -1/2*b*d*e*n*x^2-1/16*b*e^2*n*x^4-1/2*b*d^2*n*ln(x)^2+d*e*x^2*(a+b*ln(c*x^n
))+1/4*e^2*x^4*(a+b*ln(c*x^n))+d^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {272, 45, 2372, 2338}

$$d^2\log(x)(a+b\log(cx^n))+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))-\frac{1}{2}bd^2n\log^2(x)-\frac{1}{2}bdenx^2-\frac{1}{16}be^2nx^4$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/2*(b*d*e*n*x^2) - (b*e^2*n*x^4)/16 - (b*d^2*n*Log[x]^2)/2 + d*e*x^2*(a +
 b*Log[c*x^n]) + (e^2*x^4*(a + b*Log[c*x^n]))/4 + d^2*Log[x]*(a + b*Log[c*x
^n])
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x}\,dx &= \frac{1}{4}\left(4dex^2+e^2x^4+4d^2\log(x)\right)(a+b\log(cx^n))-(bn)\int\left(dex+\frac{e^2x^3}{4}\right.\\ &= -\frac{1}{2}bdenx^2-\frac{1}{16}be^2nx^4+\frac{1}{4}\left(4dex^2+e^2x^4+4d^2\log(x)\right)(a+b\log(cx^n)\\ &= -\frac{1}{2}bdenx^2-\frac{1}{16}be^2nx^4-\frac{1}{2}bd^2n\log^2(x)+\frac{1}{4}\left(4dex^2+e^2x^4+4d^2\log(x)\right.\end{aligned}$$

Mathematica [A]
time = 0.04, size = 82, normalized size = 0.92

$$\frac{1}{16}\left(-8bdenx^2-be^2nx^4+16dex^2(a+b\log(cx^n))+4e^2x^4(a+b\log(cx^n))+\frac{8d^2(a+b\log(cx^n))^2}{bn}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-8*b*d*e*n*x^2 - b*e^2*n*x^4 + 16*d*e*x^2*(a + b*Log[c*x^n]) + 4*e^2*x^4*(
a + b*Log[c*x^n]) + (8*d^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.25, size = 3072, normalized size = 34.52

method	result	size
risch	Expression too large to display	3072

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] (1/4*x^4*b*e^2+b*d*e*x^2+b*d^2+b*d^2*ln(x))*ln(x^n)+1/16*(16*x^4*a^2*e^2+32
*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+24*I*Pi*b^2*d*e*n*x^2*c
sgn(I*c*x^n)^3-64*I*Pi*a*b*d*e*x^2*csgn(I*c*x^n)^3-64*I*ln(c)*Pi*b^2*d*e*x^
2*csgn(I*c*x^n)^3-64*I*ln(c)*Pi*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-16*I*Pi*ln(c)*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*b^2*e
^2*n*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-16*I*Pi*a*b*e^2*x^4*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-64*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
```

n)+64*I*ln(x)*ln(c)*Pi*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^2-40*I*ln(x)*Pi*b^2*
d^2*n*csgn(I*c)*csgn(I*c*x^n)^2+64*I*ln(x)*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^
n)^2+64*I*ln(x)*ln(c)*Pi*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+16*I*Pi*a*b*e^
2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+16*I*Pi*ln(c)*b^2*e^2*x^4*csgn(I*x^n)*csg
n(I*c*x^n)^2-40*I*ln(x)*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+64*I*ln(x)
*Pi*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*b^2*e^2*n*x^4*csgn(I*x^n)*cs
gn(I*c*x^n)^2+64*a^2*d*e*x^2+64*a^2*d^2*ln(x)-64*b^2*d^2*ln(c)*n+16*I*Pi*ln
(c)*b^2*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-16*Pi^2*b^2*d*e*x^2*csgn(I*c)^2*c
sgn(I*x^n)^2*csgn(I*c*x^n)^2+32*Pi^2*b^2*d*e*x^2*csgn(I*c)^2*csgn(I*x^n)*cs
gn(I*c*x^n)^3-16*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^4+32*Pi^2*b^2*d^2*c
sgn(I*c)*csgn(I*c*x^n)^5+32*Pi^2*b^2*d*e*x^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I
*c*x^n)^3-64*Pi^2*b^2*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-4*I*Pi*
b^2*e^2*n*x^4*csgn(I*c)*csgn(I*c*x^n)^2-16*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*
c*x^n)^2*ln(x)^2-16*I*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2*ln(x)^2+64*d
^2*b^2*ln(c)^2+64*a^2*d^2+16*I*Pi*a*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-64*
I*ln(x)*ln(c)*Pi*b^2*d^2*csgn(I*c*x^n)^3+40*I*ln(x)*Pi*b^2*d^2*n*csgn(I*c*x
^n)^3+16*ln(x)*b^2*d^2*n^2+128*d^2*a*b*ln(c)-16*Pi^2*b^2*d^2*csgn(I*c*x^n)^
6-64*I*ln(c)*Pi*b^2*d^2*csgn(I*c*x^n)^3+8*b^2*d^2*n^2*ln(x)^2+16*b^2*d^2*n^
2+64*ln(c)^2*b^2*d*e*x^2-80*ln(x)*a*b*d^2*n-64*Pi^2*b^2*d^2*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)^4+4*I*Pi*b^2*e^2*n*x^4*csgn(I*c*x^n)^3+b^2*e^2*n^2*x^4
-64*b*d^2*n*a+32*Pi^2*b^2*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5+64*ln(x)*ln(c
)^2*b^2*d^2-80*ln(x)*ln(c)*b^2*d^2*n+16*ln(c)^2*b^2*e^2*x^4+64*I*Pi*a*b*d*e
*x^2*csgn(I*c)*csgn(I*c*x^n)^2+64*I*Pi*a*b*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n
)^2+8*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^5+128*ln(x)*ln(c)*a*b*d^2-32
*I*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-48*b*n*a*d*e*x^2-4*Pi^2*b^2*e^2
*x^4*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+8*Pi^2*b^2*e^2*x^4*csgn(I*c)
^2*csgn(I*x^n)*csgn(I*c*x^n)^3+8*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)^2*c
sgn(I*c*x^n)^3-16*Pi^2*b^2*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-16
*ln(x)*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-16*I*Pi*ln(c)
*b^2*e^2*x^4*csgn(I*c*x^n)^3-32*ln(x)^2*ln(c)*b^2*d^2*n-32*ln(x)^2*b*d^2*n*
a-8*a*b*e^2*n*x^4+64*I*ln(c)*Pi*b^2*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+64*
I*Pi*ln(c)*b^2*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-24*I*Pi*b^2*d*e*n*x^2*csgn
(I*c)*csgn(I*c*x^n)^2+32*I*Pi*b^2*d^2*n*csgn(I*c*x^n)^3-64*I*Pi*a*b*d^2*csg
n(I*c*x^n)^3-16*ln(x)*Pi^2*b^2*d^2*csgn(I*c*x^n)^6-64*I*ln(x)*Pi*a*b*d^2*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+16*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*ln(x)^2-4*Pi^2*b^2*e^2*x^4*csgn(I*x^n)^2*csgn(I*c*x^n)^4-16*Pi
^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+32*Pi^2*b^2*d^2*csgn(I
*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+32*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)^2*c
sgn(I*c*x^n)^3-24*I*Pi*b^2*d*e*n*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*Pi^2*b^2
*e^2*x^4*csgn(I*c*x^n)^6+8*b^2*d*e*n^2*x^2-64*I*ln(c)*Pi*b^2*d*e*x^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)+64*I*ln(c)*Pi*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)
^2+8*Pi^2*b^2*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^5-4*Pi^2*b^2*e^2*x^4*csgn(I
*c)^2*csgn(I*c*x^n)^4+64*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-16*Pi^2*b^2
*d*e*x^2*csgn(I*c*x^n)^6-16*ln(x)*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x^n)^4+
32*ln(x)*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5-16*ln(x)*Pi^2*b^2*d^2*csgn(

```
I*x^n)^2*csgn(I*c*x^n)^4+32*ln(x)*Pi^2*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^5-
16*I*Pi*a*b*e^2*x^4*csgn(I*c*x^n)^3-16*Pi^2*b^2*d*e*x^2*csgn(I*x^n)^2*csgn(
I*c*x^n)^4-16*Pi^2*b^2*d^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+32*Pi^2*b^2*d^2*cs
gn(I*x^n)*csgn(I*c*x^n)^5-64*I*ln(x)*ln(c)*Pi*b^2*d^2*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)-48*ln(c)*b^2*d*e*n*x^2+128*ln(c)*a*b*d*e*x^2-16*Pi^2*b^2*d*e
*x^2*csgn(I*c)^2*csgn(I*c*x^n)^4+32*Pi^2*b^2*d*e*x^2*csgn(I*c)*csgn(I*c*x^n
)^5+40*I*ln(x)*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+32*ln(x)*Pi
^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+32*ln(x)*Pi^2*b^2*d^2*cs
gn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-64*ln(x)*Pi^2*b^2*d^2*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)^4+16*I*Pi*b^2*d^2*n*csgn(I*c*x^n)^3*ln(x)^2+64*I*Pi*a*
b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*b^2*d*e*n*x^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-64*I*Pi*a*b*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-32
*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^2+64*I*ln(c)*Pi*b^2*d^2*csgn(I*x^n)
*csgn(I*c*x^n)^2-8*ln(c)*b^2*e^2*n*x^4+32*ln(c)*a*b*e^2*x^4-64*I*ln(x)*Pi*a
*b*d^2*csgn(I*c*x^n)^3)/(-2*I*b*Pi*csgn(I*c)*cs...
```

Maxima [**A**]
time = 0.29, size = 88, normalized size = 0.99

$$-\frac{1}{16}\,bnx^4e^2+\frac{1}{4}\,bx^4e^2\log\left(cx^n\right)+\frac{1}{4}\,ax^4e^2-\frac{1}{2}\,bdnx^2e+bdx^2e\log\left(cx^n\right)+adx^2e+\frac{bd^2\log\left(cx^n\right)^2}{2\,n}+ad^2\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -1/16*b*n*x^4*e^2 + 1/4*b*x^4*e^2*log(c*x^n) + 1/4*a*x^4*e^2 - 1/2*b*d*n*x^
2*e + b*d*x^2*e*log(c*x^n) + a*d*x^2*e + 1/2*b*d^2*log(c*x^n)^2/n + a*d^2*l
og(x)
```

Fricas [**A**]
time = 0.38, size = 100, normalized size = 1.12

$$-\frac{1}{16}\,(bn-4\,a)x^4e^2+\frac{1}{2}\,bd^2n\log\left(x\right)^2-\frac{1}{2}\,(bdn-2\,ad)x^2e+\frac{1}{4}\,\left(bx^4e^2+4\,bdx^2e\right)\log\left(c\right)+\frac{1}{4}\,\left(bnx^4e^2+4\,bdnx^2e+4\,bd^2\log\left(c\right)+4\,ad^2\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] -1/16*(b*n - 4*a)*x^4*e^2 + 1/2*b*d^2*n*log(x)^2 - 1/2*(b*d*n - 2*a*d)*x^2*
e + 1/4*(b*x^4*e^2 + 4*b*d*x^2*e)*log(c) + 1/4*(b*n*x^4*e^2 + 4*b*d*n*x^2*e
 + 4*b*d^2*log(c) + 4*a*d^2)*log(x)
```

Sympy [**A**]
time = 0.70, size = 133, normalized size = 1.49

$$\begin{cases} \frac{ad^2\log\left(cx^n\right)}{n}+adex^2+\frac{ae^2x^4}{4}+\frac{bd^2\log\left(cx^n\right)^2}{2n}-\frac{bdenx^2}{2}+bdex^2\log\left(cx^n\right)-\frac{be^2nx^4}{16}+\frac{be^2x^4\log\left(cx^n\right)}{4} & \text{for}\; n\neq 0 \\ \left(a+b\log\left(c\right)\right)\left(d^2\log\left(x\right)+dex^2+\frac{e^2x^4}{4}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise((a*d**2*log(c*x**n)/n + a*d*e*x**2 + a*e**2*x**4/4 + b*d**2*log(c
*x**n)**2/(2*n) - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**4/1
6 + b*e**2*x**4*log(c*x**n)/4, Ne(n, 0)), ((a + b*log(c))*(d**2*log(x) + d*
e*x**2 + e**2*x**4/4), True))
```

Giac [A]
time = 4.01, size = 105, normalized size = 1.18

$$\frac{1}{4}bnx^4e^2\log(x) - \frac{1}{16}bnx^4e^2 + \frac{1}{4}bx^4e^2\log(c) + bdnx^2e\log(x) + \frac{1}{4}ax^4e^2 - \frac{1}{2}bdnx^2e + bdx^2e\log(c) + \frac{1}{2}bd^2n\log(x)^2 + adx^2e + bd^2\log(c)\log(x) + ad^2\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/4*b*n*x^4*e^2*log(x) - 1/16*b*n*x^4*e^2 + 1/4*b*x^4*e^2*log(c) + b*d*n*x^
2*e*log(x) + 1/4*a*x^4*e^2 - 1/2*b*d*n*x^2*e + b*d*x^2*e*log(c) + 1/2*b*d^2
*n*log(x)^2 + a*d*x^2*e + b*d^2*log(c)*log(x) + a*d^2*log(x)
```

Mupad [B]
time = 3.66, size = 80, normalized size = 0.90

$$\ln(c\,x^n)\,\left(\frac{b\,e^2\,x^4}{4}+b\,d\,e\,x^2\right)+\frac{e^2\,x^4\,(4\,a-b\,n)}{16}+a\,d^2\,\ln(x)+\frac{b\,d^2\ln(c\,x^n)^2}{2\,n}+\frac{d\,e\,x^2\,(2\,a-b\,n)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x,x)
```

```
[Out] log(c*x^n)*((b*e^2*x^4)/4 + b*d*e*x^2) + (e^2*x^4*(4*a - b*n))/16 + a*d^2*l
og(x) + (b*d^2*log(c*x^n)^2)/(2*n) + (d*e*x^2*(2*a - b*n))/2
```

3.187 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=91

$$-\frac{bd^2n}{4x^2}-\frac{1}{4}be^2nx^2-bden\log^2(x)-\frac{d^2(a+b\log(cx^n))}{2x^2}+\frac{1}{2}e^2x^2(a+b\log(cx^n))+2de\log(x)(a+b\log(cx^n))$$

```
[Out] -1/4*b*d^2*n/x^2-1/4*b*e^2*n*x^2-b*d*e*n*ln(x)^2-1/2*d^2*(a+b*ln(c*x^n))/x^
2+1/2*e^2*x^2*(a+b*ln(c*x^n))+2*d*e*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 91, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))-\frac{bd^2n}{4x^2}-bden\log^2(x)-\frac{1}{4}be^2nx^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^2*n)/x^2 - (b*e^2*n*x^2)/4 - b*d*e*n*Log[x]^2 - (d^2*(a + b*Log[c
*x^n]))/(2*x^2) + (e^2*x^2*(a + b*Log[c*x^n]))/2 + 2*d*e*Log[x]*(a + b*Log[
c*x^n])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
```

```
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{1}{2}\left(\frac{d^2}{x^2}-e^2x^2-4de\log(x)\right)(a+b\log(cx^n))-(bn)\int \frac{-d^2+e^2x^4+4}{2x^3}$$

$$= -\frac{1}{2}\left(\frac{d^2}{x^2}-e^2x^2-4de\log(x)\right)(a+b\log(cx^n))-\frac{1}{2}(bn)\int \frac{-d^2+e^2x^4+}{x}$$

$$= -\frac{1}{2}\left(\frac{d^2}{x^2}-e^2x^2-4de\log(x)\right)(a+b\log(cx^n))-\frac{1}{2}(bn)\int \left(\frac{-d^2+e^2x^4}{x^3}\right.$$

$$= -\frac{1}{2}\left(\frac{d^2}{x^2}-e^2x^2-4de\log(x)\right)(a+b\log(cx^n))-\frac{1}{2}(bn)\int \frac{-d^2+e^2x^4}{x^3}\,dx$$

$$= -bden\log^2(x)-\frac{1}{2}\left(\frac{d^2}{x^2}-e^2x^2-4de\log(x)\right)(a+b\log(cx^n))-\frac{1}{2}(bn)\int$$

$$= -\frac{bd^2n}{4x^2}-\frac{1}{4}be^2nx^2-bden\log^2(x)-\frac{1}{2}\left(\frac{d^2}{x^2}-e^2x^2-4de\log(x)\right)(a+b\log$$

Mathematica [**A**]
time = 0.04, size = 83, normalized size = 0.91

$$\frac{1}{4}\left(-\frac{bd^2n}{x^2}-be^2nx^2-\frac{2d^2(a+b\log(cx^n))}{x^2}+2e^2x^2(a+b\log(cx^n))+\frac{4de(a+b\log(cx^n))^2}{bn}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] (-((b*d^2*n)/x^2) - b*e^2*n*x^2 - (2*d^2*(a + b*Log[c*x^n]))/x^2 + 2*e^2*x^
2*(a + b*Log[c*x^n]) + (4*d*e*(a + b*Log[c*x^n])^2)/(b*n))/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 433, normalized size = 4.76

method	result
risch	$-\frac{b(-e^2x^4-4de\ln(x)x^2+d^2)\ln(x^n)}{2x^2} - \frac{-i\pi b\, e^2x^4 \mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-4i\ln(x)\pi bde\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2x^2-4i\ln(x)\pi bde\,\mathrm{csgn}(ix}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(-e^2*x^4-4*d*e*ln(x)*x^2+d^2)/x^2*ln(x^n)-1/4*(-I*Pi*b*e^2*x^4*csgn
(I*c)*csgn(I*c*x^n)^2-4*I*ln(x)*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^2-4*I*
ln(x)*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^2+I*Pi*b*d^2*csgn(I*x^n)*csgn(
I*c*x^n)^2-I*Pi*b*d^2*csgn(I*c*x^n)^3+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+
4*I*ln(x)*Pi*b*d*e*csgn(I*c*x^n)^3*x^2+I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+4*I*ln(x)*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^2+I
*Pi*b*e^2*x^4*csgn(I*c*x^n)^3-I*Pi*b*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-I*
Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*ln(c)*b*e^2*x^4+4*b*d*e*n*ln
(x)^2*x^2+b*e^2*n*x^4-8*ln(x)*ln(c)*b*d*e*x^2-2*x^4*a*e^2-8*ln(x)*a*d*e*x^2
+2*d^2*b*ln(c)+b*d^2*n+2*a*d^2)/x^2
```

Maxima [A]
time = 0.27, size = 90, normalized size = 0.99

$$-\frac{1}{4}\,bnx^2e^2+\frac{1}{2}\,bx^2e^2\log\left(cx^n\right)+\frac{1}{2}\,ax^2e^2+\frac{bde\log\left(cx^n\right)^2}{n}+2\,ade\log\left(x\right)-\frac{bd^2n}{4\,x^2}-\frac{bd^2\log\left(cx^n\right)}{2\,x^2}-\frac{ad^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*x^2*e^2 + 1/2*b*x^2*e^2*log(c*x^n) + 1/2*a*x^2*e^2 + b*d*e*log(c*x
^n)^2/n + 2*a*d*e*log(x) - 1/4*b*d^2*n/x^2 - 1/2*b*d^2*log(c*x^n)/x^2 - 1/2
*a*d^2/x^2
```

Fricas [A]
time = 0.38, size = 105, normalized size = 1.15

$$\frac{4\,bdnx^2e\log\left(x\right)^2-(bn-2\,a)x^4e^2-bd^2n-2\,ad^2+2\,(bx^4e^2-bd^2)\log\left(c\right)+2\,(bnx^4e^2+4\,bdx^2e\log\left(c\right)+4\,adx^2e-bd^2n)\log\left(x\right)}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] 1/4*(4*b*d*n*x^2*e*log(x)^2 - (b*n - 2*a)*x^4*e^2 - b*d^2*n - 2*a*d^2 + 2*(
b*x^4*e^2 - b*d^2)*log(c) + 2*(b*n*x^4*e^2 + 4*b*d*x^2*e*log(c) + 4*a*d*x^2
*e - b*d^2*n)*log(x))/x^2
```

Sympy [A]
time = 0.77, size = 139, normalized size = 1.53

$$\begin{cases} -\frac{ad^2}{2x^2} + \frac{2ade\log(cx^n)}{n} + \frac{ae^2x^2}{2} - \frac{bd^2n}{4x^2} - \frac{bd^2\log(cx^n)}{2x^2} + \frac{bde\log(cx^n)^2}{n} - \frac{be^2nx^2}{4} + \frac{be^2x^2\log(cx^n)}{2} & \text{for } n \neq 0 \\ (a + b\log(c))\left(-\frac{d^2}{2x^2} + 2de\log(x) + \frac{e^2x^2}{2}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Piecewise((-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**2/2 - b*d**
2*n/(4*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**n)**2/n - b*e**
2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(-d**2/(
2*x**2) + 2*d*e*log(x) + e**2*x**2/2), True))
```

Giac [A]
time = 3.46, size = 112, normalized size = 1.23

$$\frac{2\,bnx^4e^2\log(x) + 4\,bdnx^2e\log(x)^2 - bnx^4e^2 + 2\,bx^4e^2\log(c) + 8\,bdx^2e\log(c)\log(x) + 2\,ax^4e^2 + 8\,adx^2e\log(x) - 2\,bd^2n\log(x) - bd^2n - 2\,bd^2\log(c) - 2\,ad^2}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] 1/4*(2*b*n*x^4*e^2*log(x) + 4*b*d*n*x^2*e*log(x)^2 - b*n*x^4*e^2 + 2*b*x^4*
e^2*log(c) + 8*b*d*x^2*e*log(c)*log(x) + 2*a*x^4*e^2 + 8*a*d*x^2*e*log(x) -
 2*b*d^2*n*log(x) - b*d^2*n - 2*b*d^2*log(c) - 2*a*d^2)/x^2
```

Mupad [B]
time = 3.74, size = 110, normalized size = 1.21

$$\ln(x)\,\left(2\,a\,d\,e + b\,d\,e\,n\right) - \frac{\frac{a\,d^2}{2} + \frac{b\,d^2\,n}{4}}{x^2} - \ln(c\,x^n)\,\left(\frac{\frac{b\,d^2}{2} + b\,d\,e\,x^2 + \frac{b\,e^2\,x^4}{2}}{x^2} - b\,e^2\,x^2\right) + \frac{e^2\,x^2\,\left(2\,a - b\,n\right)}{4} + \frac{b\,d\,e\ln(c\,x^n)^2}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] log(x)*(2*a*d*e + b*d*e*n) - ((a*d^2)/2 + (b*d^2*n)/4)/x^2 - log(c*x^n)*(((
b*d^2)/2 + (b*e^2*x^4)/2 + b*d*e*x^2)/x^2 - b*e^2*x^2) + (e^2*x^2*(2*a - b*
n))/4 + (b*d*e*log(c*x^n)^2)/n
```

3.188 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=90

$$-\frac{bd^2n}{16x^4}-\frac{bden}{2x^2}-\frac{1}{2}be^2n\log^2(x)-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{de(a+b\log(cx^n))}{x^2}+e^2\log(x)\left(a+b\log(cx^n)\right)$$

```
[Out] -1/16*b*d^2*n/x^4-1/2*b*d*e*n/x^2-1/2*b*e^2*n*ln(x)^2-1/4*d^2*(a+b*ln(c*x^n
))/x^4-d*e*(a+b*ln(c*x^n))/x^2+e^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {272, 45, 2372, 14, 2338}

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{de(a+b\log(cx^n))}{x^2}+e^2\log(x)\left(a+b\log(cx^n)\right)-\frac{bd^2n}{16x^4}-\frac{bden}{2x^2}-\frac{1}{2}be^2n\log^2(x)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d^2*n)/x^4 - (b*d*e*n)/(2*x^2) - (b*e^2*n*Log[x]^2)/2 - (d^2*(a +
b*Log[c*x^n]))/(4*x^4) - (d*e*(a + b*Log[c*x^n]))/x^2 + e^2*Log[x]*(a + b*L
og[c*x^n])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^5}\,dx &= -\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{4de}{x^2}-4e^2\log(x)\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d(d+4ex^2)}{4x^5}\right.\\ &= -\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{4de}{x^2}-4e^2\log(x)\right)(a+b\log(cx^n))+\frac{1}{4}(bdn)\int\frac{d+4ex^2}{x^5}\,dx\\ &= -\frac{1}{2}be^2n\log^2(x)-\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{4de}{x^2}-4e^2\log(x)\right)(a+b\log(cx^n))+\frac{1}{4}(bdn)\\ &= -\frac{bd^2n}{16x^4}-\frac{bden}{2x^2}-\frac{1}{2}be^2n\log^2(x)-\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{4de}{x^2}-4e^2\log(x)\right)(a+b\log\end{aligned}$$

Mathematica [A]
time = 0.04, size = 82, normalized size = 0.91

$$\frac{1}{16}\left(-\frac{bd^2n}{x^4}-\frac{8bden}{x^2}-\frac{4d^2(a+b\log(cx^n))}{x^4}-\frac{16de(a+b\log(cx^n))}{x^2}+\frac{8e^2(a+b\log(cx^n))^2}{bn}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] (-((b*d^2*n)/x^4) - (8*b*d*e*n)/x^2 - (4*d^2*(a + b*Log[c*x^n]))/x^4 - (16*
d*e*(a + b*Log[c*x^n]))/x^2 + (8*e^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 434, normalized size = 4.82

method	result
risch	$-\frac{b(-4e^2\ln(x)x^4+4de\,x^2+d^2)\ln(x^n)}{4x^4}-\frac{8i\pi bde\,x^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+8i\pi bde\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-8i\ln(x)\pi b\,e^2\mathrm{csgn}(ix^n)\mathrm{csg}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(-4*e^2*ln(x)*x^4+4*d*e*x^2+d^2)/x^4*ln(x^n)-1/16*(8*I*Pi*b*d*e*x^2*
csgn(I*c)*csgn(I*c*x^n)^2+8*I*Pi*b*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-8*I*
ln(x)*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^4+2*I*Pi*b*d^2*csgn(I*x^n)*csg
n(I*c*x^n)^2-2*I*Pi*b*d^2*csgn(I*c*x^n)^3+8*I*ln(x)*Pi*b*e^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*x^4-8*I*Pi*b*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)-8*I*Pi*b*d*e*x^2*csgn(I*c*x^n)^3+8*e^2*b*n*ln(x)^2*x^4-16*ln(x)*ln(c)*b
*e^2*x^4-16*ln(x)*a*e^2*x^4-2*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+8*I*ln(x)*Pi*b*e^2*csgn(I*c*x^n)^3*x^4-8*I*ln(x)*Pi*b*e^2*csgn(I*c)*csgn(
I*c*x^n)^2*x^4+2*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+16*ln(c)*b*d*e*x^2+8*
b*d*e*n*x^2+16*x^2*a*d*e+4*d^2*b*ln(c)+b*d^2*n+4*a*d^2)/x^4
```

Maxima [A]
time = 0.26, size = 91, normalized size = 1.01

$$\frac{be^2\log\left(cx^n\right)^2}{2\,n}+ae^2\log\left(x\right)-\frac{bdne}{2\,x^2}-\frac{bde\log\left(cx^n\right)}{x^2}-\frac{ade}{x^2}-\frac{bd^2n}{16\,x^4}-\frac{bd^2\log\left(cx^n\right)}{4\,x^4}-\frac{ad^2}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] 1/2*b*e^2*log(c*x^n)^2/n + a*e^2*log(x) - 1/2*b*d*n*e/x^2 - b*d*e*log(c*x^n
)/x^2 - a*d*e/x^2 - 1/16*b*d^2*n/x^4 - 1/4*b*d^2*log(c*x^n)/x^4 - 1/4*a*d^2
/x^4
```

Fricas [A]
time = 0.38, size = 107, normalized size = 1.19

$$\frac{8\,bnx^4e^2\log\left(x\right)^2-bd^2n-8\,(bdn+2\,ad)x^2e-4\,ad^2-4\,(4\,bdx^2e+bd^2)\log\left(c\right)+4\,(4\,bx^4e^2\log\left(c\right)+4\,ax^4e^2-4\,bdnx^2e-bd^2n)\log\left(x\right)}{16\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] 1/16*(8*b*n*x^4*e^2*log(x)^2 - b*d^2*n - 8*(b*d*n + 2*a*d)*x^2*e - 4*a*d^2
- 4*(4*b*d*x^2*e + b*d^2)*log(c) + 4*(4*b*x^4*e^2*log(c) + 4*a*x^4*e^2 - 4*
b*d*n*x^2*e - b*d^2*n)*log(x))/x^4
```

Sympy [A]
time = 3.20, size = 105, normalized size = 1.17

$$-\frac{ad^2}{4x^4}-\frac{ade}{x^2}+ae^2\log\left(x\right)+bd^2\left(-\frac{n}{16x^4}-\frac{\log\left(cx^n\right)}{4x^4}\right)+2bde\left(-\frac{n}{4x^2}-\frac{\log\left(cx^n\right)}{2x^2}\right)-be^2\left(\begin{cases}-\log\left(c\right)\log\left(x\right) & \text{for}\: n=0\\-\frac{\log\left(cx^n\right)^2}{2n} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] -a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*x**4) - log(
c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2)) - b*e**2*P
iecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

Giac [A]
time = 3.89, size = 113, normalized size = 1.26

$$\frac{8\,bnx^4e^2\log\left(x\right)^2+16\,bx^4e^2\log\left(c\right)\log\left(x\right)+16\,ax^4e^2\log\left(x\right)-16\,bdnx^2e\log\left(x\right)-8\,bdnx^2e-16\,bdx^2e\log\left(c\right)-16\,adx^2e-4\,bd^2n\log\left(x\right)-bd^2n-4\,bd^2\log\left(c\right)-4\,ad^2}{16\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

```
[Out] 1/16*(8*b*n*x^4*e^2*log(x)^2 + 16*b*x^4*e^2*log(c)*log(x) + 16*a*x^4*e^2*lo
g(x) - 16*b*d*n*x^2*e*log(x) - 8*b*d*n*x^2*e - 16*b*d*x^2*e*log(c) - 16*a*d
*x^2*e - 4*b*d^2*n*log(x) - b*d^2*n - 4*b*d^2*log(c) - 4*a*d^2)/x^4
```

Mupad [B]
time = 3.57, size = 102, normalized size = 1.13

$$\ln\left(x\right)\,\left(a\,e^2+\frac{3\,b\,e^2\,n}{4}\right)-\frac{x^2\,\left(4\,a\,d\,e+2\,b\,d\,e\,n\right)+a\,d^2+\frac{b\,d^2\,n}{4}}{4\,x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{4}+b\,d\,e\,x^2+\frac{3\,b\,e^2\,x^4}{4}\right)}{x^4}+\frac{b\,e^2\,\ln\left(c\,x^n\right)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^5,x)
```

```
[Out] log(x)*(a*e^2 + (3*b*e^2*n)/4) - (x^2*(4*a*d*e + 2*b*d*e*n) + a*d^2 + (b*d^
2*n)/4)/(4*x^4) - (log(c*x^n)*((b*d^2)/4 + (3*b*e^2*x^4)/4 + b*d*e*x^2))/x^
4 + (b*e^2*log(c*x^n)^2)/(2*n)
```

3.189 $\int x^4(d+ex^2)^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=74

$$-\frac{1}{25}bd^2nx^5-\frac{2}{49}bdenx^7-\frac{1}{81}be^2nx^9+\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2x^9\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/25*b*d^2*n*x^5-2/49*b*d*e*n*x^7-1/81*b*e^2*n*x^9+1/315*(35*e^2*x^9+90*d*
e*x^7+63*d^2*x^5)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.087$, Rules used = {276, 2371}

$$\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2x^9\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{25}bd^2nx^5-\frac{2}{49}bdenx^7-\frac{1}{81}be^2nx^9$$

Antiderivative was successfully verified.

```
[In] Int[x^4*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d^2*n*x^5) - (2*b*d*e*n*x^7)/49 - (b*e^2*n*x^9)/81 + ((63*d^2*x^5
+ 90*d*e*x^7 + 35*e^2*x^9)*(a + b*Log[c*x^n]))/315
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^4\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2x^9\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\left(\frac{d^2x^4}{5}+\right.$$

$$=-\frac{1}{25}bd^2nx^5-\frac{2}{49}bdenx^7-\frac{1}{81}be^2nx^9+\frac{1}{315}\left(63d^2x^5+90dex^7+35e^2\right.$$

Mathematica [A]
time = 0.03, size = 95, normalized size = 1.28

$$-\frac{1}{25}bd^2nx^5-\frac{2}{49}bdenx^7-\frac{1}{81}be^2nx^9+\frac{1}{5}d^2x^5(a+b\log(cx^n))+\frac{2}{7}dex^7(a+b\log(cx^n))+\frac{1}{9}e^2x^9(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d^2*n*x^5) - (2*b*d*e*n*x^7)/49 - (b*e^2*n*x^9)/81 + (d^2*x^5*(a +
 b*Log[c*x^n]))/5 + (2*d*e*x^7*(a + b*Log[c*x^n]))/7 + (e^2*x^9*(a + b*Log[
c*x^n]))/9
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 1.45, size = 434, normalized size = 5.86

method	result
risch	$\frac{b\,x^5(35e^2x^4+90de\,x^2+63d^2)\ln(x^n)}{315}-\frac{i\pi bde\,x^7\mathrm{csgn}(ic\,x^n)^3}{7}+\frac{i\pi bde\,x^7\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{7}-\frac{i\pi b\,e^2x^9\mathrm{csgn}(ic\,x^n)^3}{18}-\frac{i\pi b\,d^2x^5}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/315*b*x^5*(35*e^2*x^4+90*d*e*x^2+63*d^2)*ln(x^n)-1/7*I*Pi*b*d*e*x^7*csgn(
I*c*x^n)^3+1/7*I*Pi*b*d*e*x^7*csgn(I*c)*csgn(I*c*x^n)^2-1/18*I*Pi*b*e^2*x^9
*csgn(I*c*x^n)^3-1/10*I*Pi*b*d^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/
9*ln(c)*b*e^2*x^9-1/81*b*e^2*n*x^9+1/9*x^9*a*e^2-1/10*I*Pi*b*d^2*x^5*csgn(I
*c*x^n)^3-1/7*I*Pi*b*d*e*x^7*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/18*I*Pi*
b*e^2*x^9*csgn(I*c)*csgn(I*c*x^n)^2+1/10*I*Pi*b*d^2*x^5*csgn(I*x^n)*csgn(I*
c*x^n)^2+2/7*ln(c)*b*d*e*x^7-2/49*b*d*e*n*x^7+2/7*x^7*a*d*e+1/18*I*Pi*b*e^2
*x^9*csgn(I*x^n)*csgn(I*c*x^n)^2+1/10*I*Pi*b*d^2*x^5*csgn(I*c)*csgn(I*c*x^n
)^2+1/7*I*Pi*b*d*e*x^7*csgn(I*x^n)*csgn(I*c*x^n)^2-1/18*I*Pi*b*e^2*x^9*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/5*ln(c)*b*d^2*x^5-1/25*b*d^2*n*x^5+1/5*x^
5*a*d^2
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.35

$$-\frac{1}{81}\,bnx^9e^2+\frac{1}{9}\,bx^9e^2\log(cx^n)+\frac{1}{9}\,ax^9e^2-\frac{2}{49}\,bdnx^7e+\frac{2}{7}\,bdx^7e\log(cx^n)+\frac{2}{7}\,adx^7e-\frac{1}{25}\,bd^2nx^5+\frac{1}{5}\,bd^2x^5\log(cx^n)+\frac{1}{5}\,ad^2x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/81*b*n*x^9*e^2 + 1/9*b*x^9*e^2*log(c*x^n) + 1/9*a*x^9*e^2 - 2/49*b*d*n*x
^7*e + 2/7*b*d*x^7*e*log(c*x^n) + 2/7*a*d*x^7*e - 1/25*b*d^2*n*x^5 + 1/5*b*
d^2*x^5*log(c*x^n) + 1/5*a*d^2*x^5
```

Fricas [A]
time = 0.37, size = 114, normalized size = 1.54

$$-\frac{1}{81}\,(bn-9\,a)x^9e^2-\frac{2}{49}\,(bdn-7\,ad)x^7e-\frac{1}{25}\,(bd^2n-5\,ad^2)x^5+\frac{1}{315}\,(35\,bx^9e^2+90\,bdx^7e+63\,bd^2x^5)\log(c)+\frac{1}{315}\,(35\,bnx^9e^2+90\,bdnx^7e+63\,bd^2nx^5)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/81*(b*n - 9*a)*x^9*e^2 - 2/49*(b*d*n - 7*a*d)*x^7*e - 1/25*(b*d^2*n - 5*
a*d^2)*x^5 + 1/315*(35*b*x^9*e^2 + 90*b*d*x^7*e + 63*b*d^2*x^5)*log(c) + 1/
315*(35*b*n*x^9*e^2 + 90*b*d*n*x^7*e + 63*b*d^2*n*x^5)*log(x)
```

Sympy [A]
time = 1.85, size = 121, normalized size = 1.64

$$\frac{ad^2x^5}{5}+\frac{2adex^7}{7}+\frac{ae^2x^9}{9}-\frac{bd^2nx^5}{25}+\frac{bd^2x^5\log(cx^n)}{5}-\frac{2bdenx^7}{49}+\frac{2bdex^7\log(cx^n)}{7}-\frac{be^2nx^9}{81}+\frac{be^2x^9\log(cx^n)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**5/5 + 2*a*d*e*x**7/7 + a*e**2*x**9/9 - b*d**2*n*x**5/25 + b*d**2*
x**5*log(c*x**n)/5 - 2*b*d*e*n*x**7/49 + 2*b*d*e*x**7*log(c*x**n)/7 - b*e**
2*n*x**9/81 + b*e**2*x**9*log(c*x**n)/9
```

Giac [A]
time = 5.93, size = 123, normalized size = 1.66

$$\frac{1}{9}\,bnx^9e^2\log(x)-\frac{1}{81}\,bnx^9e^2+\frac{1}{9}\,bx^9e^2\log(c)+\frac{2}{7}\,bdnx^7e\log(x)+\frac{1}{9}\,ax^9e^2-\frac{2}{49}\,bdnx^7e+\frac{2}{7}\,bdx^7e\log(c)+\frac{2}{7}\,adx^7e+\frac{1}{5}\,bd^2nx^5\log(x)-\frac{1}{25}\,bd^2nx^5+\frac{1}{5}\,bd^2x^5\log(c)+\frac{1}{5}\,ad^2x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/9*b*n*x^9*e^2*log(x) - 1/81*b*n*x^9*e^2 + 1/9*b*x^9*e^2*log(c) + 2/7*b*d*
n*x^7*e*log(x) + 1/9*a*x^9*e^2 - 2/49*b*d*n*x^7*e + 2/7*b*d*x^7*e*log(c) +
2/7*a*d*x^7*e + 1/5*b*d^2*n*x^5*log(x) - 1/25*b*d^2*n*x^5 + 1/5*b*d^2*x^5*l
og(c) + 1/5*a*d^2*x^5
```

Mupad [B]
time = 3.69, size = 82, normalized size = 1.11

$$\ln(c\,x^n)\,\left(\frac{b\,d^2\,x^5}{5}+\frac{2\,b\,d\,e\,x^7}{7}+\frac{b\,e^2\,x^9}{9}\right)+\frac{d^2\,x^5\,(5\,a-b\,n)}{25}+\frac{e^2\,x^9\,(9\,a-b\,n)}{81}+\frac{2\,d\,e\,x^7\,(7\,a-b\,n)}{49}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^2*x^5)/5 + (b*e^2*x^9)/9 + (2*b*d*e*x^7)/7) + (d^2*x^5*(5*
a - b*n))/25 + (e^2*x^9*(9*a - b*n))/81 + (2*d*e*x^7*(7*a - b*n))/49
```

3.190 $\int x^2(d+ex^2)^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=74

$$-\frac{1}{9}bd^2nx^3-\frac{2}{25}bdenx^5-\frac{1}{49}be^2nx^7+\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/9*b*d^2*n*x^3-2/25*b*d*e*n*x^5-1/49*b*e^2*n*x^7+1/105*(15*e^2*x^7+42*d*e
*x^5+35*d^2*x^3)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.087$, Rules used = {276, 2371}

$$\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{9}bd^2nx^3-\frac{2}{25}bdenx^5-\frac{1}{49}be^2nx^7$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^2*n*x^3) - (2*b*d*e*n*x^5)/25 - (b*e^2*n*x^7)/49 + ((35*d^2*x^3 +
 42*d*e*x^5 + 15*e^2*x^7)*(a + b*Log[c*x^n]))/105
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^2\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx&=\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\left(\frac{d^2x^2}{3}+\frac{2}{5}\right.\\&=-\frac{1}{9}bd^2nx^3-\frac{2}{25}bdenx^5-\frac{1}{49}be^2nx^7+\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right.\end{aligned}$$

Mathematica [A]
time = 0.03, size = 95, normalized size = 1.28

$$-\frac{1}{9}bd^2nx^3-\frac{2}{25}bdenx^5-\frac{1}{49}be^2nx^7+\frac{1}{3}d^2x^3(a+b\log(cx^n))+\frac{2}{5}dex^5(a+b\log(cx^n))+\frac{1}{7}e^2x^7(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^2*n*x^3) - (2*b*d*e*n*x^5)/25 - (b*e^2*n*x^7)/49 + (d^2*x^3*(a +
b*Log[c*x^n]))/3 + (2*d*e*x^5*(a + b*Log[c*x^n]))/5 + (e^2*x^7*(a + b*Log[c
*x^n]))/7
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 434, normalized size = 5.86

method	result
risch	$\frac{b\,x^3(15e^2x^4+42de\,x^2+35d^2)\ln(x^n)}{105}+\frac{i\pi b\,d^2x^3\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{6}-\frac{i\pi bde\,x^5\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{5}-\frac{i\pi b\,e^2x^7\mathrm{csgn}(ic$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/105*b*x^3*(15*e^2*x^4+42*d*e*x^2+35*d^2)*ln(x^n)+1/6*I*Pi*b*d^2*x^3*csgn(
I*c)*csgn(I*c*x^n)^2-1/5*I*Pi*b*d*e*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-1/14*I*Pi*b*e^2*x^7*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/5*I*Pi*b*d*e*x^5
*csgn(I*x^n)*csgn(I*c*x^n)^2+1/7*ln(c)*b*e^2*x^7-1/49*b*e^2*n*x^7+1/7*x^7*a
*e^2-1/14*I*Pi*b*e^2*x^7*csgn(I*c*x^n)^3+1/5*I*Pi*b*d*e*x^5*csgn(I*c)*csgn(
I*c*x^n)^2-1/5*I*Pi*b*d*e*x^5*csgn(I*c*x^n)^3+1/6*I*Pi*b*d^2*x^3*csgn(I*x^n
)*csgn(I*c*x^n)^2+2/5*ln(c)*b*d*e*x^5-2/25*b*d*e*n*x^5+2/5*a*d*e*x^5-1/6*I*
Pi*b*d^2*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/14*I*Pi*b*e^2*x^7*csgn(I
*x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*d^2*x^3*csgn(I*c*x^n)^3+1/14*I*Pi*b*e^2*x^
7*csgn(I*c)*csgn(I*c*x^n)^2+1/3*ln(c)*b*d^2*x^3-1/9*b*d^2*n*x^3+1/3*x^3*a*d
^2
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.35

$$-\frac{1}{49}bnx^7e^2+\frac{1}{7}bx^7e^2\log(cx^n)+\frac{1}{7}ax^7e^2-\frac{2}{25}bdnx^5e+\frac{2}{5}bdx^5e\log(cx^n)+\frac{2}{5}adx^5e-\frac{1}{9}bd^2nx^3+\frac{1}{3}bd^2x^3\log(cx^n)+\frac{1}{3}ad^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/49*b*n*x^7*e^2 + 1/7*b*x^7*e^2*log(c*x^n) + 1/7*a*x^7*e^2 - 2/25*b*d*n*x
^5*e + 2/5*b*d*x^5*e*log(c*x^n) + 2/5*a*d*x^5*e - 1/9*b*d^2*n*x^3 + 1/3*b*d
^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3
```

Fricas [A]
time = 0.38, size = 114, normalized size = 1.54

$$-\frac{1}{49}(bn-7a)x^7e^2-\frac{2}{25}(bdn-5ad)x^5e-\frac{1}{9}(bd^2n-3ad^2)x^3+\frac{1}{105}(15bx^7e^2+42bdx^5e+35bd^2x^3)\log(c)+\frac{1}{105}(15bnx^7e^2+42bdnx^5e+35bd^2nx^3)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/49*(b*n - 7*a)*x^7*e^2 - 2/25*(b*d*n - 5*a*d)*x^5*e - 1/9*(b*d^2*n - 3*a
*d^2)*x^3 + 1/105*(15*b*x^7*e^2 + 42*b*d*x^5*e + 35*b*d^2*x^3)*log(c) + 1/1
05*(15*b*n*x^7*e^2 + 42*b*d*n*x^5*e + 35*b*d^2*n*x^3)*log(x)
```

Sympy [A]
time = 0.93, size = 121, normalized size = 1.64

$$\frac{ad^2x^3}{3}+\frac{2adex^5}{5}+\frac{ae^2x^7}{7}-\frac{bd^2nx^3}{9}+\frac{bd^2x^3\log(cx^n)}{3}-\frac{2bdenx^5}{25}+\frac{2bdex^5\log(cx^n)}{5}-\frac{be^2nx^7}{49}+\frac{be^2x^7\log(cx^n)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x**3/3 + 2*a*d*e*x**5/5 + a*e**2*x**7/7 - b*d**2*n*x**3/9 + b*d**2*x
**3*log(c*x**n)/3 - 2*b*d*e*n*x**5/25 + 2*b*d*e*x**5*log(c*x**n)/5 - b*e**2
*n*x**7/49 + b*e**2*x**7*log(c*x**n)/7
```

Giac [A]
time = 7.85, size = 123, normalized size = 1.66

$$\frac{1}{7}bnx^7e^2\log(x)-\frac{1}{49}bnx^7e^2+\frac{1}{7}bx^7e^2\log(c)+\frac{2}{5}bdnx^5e\log(x)+\frac{1}{7}ax^7e^2-\frac{2}{25}bdnx^5e+\frac{2}{5}bdx^5e\log(c)+\frac{2}{5}adx^5e+\frac{1}{3}bd^2nx^3\log(x)-\frac{1}{9}bd^2nx^3+\frac{1}{3}bd^2x^3\log(c)+\frac{1}{3}ad^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/7*b*n*x^7*e^2*log(x) - 1/49*b*n*x^7*e^2 + 1/7*b*x^7*e^2*log(c) + 2/5*b*d*
n*x^5*e*log(x) + 1/7*a*x^7*e^2 - 2/25*b*d*n*x^5*e + 2/5*b*d*x^5*e*log(c) +
2/5*a*d*x^5*e + 1/3*b*d^2*n*x^3*log(x) - 1/9*b*d^2*n*x^3 + 1/3*b*d^2*x^3*lo
g(c) + 1/3*a*d^2*x^3
```

Mupad [B]
time = 3.59, size = 82, normalized size = 1.11

$$\ln(c\,x^n)\,\left(\frac{b\,d^2\,x^3}{3}+\frac{2\,b\,d\,e\,x^5}{5}+\frac{b\,e^2\,x^7}{7}\right)+\frac{d^2\,x^3\,(3\,a-b\,n)}{9}+\frac{e^2\,x^7\,(7\,a-b\,n)}{49}+\frac{2\,d\,e\,x^5\,(5\,a-b\,n)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^2*x^3)/3 + (b*e^2*x^7)/7 + (2*b*d*e*x^5)/5) + (d^2*x^3*(3*
a - b*n))/9 + (e^2*x^7*(7*a - b*n))/49 + (2*d*e*x^5*(5*a - b*n))/25
```

3.191 $\int (d+ex^2)^2 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=86

$$-bd^2nx-\frac{2}{9}bdenx^3-\frac{1}{25}be^2nx^5+d^2x(a+b\log(cx^n))+\frac{2}{3}dex^3(a+b\log(cx^n))+\frac{1}{5}e^2x^5(a+b\log(cx^n))$$

```
[Out] -b*d^2*n*x-2/9*b*d*e*n*x^3-1/25*b*e^2*n*x^5+d^2*x*(a+b*ln(c*x^n))+2/3*d*e*x
^3*(a+b*ln(c*x^n))+1/5*e^2*x^5*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.03, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {200, 2350}

$$d^2x(a+b\log(cx^n))+\frac{2}{3}dex^3(a+b\log(cx^n))+\frac{1}{5}e^2x^5(a+b\log(cx^n))-bd^2nx-\frac{2}{9}bdenx^3-\frac{1}{25}be^2nx^5$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d^2*n*x) - (2*b*d*e*n*x^3)/9 - (b*e^2*n*x^5)/25 + d^2*x*(a + b*Log[c*x^
n]) + (2*d*e*x^3*(a + b*Log[c*x^n]))/3 + (e^2*x^5*(a + b*Log[c*x^n]))/5
```

Rule 200

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[ExpandIntegrand[(a + b*
x^n)^p, x], x] /; FreeQ[{a, b}, x] && IGtQ[n, 0] && IGtQ[p, 0]
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\int (d+ex^2)^2 (a+b\log(cx^n))\, dx = \frac{1}{15}\left(15d^2x+10dex^3+3e^2x^5\right)(a+b\log(cx^n))-(bn)\int \left(d^2+\frac{2}{3}dex^2 +$$
$$= -bd^2nx-\frac{2}{9}bdenx^3-\frac{1}{25}be^2nx^5+\frac{1}{15}\left(15d^2x+10dex^3+3e^2x^5\right)(a+b$$

Mathematica [A]
time = 0.03, size = 89, normalized size = 1.03

$$ad^2x-bd^2nx-\frac{2}{9}bdenx^3-\frac{1}{25}be^2nx^5+bd^2x\log(cx^n)+\frac{2}{3}dex^3(a+b\log(cx^n))+\frac{1}{5}e^2x^5(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] a*d^2*x - b*d^2*n*x - (2*b*d*e*n*x^3)/9 - (b*e^2*n*x^5)/25 + b*d^2*x*Log[c*
x^n] + (2*d*e*x^3*(a + b*Log[c*x^n]))/3 + (e^2*x^5*(a + b*Log[c*x^n]))/5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 416, normalized size = 4.84

method	result
risch	$\frac{bx(3e^2x^4+10de\,x^2+15d^2)\ln(x^n)}{15}+\frac{i\pi b\,e^2x^5\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{10}-\frac{i\pi bde\,x^3\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{3}+\frac{i\pi bde\,x^3\mathrm{csgn}(ix^n)\mathrm{cs}}{3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/15*b*x*(3*e^2*x^4+10*d*e*x^2+15*d^2)*ln(x^n)+1/10*I*Pi*b*e^2*x^5*csgn(I*c
)*csgn(I*c*x^n)^2-1/3*I*Pi*b*d*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/
3*I*Pi*b*d*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2+1/10*I*Pi*b*e^2*x^5*csgn(I*x^n
)*csgn(I*c*x^n)^2-1/2*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x-1/10
*I*Pi*b*e^2*x^5*csgn(I*c*x^n)^3-1/3*I*Pi*b*d*e*x^3*csgn(I*c*x^n)^3-1/2*I*Pi
*b*d^2*csgn(I*c*x^n)^3*x+1/5*ln(c)*b*e^2*x^5+1/2*I*Pi*b*d^2*csgn(I*c)*csgn(
I*c*x^n)^2*x+1/3*I*Pi*b*d*e*x^3*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*Pi*b*d^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x-1/10*I*Pi*b*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)-1/25*b*e^2*n*x^5+1/5*x^5*a*e^2+2/3*ln(c)*b*d*e*x^3-2/9*b*d*e*n*x^3
+2/3*x^3*a*d*e+ln(c)*b*d^2*x-b*d^2*n*x+a*d^2*x
```

Maxima [A]
time = 0.30, size = 92, normalized size = 1.07

$$-\frac{1}{25}bnx^5e^2+\frac{1}{5}bx^5e^2\log(cx^n)+\frac{1}{5}ax^5e^2-\frac{2}{9}bdnx^3e+\frac{2}{3}bdx^3e\log(cx^n)+\frac{2}{3}adx^3e-bd^2nx+bd^2x\log(cx^n)+ad^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*n*x^5*e^2 + 1/5*b*x^5*e^2*log(c*x^n) + 1/5*a*x^5*e^2 - 2/9*b*d*n*x^
3*e + 2/3*b*d*x^3*e*log(c*x^n) + 2/3*a*d*x^3*e - b*d^2*n*x + b*d^2*x*log(c*
x^n) + a*d^2*x
```

Fricas [A]
time = 0.36, size = 108, normalized size = 1.26

$$-\frac{1}{25}(bn-5a)x^5e^2-\frac{2}{9}(bdn-3ad)x^3e-(bd^2n-ad^2)x+\frac{1}{15}(3bx^5e^2+10bdx^3e+15bd^2x)\log(c)+\frac{1}{15}(3bnx^5e^2+10bdnx^3e+15bd^2nx)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/25*(b*n - 5*a)*x^5*e^2 - 2/9*(b*d*n - 3*a*d)*x^3*e - (b*d^2*n - a*d^2)*x
 + 1/15*(3*b*x^5*e^2 + 10*b*d*x^3*e + 15*b*d^2*x)*log(c) + 1/15*(3*b*n*x^5*
e^2 + 10*b*d*n*x^3*e + 15*b*d^2*n*x)*log(x)
```

Sympy [A]
time = 0.44, size = 110, normalized size = 1.28

$$ad^2x + \frac{2adex^3}{3} + \frac{ae^2x^5}{5} - bd^2nx + bd^2x\log(cx^n) - \frac{2bdenx^3}{9} + \frac{2bdex^3\log(cx^n)}{3} - \frac{be^2nx^5}{25} + \frac{be^2x^5\log(cx^n)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x + 2*a*d*e*x**3/3 + a*e**2*x**5/5 - b*d**2*n*x + b*d**2*x*log(c*x**
n) - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 - b*e**2*n*x**5/25 + b*e
**2*x**5*log(c*x**n)/5
```

Giac [A]
time = 10.36, size = 112, normalized size = 1.30

$$\frac{1}{5}bnx^5e^2\log(x) - \frac{1}{25}bnx^5e^2 + \frac{1}{5}bx^5e^2\log(c) + \frac{2}{3}bdnx^3e\log(x) + \frac{1}{5}ax^5e^2 - \frac{2}{9}bdnx^3e + \frac{2}{3}bdx^3e\log(c) + \frac{2}{3}adx^3e + bd^2nx\log(x) - bd^2nx + bd^2x\log(c) + ad^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/5*b*n*x^5*e^2*log(x) - 1/25*b*n*x^5*e^2 + 1/5*b*x^5*e^2*log(c) + 2/3*b*d*
n*x^3*e*log(x) + 1/5*a*x^5*e^2 - 2/9*b*d*n*x^3*e + 2/3*b*d*x^3*e*log(c) + 2
/3*a*d*x^3*e + b*d^2*n*x*log(x) - b*d^2*n*x + b*d^2*x*log(c) + a*d^2*x
```

Mupad [B]
time = 3.44, size = 74, normalized size = 0.86

$$\ln(c\,x^n)\,\left(b\,d^2\,x + \frac{2\,b\,d\,e\,x^3}{3} + \frac{b\,e^2\,x^5}{5}\right) + \frac{e^2\,x^5\,(5\,a - b\,n)}{25} + d^2\,x\,(a - b\,n) + \frac{2\,d\,e\,x^3\,(3\,a - b\,n)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*e^2*x^5)/5 + b*d^2*x + (2*b*d*e*x^3)/3) + (e^2*x^5*(5*a - b*
n))/25 + d^2*x*(a - b*n) + (2*d*e*x^3*(3*a - b*n))/9
```

3.192 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=83

$$-\frac{bd^2n}{x}-2bdenx-\frac{1}{9}be^2nx^3-\frac{d^2(a+b\log(cx^n))}{x}+2dex(a+b\log(cx^n))+\frac{1}{3}e^2x^3(a+b\log(cx^n))$$

```
[Out] -b*d^2*n/x-2*b*d*e*n*x-1/9*b*e^2*n*x^3-d^2*(a+b*ln(c*x^n))/x+2*d*e*x*(a+b*l
n(c*x^n))+1/3*e^2*x^3*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 83, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {276, 2372}

$$-\frac{d^2(a+b\log(cx^n))}{x}+2dex(a+b\log(cx^n))+\frac{1}{3}e^2x^3(a+b\log(cx^n))-\frac{bd^2n}{x}-2bdenx-\frac{1}{9}be^2nx^3$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^2*n)/x) - 2*b*d*e*n*x - (b*e^2*n*x^3)/9 - (d^2*(a + b*Log[c*x^n]))/x
 + 2*d*e*x*(a + b*Log[c*x^n]) + (e^2*x^3*(a + b*Log[c*x^n]))/3
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^2}\,dx &= -\frac{1}{3}\left(\frac{3d^2}{x}-6dex-e^2x^3\right)(a+b\log(cx^n))-(bn)\int\left(2de-\frac{d^2}{x^2}+\frac{e^2x^2}{3}\right)\\ &= -\frac{bd^2n}{x}-2bdenx-\frac{1}{9}be^2nx^3-\frac{1}{3}\left(\frac{3d^2}{x}-6dex-e^2x^3\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.03, size = 86, normalized size = 1.04

$$-\frac{bd^2n}{x}+2adex-2bdenx-\frac{1}{9}be^2nx^3+2bdex\log\left(cx^n\right)-\frac{d^2(a+b\log\left(cx^n\right))}{x}+\frac{1}{3}e^2x^3(a+b\log\left(cx^n\right))$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^2*n)/x) + 2*a*d*e*x - 2*b*d*e*n*x - (b*e^2*n*x^3)/9 + 2*b*d*e*x*Log[
c*x^n] - (d^2*(a + b*Log[c*x^n]))/x + (e^2*x^3*(a + b*Log[c*x^n]))/3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 419, normalized size = 5.05

method	result
risch	$-\frac{b(-e^2x^4-6de\,x^2+3d^2)\ln(x^n)}{3x}-\frac{3i\pi b\,e^2x^4\mathrm{csgn}(ic\,x^n)^3+3i\pi b\,e^2x^4\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)-3i\pi b\,e^2x^4\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(-e^2*x^4-6*d*e*x^2+3*d^2)/x*ln(x^n)-1/18*(3*I*Pi*b*e^2*x^4*csgn(I*c
*x^n)^3+3*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I*Pi*b*e^2*x
^4*csgn(I*x^n)*csgn(I*c*x^n)^2+18*I*Pi*b*d*e*x^2*csgn(I*c*x^n)^3-9*I*Pi*b*d
^2*csgn(I*c*x^n)^3+9*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-18*I*Pi*b*d*e*x^2
*csgn(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+9*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b*e^2*x^4*csgn(I*c)*csgn
(I*c*x^n)^2-18*I*Pi*b*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+18*I*Pi*b*d*e*x^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-6*ln(c)*b*e^2*x^4+2*b*e^2*n*x^4-6*x^4*a*
e^2-36*ln(c)*b*d*e*x^2+36*b*d*e*n*x^2-36*x^2*a*d*e+18*d^2*b*ln(c)+18*b*d^2*
n+18*a*d^2)/x
```

Maxima [A]
time = 0.28, size = 94, normalized size = 1.13

$$-\frac{1}{9}\,bnx^3e^2+\frac{1}{3}\,bx^3e^2\log\left(cx^n\right)+\frac{1}{3}\,ax^3e^2-2\,bdnxe+2\,bdxe\log\left(cx^n\right)+2\,adxe-\frac{bd^2n}{x}-\frac{bd^2\log\left(cx^n\right)}{x}-\frac{ad^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*x^3*e^2 + 1/3*b*x^3*e^2*log(c*x^n) + 1/3*a*x^3*e^2 - 2*b*d*n*x*e +
 2*b*d*x*e*log(c*x^n) + 2*a*d*x*e - b*d^2*n/x - b*d^2*log(c*x^n)/x - a*d^2/
x
```

Fricas [A]
time = 0.36, size = 105, normalized size = 1.27

$$-\frac{(bn-3a)x^4e^2+9bd^2n+18(bdn-ad)x^2e+9ad^2-3(bx^4e^2+6bdx^2e-3bd^2)\log(c)-3(bnx^4e^2+6bdnx^2e-3bd^2n)\log(x)}{9x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] -1/9*((b*n - 3*a)*x^4*e^2 + 9*b*d^2*n + 18*(b*d*n - a*d)*x^2*e + 9*a*d^2 -
3*(b*x^4*e^2 + 6*b*d*x^2*e - 3*b*d^2)*log(c) - 3*(b*n*x^4*e^2 + 6*b*d*n*x^2
*e - 3*b*d^2*n)*log(x))/x
```

Sympy [A]
time = 0.48, size = 100, normalized size = 1.20

$$-\frac{ad^2}{x}+2adex+\frac{ae^2x^3}{3}-\frac{bd^2n}{x}-\frac{bd^2\log(cx^n)}{x}-2bdenx+2bdex\log(cx^n)-\frac{be^2nx^3}{9}+\frac{be^2x^3\log(cx^n)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] -a*d**2/x + 2*a*d*e*x + a*e**2*x**3/3 - b*d**2*n/x - b*d**2*log(c*x**n)/x -
 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n*x**3/9 + b*e**2*x**3*log(c*
x**n)/3
```

Giac [A]
time = 8.88, size = 116, normalized size = 1.40

$$\frac{3bnx^4e^2\log(x)-bnx^4e^2+3bx^4e^2\log(c)+18bdnx^2e\log(x)+3ax^4e^2-18bdnx^2e+18bdx^2e\log(c)+18adx^2e-9bd^2n\log(x)-9bd^2n-9bd^2\log(c)-9ad^2}{9x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] 1/9*(3*b*n*x^4*e^2*log(x) - b*n*x^4*e^2 + 3*b*x^4*e^2*log(c) + 18*b*d*n*x^2
*e*log(x) + 3*a*x^4*e^2 - 18*b*d*n*x^2*e + 18*b*d*x^2*e*log(c) + 18*a*d*x^2
*e - 9*b*d^2*n*log(x) - 9*b*d^2*n - 9*b*d^2*log(c) - 9*a*d^2)/x
```

Mupad [B]
time = 3.46, size = 102, normalized size = 1.23

$$\ln(c\,x^n)\left(\frac{\frac{4\,b\,e^2\,x^4}{3}+4\,b\,d\,e\,x^2}{x}-\frac{b\,d^2+2\,b\,d\,e\,x^2+b\,e^2\,x^4}{x}\right)-\frac{a\,d^2+b\,d^2\,n}{x}+\frac{e^2\,x^3\,(3\,a-b\,n)}{9}+2\,d\,e\,x\,(a-b\,n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^2,x)
```

```
[Out] log(c*x^n)*(((4*b*e^2*x^4)/3 + 4*b*d*e*x^2)/x - (b*d^2 + b*e^2*x^4 + 2*b*d*
e*x^2)/x) - (a*d^2 + b*d^2*n)/x + (e^2*x^3*(3*a - b*n))/9 + 2*d*e*x*(a - b*
n)
```

3.193 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=82

$$-\frac{bd^2n}{9x^3}-\frac{2bden}{x}-be^2nx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2de(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))$$

```
[Out] -1/9*b*d^2*n/x^3-2*b*d*e*n/x-b*e^2*n*x-1/3*d^2*(a+b*ln(c*x^n))/x^3-2*d*e*(a
+b*ln(c*x^n))/x+e^2*x*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.087$, Rules used = {276, 2372}

$$-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2de(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))-\frac{bd^2n}{9x^3}-\frac{2bden}{x}-be^2nx$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^2*n)/x^3 - (2*b*d*e*n)/x - b*e^2*n*x - (d^2*(a + b*Log[c*x^n]))/(
3*x^3) - (2*d*e*(a + b*Log[c*x^n]))/x + e^2*x*(a + b*Log[c*x^n])
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4}\,dx &= -\frac{1}{3}\left(\frac{d^2}{x^3}+\frac{6de}{x}-3e^2x\right)(a+b\log(cx^n))-(bn)\int\left(e^2-\frac{d^2}{3x^4}-\frac{2de}{x^2}\right)\\ &= -\frac{bd^2n}{9x^3}-\frac{2bden}{x}-be^2nx-\frac{1}{3}\left(\frac{d^2}{x^3}+\frac{6de}{x}-3e^2x\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.03, size = 80, normalized size = 0.98

$$-\frac{3a(d^2+6dex^2-3e^2x^4)+bn(d^2+18dex^2+9e^2x^4)+3b(d^2+6dex^2-3e^2x^4)\log(cx^n)}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(3*a*(d^2 + 6*d*e*x^2 - 3*e^2*x^4) + b*n*(d^2 + 18*d*e*x^2 + 9*e^2*x^4
) + 3*b*(d^2 + 6*d*e*x^2 - 3*e^2*x^4)*Log[c*x^n])/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 417, normalized size = 5.09

method	result
risch	$-\frac{b(-3e^2x^4+6de\,x^2+d^2)\ln(x^n)}{3x^3}-\frac{18i\pi bde\,x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+3i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-3i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(-3*e^2*x^4+6*d*e*x^2+d^2)/x^3*ln(x^n)-1/18*(18*I*Pi*b*d*e*x^2*csgn(
I*x^n)*csgn(I*c*x^n)^2+3*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-3*I*Pi*b*d^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi*b*e^2*x^4*csgn(I*c*x^n)^3-18*I*P
i*b*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi*b*e^2*x^4*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-9*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi
*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-18*I*Pi*b*d*e*x^2*csgn(I*c*x^n)^3-9*I*Pi
*b*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b*d^2*csgn(I*c*x^n)^3+18*I*Pi
*b*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-18*ln(c)*b*e^2*x^4+18*b*e^2*n*x^4-18*x
^4*a*e^2+36*ln(c)*b*d*e*x^2+36*b*d*e*n*x^2+36*x^2*a*d*e+6*d^2*b*ln(c)+2*b*d
^2*n+6*a*d^2)/x^3
```

Maxima [A]
time = 0.27, size = 92, normalized size = 1.12

$$-bnxe^2+bxe^2\log(cx^n)+axe^2-\frac{2\,bdne}{x}-\frac{2\,bde\log(cx^n)}{x}-\frac{2\,ade}{x}-\frac{bd^2n}{9\,x^3}-\frac{bd^2\log(cx^n)}{3\,x^3}-\frac{ad^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] -b*n*x*e^2 + b*x*e^2*log(c*x^n) + a*x*e^2 - 2*b*d*n*e/x - 2*b*d*e*log(c*x^n
)/x - 2*a*d*e/x - 1/9*b*d^2*n/x^3 - 1/3*b*d^2*log(c*x^n)/x^3 - 1/3*a*d^2/x^
3
```

Fricas [A]
time = 0.38, size = 106, normalized size = 1.29

$$-\frac{9\,(bn-a)x^4e^2+bd^2n+18\,(bdn+ad)x^2e+3\,ad^2-3\,(3\,bx^4e^2-6\,bdx^2e-bd^2)\log{(c)}-3\,(3\,bnx^4e^2-6\,bdnx^2e-bd^2n)\log{(x)}}{9\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/9*(9*(b*n - a)*x^4*e^2 + b*d^2*n + 18*(b*d*n + a*d)*x^2*e + 3*a*d^2 - 3*
(3*b*x^4*e^2 - 6*b*d*x^2*e - b*d^2)*log(c) - 3*(3*b*n*x^4*e^2 - 6*b*d*n*x^2
*e - b*d^2*n)*log(x))/x^3
```

Sympy [A]
time = 0.55, size = 100, normalized size = 1.22

$$-\frac{ad^2}{3x^3}-\frac{2ade}{x}+ae^2x-\frac{bd^2n}{9x^3}-\frac{bd^2\log{(cx^n)}}{3x^3}-\frac{2bden}{x}-\frac{2bde\log{(cx^n)}}{x}-be^2nx+be^2x\log{(cx^n)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d**2/(3*x**3) - 2*a*d*e/x + a*e**2*x - b*d**2*n/(9*x**3) - b*d**2*log(c*
x**n)/(3*x**3) - 2*b*d*e*n/x - 2*b*d*e*log(c*x**n)/x - b*e**2*n*x + b*e**2*
x*log(c*x**n)
```

Giac [A]
time = 6.80, size = 116, normalized size = 1.41

$$\frac{9\,bnx^4e^2\log{(x)}-9\,bnx^4e^2+9\,bx^4e^2\log{(c)}-18\,bdnx^2e\log{(x)}+9\,ax^4e^2-18\,bdnx^2e-18\,bdx^2e\log{(c)}-18\,adx^2e-3\,bd^2n\log{(x)}-bd^2n-3\,bd^2\log{(c)}-3\,ad^2}{9\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] 1/9*(9*b*n*x^4*e^2*log(x) - 9*b*n*x^4*e^2 + 9*b*x^4*e^2*log(c) - 18*b*d*n*x
^2*e*log(x) + 9*a*x^4*e^2 - 18*b*d*n*x^2*e - 18*b*d*x^2*e*log(c) - 18*a*d*x
^2*e - 3*b*d^2*n*log(x) - b*d^2*n - 3*b*d^2*log(c) - 3*a*d^2)/x^3
```

Mupad [B]
time = 3.48, size = 90, normalized size = 1.10

$$e^2\,x\,\left(a-b\,n\right)-\frac{x^2\,\left(6\,a\,d\,e+6\,b\,d\,e\,n\right)+a\,d^2+\frac{b\,d^2\,n}{3}}{3\,x^3}-\ln\left(c\,x^n\right)\,\left(\frac{\frac{b\,d^2}{3}+2\,b\,d\,e\,x^2+\frac{5\,b\,e^2\,x^4}{3}}{x^3}-\frac{8\,b\,e^2\,x}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] e^2*x*(a - b*n) - (x^2*(6*a*d*e + 6*b*d*e*n) + a*d^2 + (b*d^2*n)/3)/(3*x^3)
 - log(c*x^n)*(((b*d^2)/3 + (5*b*e^2*x^4)/3 + 2*b*d*e*x^2)/x^3 - (8*b*e^2*x
)/3)
```

3.194 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=91

$$-\frac{bd^2n}{25x^5}-\frac{2bden}{9x^3}-\frac{be^2n}{x}-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

```
[Out] -1/25*b*d^2*n/x^5-2/9*b*d*e*n/x^3-b*e^2*n/x-1/5*d^2*(a+b*ln(c*x^n))/x^5-2/3
*d*e*(a+b*ln(c*x^n))/x^3-e^2*(a+b*ln(c*x^n))/x
```

Rubi [A]
time = 0.06, antiderivative size = 91, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}-\frac{bd^2n}{25x^5}-\frac{2bden}{9x^3}-\frac{be^2n}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d^2*n)/x^5 - (2*b*d*e*n)/(9*x^3) - (b*e^2*n)/x - (d^2*(a + b*Log[c
*x^n]))/(5*x^5) - (2*d*e*(a + b*Log[c*x^n]))/(3*x^3) - (e^2*(a + b*Log[c*x^
n]))/x
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
```

```
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{1}{15}\left(\frac{3d^2}{x^5}+\frac{10de}{x^3}+\frac{15e^2}{x}\right)(a+b\log(cx^n))-(bn)\int \frac{-3d^2-10dex^2}{15x^6}$$

$$= -\frac{1}{15}\left(\frac{3d^2}{x^5}+\frac{10de}{x^3}+\frac{15e^2}{x}\right)(a+b\log(cx^n))-\frac{1}{15}(bn)\int \frac{-3d^2-10de}{x^6}$$

$$= -\frac{1}{15}\left(\frac{3d^2}{x^5}+\frac{10de}{x^3}+\frac{15e^2}{x}\right)(a+b\log(cx^n))-\frac{1}{15}(bn)\int \left(-\frac{3d^2}{x^6}-\frac{10}{x}\right.$$

$$= -\frac{bd^2n}{25x^5}-\frac{2bden}{9x^3}-\frac{be^2n}{x}-\frac{1}{15}\left(\frac{3d^2}{x^5}+\frac{10de}{x^3}+\frac{15e^2}{x}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.03, size = 86, normalized size = 0.95

$$-\frac{15a(3d^2+10dex^2+15e^2x^4)+bn(9d^2+50dex^2+225e^2x^4)+15b(3d^2+10dex^2+15e^2x^4)\log(cx^n)}{225x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/225*(15*a*(3*d^2 + 10*d*e*x^2 + 15*e^2*x^4) + b*n*(9*d^2 + 50*d*e*x^2 +
225*e^2*x^4) + 15*b*(3*d^2 + 10*d*e*x^2 + 15*e^2*x^4)*Log[c*x^n])/x^5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 419, normalized size = 4.60

method	result
risch	$-\frac{b(15e^2x^4+10de\,x^2+3d^2)\ln(x^n)}{15x^5}-\frac{-225i\pi b\,e^2x^4\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)-45i\pi b\,d^2\text{csgn}(ic\,x^n)^3+225i\pi b\,e^2x^4\text{csgn}(ix^n)\text{csg}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/15*b*(15*e^2*x^4+10*d*e*x^2+3*d^2)/x^5*ln(x^n)-1/450*(-225*I*Pi*b*e^2*x^
4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-45*I*Pi*b*d^2*csgn(I*c*x^n)^3+225*I*P
i*b*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+45*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*
x^n)^2+450*ln(c)*b*e^2*x^4+450*b*e^2*n*x^4+450*x^4*a*e^2+150*I*Pi*b*d*e*x^2
*csgn(I*x^n)*csgn(I*c*x^n)^2+150*I*Pi*b*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-1
50*I*Pi*b*d*e*x^2*csgn(I*c*x^n)^3-45*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(
```

```
I*c*x^n)+300*ln(c)*b*d*e*x^2+100*b*d*e*n*x^2+300*x^2*a*d*e-225*I*Pi*b*e^2*x
^4*csgn(I*c*x^n)^3-150*I*Pi*b*d*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2
25*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+45*I*Pi*b*d^2*csgn(I*c)*csgn(I*
c*x^n)^2+90*d^2*b*ln(c)+18*b*d^2*n+90*a*d^2)/x^5
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.10

$$-\frac{bne^2}{x}-\frac{be^2\log\left(cx^n\right)}{x}-\frac{ae^2}{x}-\frac{2\,bdne}{9\,x^3}-\frac{2\,bde\log\left(cx^n\right)}{3\,x^3}-\frac{2\,ade}{3\,x^3}-\frac{bd^2n}{25\,x^5}-\frac{bd^2\log\left(cx^n\right)}{5\,x^5}-\frac{ad^2}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] -b*n*e^2/x - b*e^2*log(c*x^n)/x - a*e^2/x - 2/9*b*d*n*e/x^3 - 2/3*b*d*e*log
(c*x^n)/x^3 - 2/3*a*d*e/x^3 - 1/25*b*d^2*n/x^5 - 1/5*b*d^2*log(c*x^n)/x^5 -
 1/5*a*d^2/x^5
```

Fricas [A]
time = 0.39, size = 106, normalized size = 1.16

$$-\frac{225\,(bn+a)x^4e^2+9\,bd^2n+50\,(bdn+3\,ad)x^2e+45\,ad^2+15\,(15\,bx^4e^2+10\,bdx^2e+3\,bd^2)\log\left(c\right)+15\,(15\,bnx^4e^2+10\,bdnx^2e+3\,bd^2n)\log\left(x\right)}{225\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/225*(225*(b*n + a)*x^4*e^2 + 9*b*d^2*n + 50*(b*d*n + 3*a*d)*x^2*e + 45*a
*d^2 + 15*(15*b*x^4*e^2 + 10*b*d*x^2*e + 3*b*d^2)*log(c) + 15*(15*b*n*x^4*e
^2 + 10*b*d*n*x^2*e + 3*b*d^2*n)*log(x))/x^5
```

Sympy [A]
time = 0.90, size = 112, normalized size = 1.23

$$-\frac{ad^2}{5x^5}-\frac{2ade}{3x^3}-\frac{ae^2}{x}-\frac{bd^2n}{25x^5}-\frac{bd^2\log\left(cx^n\right)}{5x^5}-\frac{2bden}{9x^3}-\frac{2bde\log\left(cx^n\right)}{3x^3}-\frac{be^2n}{x}-\frac{be^2\log\left(cx^n\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] -a*d**2/(5*x**5) - 2*a*d*e/(3*x**3) - a*e**2/x - b*d**2*n/(25*x**5) - b*d**
2*log(c*x**n)/(5*x**5) - 2*b*d*e*n/(9*x**3) - 2*b*d*e*log(c*x**n)/(3*x**3)
- b*e**2*n/x - b*e**2*log(c*x**n)/x
```

Giac [A]
time = 3.95, size = 116, normalized size = 1.27

$$-\frac{225\,bnx^4e^2\log\left(x\right)+225\,bnx^4e^2+225\,bx^4e^2\log\left(c\right)+150\,bdnx^2e\log\left(x\right)+225\,ax^4e^2+50\,bdnx^2e+150\,bdx^2e\log\left(c\right)+150\,adx^2e+45\,bd^2n\log\left(x\right)+9\,bd^2n+45\,bd^2\log\left(c\right)+45\,ad^2}{225\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] -1/225*(225*b*n*x^4*e^2*log(x) + 225*b*n*x^4*e^2 + 225*b*x^4*e^2*log(c) + 1
50*b*d*n*x^2*e*log(x) + 225*a*x^4*e^2 + 50*b*d*n*x^2*e + 150*b*d*x^2*e*log(
c) + 150*a*d*x^2*e + 45*b*d^2*n*log(x) + 9*b*d^2*n + 45*b*d^2*log(c) + 45*a
*d^2)/x^5
```

Mupad [B]
time = 3.51, size = 88, normalized size = 0.97

$$-\frac{x^4\,\left(15\,a\,e^2+15\,b\,e^2\,n\right)+x^2\,\left(10\,a\,d\,e+\frac{10\,b\,d\,e\,n}{3}\right)+3\,a\,d^2+\frac{3\,b\,d^2\,n}{5}}{15\,x^5}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{5}+\frac{2\,b\,d\,e\,x^2}{3}+b\,e^2\,x^4\right)}{x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^6,x)
```

```
[Out] - (x^4*(15*a*e^2 + 15*b*e^2*n) + x^2*(10*a*d*e + (10*b*d*e*n)/3) + 3*a*d^2
+ (3*b*d^2*n)/5)/(15*x^5) - (log(c*x^n)*((b*d^2)/5 + b*e^2*x^4 + (2*b*d*e*x
^2)/3))/x^5
```

3.195 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx$

Optimal. Leaf size=95

$$-\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

```
[Out] -1/49*b*d^2*n/x^7-2/25*b*d*e*n/x^5-1/9*b*e^2*n/x^3-1/7*d^2*(a+b*ln(c*x^n))/
x^7-2/5*d*e*(a+b*ln(c*x^n))/x^5-1/3*e^2*(a+b*ln(c*x^n))/x^3
```

Rubi [A]
time = 0.06, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}-\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^2*n)/x^7 - (2*b*d*e*n)/(25*x^5) - (b*e^2*n)/(9*x^3) - (d^2*(a +
b*Log[c*x^n]))/(7*x^7) - (2*d*e*(a + b*Log[c*x^n]))/(5*x^5) - (e^2*(a + b*L
og[c*x^n]))/(3*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
```

```
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx = -\frac{1}{105}\left(\frac{15d^2}{x^7}+\frac{42de}{x^5}+\frac{35e^2}{x^3}\right)(a+b\log(cx^n))-(bn)\int\frac{-15d^2-42de}{105}$$
$$= -\frac{1}{105}\left(\frac{15d^2}{x^7}+\frac{42de}{x^5}+\frac{35e^2}{x^3}\right)(a+b\log(cx^n))-\frac{1}{105}(bn)\int\frac{-15d^2-}{}$$
$$= -\frac{1}{105}\left(\frac{15d^2}{x^7}+\frac{42de}{x^5}+\frac{35e^2}{x^3}\right)(a+b\log(cx^n))-\frac{1}{105}(bn)\int\left(-\frac{15d^2}{x^8}\right.$$
$$= -\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{1}{105}\left(\frac{15d^2}{x^7}+\frac{42de}{x^5}+\frac{35e^2}{x^3}\right)(a+b\log(cx^n)$$

Mathematica [A]
time = 0.03, size = 95, normalized size = 1.00

$$-\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^2*n)/x^7 - (2*b*d*e*n)/(25*x^5) - (b*e^2*n)/(9*x^3) - (d^2*(a +
b*Log[c*x^n]))/(7*x^7) - (2*d*e*(a + b*Log[c*x^n]))/(5*x^5) - (e^2*(a + b*L
og[c*x^n]))/(3*x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 419, normalized size = 4.41

method	result
risch	$-\frac{b(35e^2x^4+42de\,x^2+15d^2)\ln(x^n)}{105x^7}-\frac{-4410i\pi bde\,x^2\text{csgn}(ic\,x^n)^3-1575i\pi b\,d^2\text{csgn}(ic\,x^n)^3+1575i\pi b\,d^2\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2+15}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

```
[Out] -1/105*b*(35*e^2*x^4+42*d*e*x^2+15*d^2)/x^7*ln(x^n)-1/22050*(-4410*I*Pi*b*d
*e*x^2*csgn(I*c*x^n)^3-1575*I*Pi*b*d^2*csgn(I*c*x^n)^3+1575*I*Pi*b*d^2*csgn
(I*x^n)*csgn(I*c*x^n)^2+1575*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+7350*ln(c
)*b*e^2*x^4+2450*b*e^2*n*x^4+7350*x^4*a*e^2-4410*I*Pi*b*d*e*x^2*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)-1575*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
```

```
)+3675*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-3675*I*Pi*b*e^2*x^4*csgn(I*
c*x^n)^3+8820*ln(c)*b*d*e*x^2+1764*b*d*e*n*x^2+8820*x^2*a*d*e+3675*I*Pi*b*e
^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+4410*I*Pi*b*d*e*x^2*csgn(I*c)*csgn(I*c*x
^n)^2-3675*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4410*I*Pi*b*d
*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+3150*d^2*b*ln(c)+450*b*d^2*n+3150*a*d^2)
/x^7
```

Maxima [A]
time = 0.27, size = 100, normalized size = 1.05

$$-\frac{bne^2}{9\,x^3}-\frac{be^2\log\left(cx^n\right)}{3\,x^3}-\frac{ae^2}{3\,x^3}-\frac{2\,bdne}{25\,x^5}-\frac{2\,bde\log\left(cx^n\right)}{5\,x^5}-\frac{2\,ade}{5\,x^5}-\frac{bd^2n}{49\,x^7}-\frac{bd^2\log\left(cx^n\right)}{7\,x^7}-\frac{ad^2}{7\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*e^2/x^3 - 1/3*b*e^2*log(c*x^n)/x^3 - 1/3*a*e^2/x^3 - 2/25*b*d*n*e/
x^5 - 2/5*b*d*e*log(c*x^n)/x^5 - 2/5*a*d*e/x^5 - 1/49*b*d^2*n/x^7 - 1/7*b*d
^2*log(c*x^n)/x^7 - 1/7*a*d^2/x^7
```

Fricas [A]
time = 0.35, size = 108, normalized size = 1.14

$$-\frac{1225\,(bn+3\,a)x^4e^2+225\,bd^2n+882\,(bdn+5\,ad)x^2e+1575\,ad^2+105\,(35\,bx^4e^2+42\,bdx^2e+15\,bd^2)\log\left(c\right)+105\,(35\,bnx^4e^2+42\,bdnx^2e+15\,bd^2n)\log\left(x\right)}{11025\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

```
[Out] -1/11025*(1225*(b*n + 3*a)*x^4*e^2 + 225*b*d^2*n + 882*(b*d*n + 5*a*d)*x^2*
e + 1575*a*d^2 + 105*(35*b*x^4*e^2 + 42*b*d*x^2*e + 15*b*d^2)*log(c) + 105*
(35*b*n*x^4*e^2 + 42*b*d*n*x^2*e + 15*b*d^2*n)*log(x))/x^7
```

Sympy [A]
time = 1.59, size = 122, normalized size = 1.28

$$-\frac{ad^2}{7x^7}-\frac{2ade}{5x^5}-\frac{ae^2}{3x^3}-\frac{bd^2n}{49x^7}-\frac{bd^2\log\left(cx^n\right)}{7x^7}-\frac{2bden}{25x^5}-\frac{2bde\log\left(cx^n\right)}{5x^5}-\frac{be^2n}{9x^3}-\frac{be^2\log\left(cx^n\right)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**8,x)
```

```
[Out] -a*d**2/(7*x**7) - 2*a*d*e/(5*x**5) - a*e**2/(3*x**3) - b*d**2*n/(49*x**7)
- b*d**2*log(c*x**n)/(7*x**7) - 2*b*d*e*n/(25*x**5) - 2*b*d*e*log(c*x**n)/(
5*x**5) - b*e**2*n/(9*x**3) - b*e**2*log(c*x**n)/(3*x**3)
```

Giac [A]
time = 4.45, size = 116, normalized size = 1.22

$$-\frac{3675\,bnx^4e^2\log\left(x\right)+1225\,bnx^4e^2+3675\,bx^4e^2\log\left(c\right)+4410\,bdnx^2e\log\left(x\right)+3675\,ax^4e^2+882\,bdnx^2e+4410\,bdx^2e\log\left(c\right)+4410\,adx^2e+1575\,bd^2n\log\left(x\right)+225\,bd^2n+1575\,bd^2\log\left(c\right)+1575\,ad^2}{11025\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

```
[Out] -1/11025*(3675*b*n*x^4*e^2*log(x) + 1225*b*n*x^4*e^2 + 3675*b*x^4*e^2*log(c
) + 4410*b*d*n*x^2*e*log(x) + 3675*a*x^4*e^2 + 882*b*d*n*x^2*e + 4410*b*d*x
^2*e*log(c) + 4410*a*d*x^2*e + 1575*b*d^2*n*log(x) + 225*b*d^2*n + 1575*b*d
^2*log(c) + 1575*a*d^2)/x^7
```

Mupad [B]
time = 3.55, size = 89, normalized size = 0.94

$$-\frac{x^4\left(35\,a\,e^2+\frac{35\,b\,e^2\,n}{3}\right)+x^2\left(42\,a\,d\,e+\frac{42\,b\,d\,e\,n}{5}\right)+15\,a\,d^2+\frac{15\,b\,d^2\,n}{7}}{105\,x^7}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2}{7}+\frac{2\,b\,d\,e\,x^2}{5}+\frac{b\,e^2\,x^4}{3}\right)}{x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^8,x)
```

```
[Out] - (x^4*(35*a*e^2 + (35*b*e^2*n)/3) + x^2*(42*a*d*e + (42*b*d*e*n)/5) + 15*a
*d^2 + (15*b*d^2*n)/7)/(105*x^7) - (log(c*x^n)*((b*d^2)/7 + (b*e^2*x^4)/3 +
 (2*b*d*e*x^2)/5))/x^7
```

3.196 $\int x^5(d+ex^2)^3 (a+b\log(cx^n)) \, dx$

Optimal. Leaf size=100

$$-\frac{1}{36}bd^3nx^6-\frac{3}{64}bd^2enx^8-\frac{3}{100}bde^2nx^{10}-\frac{1}{144}be^3nx^{12}+\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)(a+b\log$$

```
[Out] -1/36*b*d^3*n*x^6-3/64*b*d^2*e*n*x^8-3/100*b*d*e^2*n*x^10-1/144*b*e^3*n*x^1
2+1/120*(10*e^3*x^12+36*d*e^2*x^10+45*d^2*e*x^8+20*d^3*x^6)*(a+b*ln(c*x^n))
```

Rubi [A]

time = 0.07, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {272, 45, 2371, 12, 14}

$$\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)(a+b\log(cx^n))-\frac{1}{36}bd^3nx^6-\frac{3}{64}bd^2enx^8-\frac{3}{100}bde^2nx^{10}-\frac{1}{144}be^3nx^{12}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/36*(b*d^3*n*x^6) - (3*b*d^2*e*n*x^8)/64 - (3*b*d*e^2*n*x^10)/100 - (b*e^
3*n*x^12)/144 + ((20*d^3*x^6 + 45*d^2*e*x^8 + 36*d*e^2*x^10 + 10*e^3*x^12)*
(a + b*Log[c*x^n]))/120
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
```

```
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^5\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)\left(a+b\log\left(cx^n\right)\right)-(bn$$
$$=\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{120}$$
$$=\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{120}$$
$$=-\frac{1}{36}bd^3nx^6-\frac{3}{64}bd^2enx^8-\frac{3}{100}bde^2nx^{10}-\frac{1}{144}be^3nx^{12}+\frac{1}{120}\left(20d^3\right.$$

Mathematica [A]
time = 0.04, size = 120, normalized size = 1.20

$$\frac{x^6\left(120a\left(20d^3+45d^2ex^2+36de^2x^4+10e^3x^6\right)-bn\left(400d^3+675d^2ex^2+432de^2x^4+100e^3x^6\right)+120b\left(20d^3+45d^2ex^2+36de^2x^4+10e^3x^6\right)\log\left(cx^n\right)\right)}{14400}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^6*(120*a*(20*d^3 + 45*d^2*e*x^2 + 36*d*e^2*x^4 + 10*e^3*x^6) - b*n*(400*
d^3 + 675*d^2*e*x^2 + 432*d*e^2*x^4 + 100*e^3*x^6) + 120*b*(20*d^3 + 45*d^2
*e*x^2 + 36*d*e^2*x^4 + 10*e^3*x^6)*Log[c*x^n]))/14400
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 109.90, size = 602, normalized size = 6.02

method	result
risch	$\frac{x^6 a\,d^3}{6}+\frac{x^{12} a\,e^3}{12}+\frac{3ad\,e^2x^{10}}{10}+\frac{3a\,d^2e\,x^8}{8}-\frac{i\pi b\,d^3x^6\mathrm{csgn}(ic\,x^n)^3}{12}-\frac{i\pi b\,e^3x^{12}\mathrm{csgn}(ic\,x^n)^3}{24}-\frac{3i\pi bd\,e^2x^{10}\mathrm{csgn}(ic)\mathrm{csgn}(ix^n}{20}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*x^6*a*d^3+1/12*x^12*a*e^3+3/10*a*d*e^2*x^10+3/8*a*d^2*e*x^8-1/12*I*Pi*b
*d^3*x^6*csgn(I*c*x^n)^3-1/24*I*Pi*b*e^3*x^12*csgn(I*c*x^n)^3+1/24*I*Pi*b*e
^3*x^12*csgn(I*c)*csgn(I*c*x^n)^2+1/24*I*Pi*b*e^3*x^12*csgn(I*x^n)*csgn(I*c
*x^n)^2-3/20*I*Pi*b*d*e^2*x^10*csgn(I*c*x^n)^3+1/12*I*Pi*b*d^3*x^6*csgn(I*c
)*csgn(I*c*x^n)^2+1/12*I*Pi*b*d^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2+3/20*I*Pi
*b*d*e^2*x^10*csgn(I*c)*csgn(I*c*x^n)^2+3/20*I*Pi*b*d*e^2*x^10*csgn(I*x^n)*
csgn(I*c*x^n)^2+3/16*I*Pi*b*d^2*e*x^8*csgn(I*c)*csgn(I*c*x^n)^2+3/16*I*Pi*b
*d^2*e*x^8*csgn(I*x^n)*csgn(I*c*x^n)^2-1/36*b*d^3*n*x^6-1/144*b*e^3*n*x^12+
1/6*ln(c)*b*d^3*x^6+1/12*ln(c)*b*e^3*x^12+1/120*b*x^6*(10*e^3*x^6+36*d*e^2*
x^4+45*d^2*e*x^2+20*d^3)*ln(x^n)-3/20*I*Pi*b*d*e^2*x^10*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-3/16*I*Pi*b*d^2*e*x^8*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-
3/64*b*d^2*e*n*x^8-3/100*b*d*e^2*n*x^10-3/16*I*Pi*b*d^2*e*x^8*csgn(I*c*x^n)
^3-1/12*I*Pi*b*d^3*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/24*I*Pi*b*e^3*
x^12*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3/10*ln(c)*b*d*e^2*x^10+3/8*ln(c)*
b*d^2*e*x^8
```

Maxima [A]
time = 0.27, size = 140, normalized size = 1.40

$$-\frac{1}{144}\,bnx^{12}e^3+\frac{1}{12}\,bx^{12}e^3\log\left(cx^n\right)+\frac{1}{12}\,ax^{12}e^3-\frac{3}{100}\,bdnx^{10}e^2+\frac{3}{10}\,bdx^{10}e^2\log\left(cx^n\right)+\frac{3}{10}\,adx^{10}e^2-\frac{3}{64}\,bd^2nx^8e+\frac{3}{8}\,bd^2x^8e\log\left(cx^n\right)+\frac{3}{8}\,ad^2x^8e-\frac{1}{36}\,bd^3nx^6+\frac{1}{6}\,bd^3x^6\log\left(cx^n\right)+\frac{1}{6}\,ad^3x^6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/144*b*n*x^12*e^3 + 1/12*b*x^12*e^3*log(c*x^n) + 1/12*a*x^12*e^3 - 3/100*
b*d*n*x^10*e^2 + 3/10*b*d*x^10*e^2*log(c*x^n) + 3/10*a*d*x^10*e^2 - 3/64*b*
d^2*n*x^8*e + 3/8*b*d^2*x^8*e*log(c*x^n) + 3/8*a*d^2*x^8*e - 1/36*b*d^3*n*x
^6 + 1/6*b*d^3*x^6*log(c*x^n) + 1/6*a*d^3*x^6
```

Fricas [A]
time = 0.38, size = 157, normalized size = 1.57

$$-\frac{1}{144}\,(bn-12\,a)x^{12}e^3-\frac{3}{100}\,(bdn-10\,ad)x^{10}e^2-\frac{3}{64}\,(bd^2n-8\,ad^2)x^8e-\frac{1}{36}\,(bd^3n-6\,ad^3)x^6+\frac{1}{120}\,(10\,bx^{12}e^3+36\,bdx^{10}e^2+45\,bd^2x^8e+20\,bd^3x^6)\log\left(c\right)+\frac{1}{120}\,(10\,bnx^{12}e^3+36\,bdnx^{10}e^2+45\,bd^2nx^8e+20\,bd^3nx^6)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/144*(b*n - 12*a)*x^12*e^3 - 3/100*(b*d*n - 10*a*d)*x^10*e^2 - 3/64*(b*d^
2*n - 8*a*d^2)*x^8*e - 1/36*(b*d^3*n - 6*a*d^3)*x^6 + 1/120*(10*b*x^12*e^3
+ 36*b*d*x^10*e^2 + 45*b*d^2*x^8*e + 20*b*d^3*x^6)*log(c) + 1/120*(10*b*n*x
^12*e^3 + 36*b*d*n*x^10*e^2 + 45*b*d^2*n*x^8*e + 20*b*d^3*n*x^6)*log(x)
```

Sympy [A]
time = 4.34, size = 175, normalized size = 1.75

$$\frac{ad^3x^6}{6}+\frac{3ad^2ex^8}{8}+\frac{3ade^2x^{10}}{10}+\frac{ae^3x^{12}}{12}-\frac{bd^3nx^6}{36}+\frac{bd^3x^6\log\left(cx^n\right)}{6}-\frac{3bd^2enx^8}{64}+\frac{3bd^2ex^8\log\left(cx^n\right)}{8}-\frac{3bde^2nx^{10}}{100}+\frac{3bde^2x^{10}\log\left(cx^n\right)}{10}-\frac{be^3nx^{12}}{144}+\frac{be^3x^{12}\log\left(cx^n\right)}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**6/6 + 3*a*d**2*e*x**8/8 + 3*a*d*e**2*x**10/10 + a*e**3*x**12/12 -
 b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 - 3*b*d**2*e*n*x**8/64 + 3*b*
d**2*e*x**8*log(c*x**n)/8 - 3*b*d*e**2*n*x**10/100 + 3*b*d*e**2*x**10*log(c
*x**n)/10 - b*e**3*n*x**12/144 + b*e**3*x**12*log(c*x**n)/12
```

Giac [A]
time = 12.08, size = 173, normalized size = 1.73

$$\frac{1}{12}\,bnx^{12}e^{3}\log\left(x\right)-\frac{1}{144}\,bnx^{12}e^{3}+\frac{1}{12}\,bx^{12}e^{3}\log\left(c\right)+\frac{3}{10}\,bdnx^{10}e^{2}\log\left(x\right)+\frac{1}{12}\,ax^{12}e^{3}-\frac{3}{100}\,bdnx^{10}e^{2}+\frac{3}{10}\,bdx^{10}e^{2}\log\left(c\right)+\frac{3}{8}\,bd^{2}nx^{8}e\log\left(x\right)+\frac{3}{10}\,adx^{10}e^{2}-\frac{3}{64}\,bd^{2}nx^{8}e+\frac{3}{8}\,bd^{2}x^{8}e\log\left(c\right)+\frac{3}{8}\,ad^{2}x^{8}e+\frac{1}{6}\,bd^{3}nx^{6}\log\left(x\right)-\frac{1}{36}\,bd^{3}nx^{6}+\frac{1}{6}\,bd^{3}x^{6}\log\left(c\right)+\frac{1}{6}\,ad^{3}x^{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/12*b*n*x^12*e^3*log(x) - 1/144*b*n*x^12*e^3 + 1/12*b*x^12*e^3*log(c) + 3/
10*b*d*n*x^10*e^2*log(x) + 1/12*a*x^12*e^3 - 3/100*b*d*n*x^10*e^2 + 3/10*b*
d*x^10*e^2*log(c) + 3/8*b*d^2*n*x^8*e*log(x) + 3/10*a*d*x^10*e^2 - 3/64*b*d
^2*n*x^8*e + 3/8*b*d^2*x^8*e*log(c) + 3/8*a*d^2*x^8*e + 1/6*b*d^3*n*x^6*log
(x) - 1/36*b*d^3*n*x^6 + 1/6*b*d^3*x^6*log(c) + 1/6*a*d^3*x^6
```

Mupad [B]
time = 3.52, size = 113, normalized size = 1.13

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^6}{6}+\frac{3\,b\,d^2\,e\,x^8}{8}+\frac{3\,b\,d\,e^2\,x^{10}}{10}+\frac{b\,e^3\,x^{12}}{12}\right)+\frac{d^3\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{e^3\,x^{12}\,\left(12\,a-b\,n\right)}{144}+\frac{3\,d^2\,e\,x^8\,\left(8\,a-b\,n\right)}{64}+\frac{3\,d\,e^2\,x^{10}\,\left(10\,a-b\,n\right)}{100}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^3*x^6)/6 + (b*e^3*x^12)/12 + (3*b*d^2*e*x^8)/8 + (3*b*d*e^
2*x^10)/10) + (d^3*x^6*(6*a - b*n))/36 + (e^3*x^12*(12*a - b*n))/144 + (3*d
^2*e*x^8*(8*a - b*n))/64 + (3*d*e^2*x^10*(10*a - b*n))/100
```

3.197 $\int x^3(d+ex^2)^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=130

$$\frac{bd^4nx^2}{20e}+\frac{3}{80}bd^3nx^4+\frac{1}{60}bd^2enx^6+\frac{1}{320}bde^2nx^8-\frac{bn(d+ex^2)^5}{100e^2}+\frac{bd^5n\log(x)}{40e^2}-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right.$$

```
[Out] 1/20*b*d^4*n*x^2/e+3/80*b*d^3*n*x^4+1/60*b*d^2*e*n*x^6+1/320*b*d*e^2*n*x^8-
1/100*b*n*(e*x^2+d)^5/e^2+1/40*b*d^5*n*ln(x)/e^2-1/40*(5*d*(e*x^2+d)^4/e^2-
4*(e*x^2+d)^5/e^2)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.10, antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.261$,
Rules used = {272, 45, 2371, 12, 457, 81}

$$-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)+\frac{bd^5n\log(x)}{40e^2}+\frac{bd^4nx^2}{20e}+\frac{3}{80}bd^3nx^4+\frac{1}{60}bd^2enx^6+\frac{1}{320}bde^2nx^8-\frac{bn(d+ex^2)^5}{100e^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (b*d^4*n*x^2)/(20*e) + (3*b*d^3*n*x^4)/80 + (b*d^2*e*n*x^6)/60 + (b*d*e^2*n
*x^8)/320 - (b*n*(d + e*x^2)^5)/(100*e^2) + (b*d^5*n*Log[x])/(40*e^2) - (((
5*d*(d + e*x^2)^4)/e^2 - (4*(d + e*x^2)^5)/e^2)*(a + b*Log[c*x^n]))/40
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^3\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{(d+$$

$$=-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{(bn)\int\frac{(d+ex^2}{}}{40}$$

$$=-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{(bn)\mathrm{Subst}\Big(}{}$$

$$=-\frac{bn\left(d+ex^2\right)^5}{100e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$=-\frac{bn\left(d+ex^2\right)^5}{100e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$=\frac{bd^4nx^2}{20e}+\frac{3}{80}bd^3nx^4+\frac{1}{60}bd^2enx^6+\frac{1}{320}bde^2nx^8-\frac{bn\left(d+ex^2\right)^5}{100e^2}+\frac{b}{}$$

Mathematica [A]

time = 0.04, size = 120, normalized size = 0.92

$$\frac{x^4\left(120a\left(10d^3+20d^2ex^2+15de^2x^4+4e^3x^6\right)-bn\left(300d^3+400d^2ex^2+225de^2x^4+48e^3x^6\right)+120b\left(10d^3+20d^2ex^2+15de^2x^4+4e^3x^6\right)\log\left(cx^n\right)\right)}{4800}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^4*(120*a*(10*d^3 + 20*d^2*e*x^2 + 15*d*e^2*x^4 + 4*e^3*x^6) - b*n*(300*d
^3 + 400*d^2*e*x^2 + 225*d*e^2*x^4 + 48*e^3*x^6) + 120*b*(10*d^3 + 20*d^2*e
*x^2 + 15*d*e^2*x^4 + 4*e^3*x^6)*Log[c*x^n]))/4800
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 602, normalized size = 4.63

method	result
risch	$\frac{x^4 a\, d^3}{4}+\frac{x^{10} a\, e^3}{10}-\frac{b\, e^3 n\, x^{10}}{100}+\frac{3 a d\, e^2 x^8}{8}-\frac{i \pi b\, d^3 x^4 \mathrm{csgn}(i c) \mathrm{csgn}(i x^n) \mathrm{csgn}(i c\, x^n)}{8}-\frac{i \pi b\, e^3 x^{10} \mathrm{csgn}(i c) \mathrm{csgn}(i x^n) \mathrm{csgn}(i c\, x^n)}{20}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*a*d^3+1/10*x^10*a*e^3-1/100*b*e^3*n*x^10+3/8*a*d*e^2*x^8+1/2*a*d^2*
e*x^6+3/16*I*Pi*b*d*e^2*x^8*csgn(I*c)*csgn(I*c*x^n)^2+1/40*b*x^4*(4*e^3*x^6
+15*d*e^2*x^4+20*d^2*e*x^2+10*d^3)*ln(x^n)+1/10*ln(c)*b*e^3*x^10+3/16*I*Pi*
b*d*e^2*x^8*csgn(I*x^n)*csgn(I*c*x^n)^2-1/8*I*Pi*b*d^3*x^4*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)-1/20*I*Pi*b*e^3*x^10*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+1/2*ln(c)*b*d^2*e*x^6+3/8*ln(c)*b*d*e^2*x^8+1/8*I*Pi*b*d^3*x^4*csgn(I*x^n
)*csgn(I*c*x^n)^2+1/4*I*Pi*b*d^2*e*x^6*csgn(I*c)*csgn(I*c*x^n)^2+1/4*I*Pi*b
*d^2*e*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2+1/20*I*Pi*b*e^3*x^10*csgn(I*c)*csgn(
I*c*x^n)^2-1/4*I*Pi*b*d^2*e*x^6*csgn(I*c*x^n)^3-1/8*I*Pi*b*d^3*x^4*csgn(I*c
*x^n)^3-1/16*b*d^3*n*x^4-3/16*I*Pi*b*d*e^2*x^8*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)-1/12*b*d^2*e*n*x^6-3/64*b*d*e^2*n*x^8+1/8*I*Pi*b*d^3*x^4*csgn(I*c)*
csgn(I*c*x^n)^2-3/16*I*Pi*b*d*e^2*x^8*csgn(I*c*x^n)^3+1/20*I*Pi*b*e^3*x^10*
csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I*Pi*b*d^2*e*x^6*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)-1/20*I*Pi*b*e^3*x^10*csgn(I*c*x^n)^3+1/4*ln(c)*b*d^3*x^4
```

Maxima [A]
time = 0.26, size = 140, normalized size = 1.08

$$-\frac{1}{100}\, b n x^{10} e^3+\frac{1}{10}\, b x^{10} e^3 \log\left(c x^n\right)+\frac{1}{10}\, a x^{10} e^3-\frac{3}{64}\, b d n x^8 e^2+\frac{3}{8}\, b d x^8 e^2 \log\left(c x^n\right)+\frac{3}{8}\, a d x^8 e^2-\frac{1}{12}\, b d^2 n x^6 e+\frac{1}{2}\, b d^2 x^6 e \log\left(c x^n\right)+\frac{1}{2}\, a d^2 x^6 e-\frac{1}{16}\, b d^3 n x^4+\frac{1}{4}\, b d^3 x^4 \log\left(c x^n\right)+\frac{1}{4}\, a d^3 x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/100*b*n*x^10*e^3 + 1/10*b*x^10*e^3*log(c*x^n) + 1/10*a*x^10*e^3 - 3/64*b
*d*n*x^8*e^2 + 3/8*b*d*x^8*e^2*log(c*x^n) + 3/8*a*d*x^8*e^2 - 1/12*b*d^2*n*
x^6*e + 1/2*b*d^2*x^6*e*log(c*x^n) + 1/2*a*d^2*x^6*e - 1/16*b*d^3*n*x^4 + 1
/4*b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4
```

Fricas [A]
time = 0.40, size = 157, normalized size = 1.21

$$-\frac{1}{100}\left(bn-10\,a\right)x^{10}e^{3}-\frac{3}{64}\left(bdn-8\,ad\right)x^{8}e^{2}-\frac{1}{12}\left(bd^{2}n-6\,ad^{2}\right)x^{6}e-\frac{1}{16}\left(bd^{3}n-4\,ad^{3}\right)x^{4}+\frac{1}{40}\left(4\,bx^{10}e^{3}+15\,bdx^{8}e^{2}+20\,bd^{2}x^{6}e+10\,bd^{3}x^{4}\right)\log\left(c\right)+\frac{1}{40}\left(4\,bnx^{10}e^{3}+15\,bdnx^{8}e^{2}+20\,bd^{2}nx^{6}e+10\,bd^{3}nx^{4}\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/100*(b*n - 10*a)*x^10*e^3 - 3/64*(b*d*n - 8*a*d)*x^8*e^2 - 1/12*(b*d^2*n
 - 6*a*d^2)*x^6*e - 1/16*(b*d^3*n - 4*a*d^3)*x^4 + 1/40*(4*b*x^10*e^3 + 15*
b*d*x^8*e^2 + 20*b*d^2*x^6*e + 10*b*d^3*x^4)*log(c) + 1/40*(4*b*n*x^10*e^3
+ 15*b*d*n*x^8*e^2 + 20*b*d^2*n*x^6*e + 10*b*d^3*n*x^4)*log(x)
```

Sympy [A]
time = 2.48, size = 170, normalized size = 1.31

$$\frac{ad^{3}x^{4}}{4}+\frac{ad^{2}ex^{6}}{2}+\frac{3ade^{2}x^{8}}{8}+\frac{ae^{3}x^{10}}{10}-\frac{bd^{3}nx^{4}}{16}+\frac{bd^{3}x^{4}\log\left(cx^{n}\right)}{4}-\frac{bd^{2}enx^{6}}{12}+\frac{bd^{2}ex^{6}\log\left(cx^{n}\right)}{2}-\frac{3bde^{2}nx^{8}}{64}+\frac{3bde^{2}x^{8}\log\left(cx^{n}\right)}{8}-\frac{be^{3}nx^{10}}{100}+\frac{be^{3}x^{10}\log\left(cx^{n}\right)}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**4/4 + a*d**2*e*x**6/2 + 3*a*d*e**2*x**8/8 + a*e**3*x**10/10 - b*d
**3*n*x**4/16 + b*d**3*x**4*log(c*x**n)/4 - b*d**2*e*n*x**6/12 + b*d**2*e*x
**6*log(c*x**n)/2 - 3*b*d*e**2*n*x**8/64 + 3*b*d*e**2*x**8*log(c*x**n)/8 -
b*e**3*n*x**10/100 + b*e**3*x**10*log(c*x**n)/10
```

Giac [A]
time = 4.41, size = 173, normalized size = 1.33

$$\frac{1}{10}\,bnx^{10}e^{3}\log\left(x\right)-\frac{1}{100}\,bnx^{10}e^{3}+\frac{1}{10}\,bx^{10}e^{3}\log\left(c\right)+\frac{3}{8}\,bdnx^{8}e^{2}\log\left(x\right)+\frac{1}{10}\,ax^{10}e^{3}-\frac{3}{64}\,bdnx^{8}e^{2}+\frac{3}{8}\,bdx^{8}e^{2}\log\left(c\right)+\frac{1}{2}\,bd^{2}nx^{6}e\log\left(x\right)+\frac{3}{8}\,adx^{8}e^{2}-\frac{1}{12}\,bd^{2}nx^{6}e+\frac{1}{2}\,bd^{2}x^{6}e\log\left(c\right)+\frac{1}{2}\,ad^{2}x^{6}e+\frac{1}{4}\,bd^{3}nx^{4}\log\left(x\right)-\frac{1}{16}\,bd^{3}nx^{4}+\frac{1}{4}\,bd^{3}x^{4}\log\left(c\right)+\frac{1}{4}\,ad^{3}x^{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/10*b*n*x^10*e^3*log(x) - 1/100*b*n*x^10*e^3 + 1/10*b*x^10*e^3*log(c) + 3/
8*b*d*n*x^8*e^2*log(x) + 1/10*a*x^10*e^3 - 3/64*b*d*n*x^8*e^2 + 3/8*b*d*x^8
*e^2*log(c) + 1/2*b*d^2*n*x^6*e*log(x) + 3/8*a*d*x^8*e^2 - 1/12*b*d^2*n*x^6
*e + 1/2*b*d^2*x^6*e*log(c) + 1/2*a*d^2*x^6*e + 1/4*b*d^3*n*x^4*log(x) - 1/
16*b*d^3*n*x^4 + 1/4*b*d^3*x^4*log(c) + 1/4*a*d^3*x^4
```

Mupad [B]
time = 3.48, size = 113, normalized size = 0.87

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^4}{4}+\frac{b\,d^2\,e\,x^6}{2}+\frac{3\,b\,d\,e^2\,x^8}{8}+\frac{b\,e^3\,x^{10}}{10}\right)+\frac{d^3\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{e^3\,x^{10}\,\left(10\,a-b\,n\right)}{100}+\frac{d^2\,e\,x^6\,\left(6\,a-b\,n\right)}{12}+\frac{3\,d\,e^2\,x^8\,\left(8\,a-b\,n\right)}{64}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^3*x^4)/4 + (b*e^3*x^10)/10 + (b*d^2*e*x^6)/2 + (3*b*d*e^2*
x^8)/8) + (d^3*x^4*(4*a - b*n))/16 + (e^3*x^10*(10*a - b*n))/100 + (d^2*e*x
^6*(6*a - b*n))/12 + (3*d*e^2*x^8*(8*a - b*n))/64
```

3.198 $\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=91

$$-\frac{1}{4}bd^3nx^2-\frac{3}{16}bd^2enx^4-\frac{1}{12}bde^2nx^6-\frac{1}{64}be^3nx^8-\frac{bd^4n\log(x)}{8e}+\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}$$

```
[Out] -1/4*b*d^3*n*x^2-3/16*b*d^2*e*n*x^4-1/12*b*d*e^2*n*x^6-1/64*b*e^3*n*x^8-1/8
*b*d^4*n*ln(x)/e+1/8*(e*x^2+d)^4*(a+b*ln(c*x^n))/e
```

Rubi [A]
time = 0.05, antiderivative size = 91, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {267, 2371, 12, 272, 45}

$$\frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{bd^4n\log(x)}{8e}-\frac{1}{4}bd^3nx^2-\frac{3}{16}bd^2enx^4-\frac{1}{12}bde^2nx^6-\frac{1}{64}be^3nx^8$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d^3*n*x^2) - (3*b*d^2*e*n*x^4)/16 - (b*d*e^2*n*x^6)/12 - (b*e^3*n*x
^8)/64 - (b*d^4*n*Log[x])/(8*e) + ((d + e*x^2)^4*(a + b*Log[c*x^n]))/(8*e)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 267

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
```

```
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x(d+ex^2)^3(a+b\log(cx^n))\,dx &= \frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-(bn)\int\frac{(d+ex^2)^4}{8ex}\,dx\\ &= \frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{(bn)\int\frac{(d+ex^2)^4}{x}\,dx}{8e}\\ &= \frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{(bn)\text{Subst}\left(\int\frac{(d+ex)^4}{x}\,dx,x,x^2\right)}{16e}\\ &= \frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}-\frac{(bn)\text{Subst}\left(\int\left(4d^3e+\frac{d^4}{x}+6d^2e^2x+4d\right.\right.}{16e}\\ &= -\frac{1}{4}bd^3nx^2-\frac{3}{16}bd^2enx^4-\frac{1}{12}bde^2nx^6-\frac{1}{64}be^3nx^8-\frac{bd^4n\log(x)}{8e}+\frac{(}{}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 118, normalized size = 1.30

$$\frac{1}{192}x^2\left(24a\left(4d^3+6d^2ex^2+4de^2x^4+e^3x^6\right)-bn\left(48d^3+36d^2ex^2+16de^2x^4+3e^3x^6\right)+24b\left(4d^3+6d^2ex^2+4de^2x^4+e^3x^6\right)\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(24*a*(4*d^3 + 6*d^2*e*x^2 + 4*d*e^2*x^4 + e^3*x^6) - b*n*(48*d^3 + 36
*d^2*e*x^2 + 16*d*e^2*x^4 + 3*e^3*x^6) + 24*b*(4*d^3 + 6*d^2*e*x^2 + 4*d*e^
2*x^4 + e^3*x^6)*Log[c*x^n]))/192
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.17, size = 591, normalized size = 6.49

method	result
risch	$\frac{3\ln(c)b\,d^2e\,x^4}{4}+\frac{x^8a\,e^3}{8}+\frac{3x^4a\,d^2e}{4}+\frac{\ln(c)b\,d^3x^2}{2}+\frac{a\,d^3x^2}{2}+\frac{\ln(c)b\,e^3x^8}{8}+\frac{(e\,x^2+d)^4b\ln(x^n)}{8e}-\frac{b\,d^3n\,x^2}{4}-\frac{3ie\pi b\,d^2x^4}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 3/4*ln(c)*b*d^2*e*x^4+1/8*x^8*a*e^3+3/4*x^4*a*d^2*e+1/2*ln(c)*b*d^3*x^2+1/2
*a*d^3*x^2+1/8*ln(c)*b*e^3*x^8+1/8*(e*x^2+d)^4*b/e*ln(x^n)-1/4*b*d^3*n*x^2-
3/8*I*e*Pi*b*d^2*x^4*csgn(I*c*x^n)^3-1/12*b*d*e^2*n*x^6-3/16*b*d^2*e*n*x^4-
1/64*b*e^3*n*x^8-1/4*I*Pi*b*d^3*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/4
*I*e^2*Pi*b*d*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/8*I*e*Pi*b*d^2*x^4*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I*Pi*b*d^3*x^2*csgn(I*c)*csgn(I*c*x
^n)^2+1/4*I*Pi*b*d^3*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1/16*I*e^3*Pi*b*x^8*cs
gn(I*c)*csgn(I*c*x^n)^2+1/16*I*e^3*Pi*b*x^8*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4
*I*e^2*Pi*b*d*x^6*csgn(I*c*x^n)^3-1/8*b*d^4*n*ln(x)/e-1/16*I*e^3*Pi*b*x^8*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/4*I*e^2*Pi*b*d*x^6*csgn(I*c)*csgn(I*c*
x^n)^2+1/4*I*e^2*Pi*b*d*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2+3/8*I*e*Pi*b*d^2*x^
4*csgn(I*c)*csgn(I*c*x^n)^2+3/8*I*e*Pi*b*d^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^
2-1/4*I*Pi*b*d^3*x^2*csgn(I*c*x^n)^3-1/16*I*e^3*Pi*b*x^8*csgn(I*c*x^n)^3+1/
2*ln(c)*b*d*e^2*x^6+1/2*a*d*e^2*x^6
```

Maxima [A]
time = 0.27, size = 140, normalized size = 1.54

$$-\frac{1}{64}\,bnx^8e^3+\frac{1}{8}\,bx^8e^3\log\left(cx^n\right)+\frac{1}{8}\,ax^8e^3-\frac{1}{12}\,bdnx^6e^2+\frac{1}{2}\,bdx^6e^2\log\left(cx^n\right)+\frac{1}{2}\,adx^6e^2-\frac{3}{16}\,bd^2nx^4e+\frac{3}{4}\,bd^2x^4e\log\left(cx^n\right)+\frac{3}{4}\,ad^2x^4e-\frac{1}{4}\,bd^3nx^2+\frac{1}{2}\,bd^3x^2\log\left(cx^n\right)+\frac{1}{2}\,ad^3x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/64*b*n*x^8*e^3 + 1/8*b*x^8*e^3*log(c*x^n) + 1/8*a*x^8*e^3 - 1/12*b*d*n*x
^6*e^2 + 1/2*b*d*x^6*e^2*log(c*x^n) + 1/2*a*d*x^6*e^2 - 3/16*b*d^2*n*x^4*e
+ 3/4*b*d^2*x^4*e*log(c*x^n) + 3/4*a*d^2*x^4*e - 1/4*b*d^3*n*x^2 + 1/2*b*d^
3*x^2*log(c*x^n) + 1/2*a*d^3*x^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 155 vs. $2(77) = 154$.
time = 0.40, size = 155, normalized size = 1.70

$$-\frac{1}{64}\,{\left(bn-8\,a\right)}x^8e^3-\frac{1}{12}\,{\left(bdn-6\,ad\right)}x^6e^2-\frac{3}{16}\,{\left(bd^2n-4\,ad^2\right)}x^4e-\frac{1}{4}\,{\left(bd^3n-2\,ad^3\right)}x^2+\frac{1}{8}\,{\left(bx^8e^3+4\,bdx^6e^2+6\,bd^2x^4e+4\,bd^3x^2\right)}\log\left(c\right)+\frac{1}{8}\,{\left(bnx^8e^3+4\,bdnx^6e^2+6\,bd^2nx^4e+4\,bd^3nx^2\right)}\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/64*(b*n - 8*a)*x^8*e^3 - 1/12*(b*d*n - 6*a*d)*x^6*e^2 - 3/16*(b*d^2*n -
4*a*d^2)*x^4*e - 1/4*(b*d^3*n - 2*a*d^3)*x^2 + 1/8*(b*x^8*e^3 + 4*b*d*x^6*e
^2 + 6*b*d^2*x^4*e + 4*b*d^3*x^2)*log(c) + 1/8*(b*n*x^8*e^3 + 4*b*d*n*x^6*e
^2 + 6*b*d^2*n*x^4*e + 4*b*d^3*n*x^2)*log(x)
```

Sympy [A]
time = 1.33, size = 170, normalized size = 1.87

$$\frac{ad^3x^2}{2}+\frac{3ad^2ex^4}{4}+\frac{ade^2x^6}{2}+\frac{ae^3x^8}{8}-\frac{bd^3nx^2}{4}+\frac{bd^3x^2\log{(cx^n)}}{2}-\frac{3bd^2enx^4}{16}+\frac{3bd^2ex^4\log{(cx^n)}}{4}-\frac{bde^2nx^6}{12}+\frac{bde^2x^6\log{(cx^n)}}{2}-\frac{be^3nx^8}{64}+\frac{be^3x^8\log{(cx^n)}}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**2/2 + 3*a*d**2*e*x**4/4 + a*d*e**2*x**6/2 + a*e**3*x**8/8 - b*d**
3*n*x**2/4 + b*d**3*x**2*log(c*x**n)/2 - 3*b*d**2*e*n*x**4/16 + 3*b*d**2*e*
x**4*log(c*x**n)/4 - b*d*e**2*n*x**6/12 + b*d*e**2*x**6*log(c*x**n)/2 - b*e
**3*n*x**8/64 + b*e**3*x**8*log(c*x**n)/8
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 173 vs. 2(77) = 154.
time = 3.55, size = 173, normalized size = 1.90

$$\frac{1}{8}bnx^8e^3\log{(x)}-\frac{1}{64}bnx^8e^3+\frac{1}{8}bx^8e^3\log{(c)}+\frac{1}{2}bdnx^6e^2\log{(x)}+\frac{1}{8}ax^8e^3-\frac{1}{12}bdnx^6e^2+\frac{1}{2}bdx^6e^2\log{(c)}+\frac{3}{4}bd^2nx^4e\log{(x)}+\frac{1}{2}adx^6e^2-\frac{3}{16}bd^2nx^4e+\frac{3}{4}bd^2x^4e\log{(c)}+\frac{3}{4}ad^2x^4e+\frac{1}{2}bd^3nx^2\log{(x)}-\frac{1}{4}bd^3nx^2+\frac{1}{2}bd^3x^2\log{(c)}+\frac{1}{2}ad^3x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/8*b*n*x^8*e^3*log(x) - 1/64*b*n*x^8*e^3 + 1/8*b*x^8*e^3*log(c) + 1/2*b*d*
n*x^6*e^2*log(x) + 1/8*a*x^8*e^3 - 1/12*b*d*n*x^6*e^2 + 1/2*b*d*x^6*e^2*log
(c) + 3/4*b*d^2*n*x^4*e*log(x) + 1/2*a*d*x^6*e^2 - 3/16*b*d^2*n*x^4*e + 3/4
*b*d^2*x^4*e*log(c) + 3/4*a*d^2*x^4*e + 1/2*b*d^3*n*x^2*log(x) - 1/4*b*d^3*
n*x^2 + 1/2*b*d^3*x^2*log(c) + 1/2*a*d^3*x^2
```

Mupad [B]
time = 3.49, size = 113, normalized size = 1.24

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^2}{2}+\frac{3\,b\,d^2\,e\,x^4}{4}+\frac{b\,d\,e^2\,x^6}{2}+\frac{b\,e^3\,x^8}{8}\right)+\frac{d^3\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^3\,x^8\,\left(8\,a-b\,n\right)}{64}+\frac{3\,d^2\,e\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{d\,e^2\,x^6\,\left(6\,a-b\,n\right)}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^3*x^2)/2 + (b*e^3*x^8)/8 + (3*b*d^2*e*x^4)/4 + (b*d*e^2*x^
6)/2) + (d^3*x^2*(2*a - b*n))/4 + (e^3*x^8*(8*a - b*n))/64 + (3*d^2*e*x^4*(
4*a - b*n))/16 + (d*e^2*x^6*(6*a - b*n))/12
```

3.199 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=130

$$-\frac{3}{4}bd^2enx^2-\frac{3}{16}bde^2nx^4-\frac{1}{36}be^3nx^6-\frac{1}{2}bd^3n\log^2(x)+\frac{3}{2}d^2ex^2(a+b\log(cx^n))+\frac{3}{4}de^2x^4(a+b\log(cx^n))+\frac{1}{6}e^3x$$

```
[Out] -3/4*b*d^2*e*n*x^2-3/16*b*d*e^2*n*x^4-1/36*b*e^3*n*x^6-1/2*b*d^3*n*ln(x)^2+
3/2*d^2*e*x^2*(a+b*ln(c*x^n))+3/4*d*e^2*x^4*(a+b*ln(c*x^n))+1/6*e^3*x^6*(a+
b*ln(c*x^n))+d^3*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.08, antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {272, 45, 2372, 14, 2338}

$$d^3\log(x)(a+b\log(cx^n))+\frac{3}{2}d^2ex^2(a+b\log(cx^n))+\frac{3}{4}de^2x^4(a+b\log(cx^n))+\frac{1}{6}e^3x^6(a+b\log(cx^n))-\frac{1}{2}bd^3n\log^2(x)-\frac{3}{4}bd^2enx^2-\frac{3}{16}bde^2nx^4-\frac{1}{36}be^3nx^6$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-3*b*d^2*e*n*x^2)/4 - (3*b*d*e^2*n*x^4)/16 - (b*e^3*n*x^6)/36 - (b*d^3*n*L
og[x]^2)/2 + (3*d^2*e*x^2*(a + b*Log[c*x^n]))/2 + (3*d*e^2*x^4*(a + b*Log[c
*x^n]))/4 + (e^3*x^6*(a + b*Log[c*x^n]))/6 + d^3*Log[x]*(a + b*Log[c*x^n])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = \frac{1}{12}\left(18d^2ex^2+9de^2x^4+2e^3x^6+12d^3\log(x)\right)(a+b\log(cx^n))-(bn)\int$$

$$=\frac{1}{12}\left(18d^2ex^2+9de^2x^4+2e^3x^6+12d^3\log(x)\right)(a+b\log(cx^n))-(bd^3n)$$

$$=-\frac{1}{2}bd^3n\log^2(x)+\frac{1}{12}\left(18d^2ex^2+9de^2x^4+2e^3x^6+12d^3\log(x)\right)(a+b\,$$

$$=-\frac{3}{4}bd^2enx^2-\frac{3}{16}bde^2nx^4-\frac{1}{36}be^3nx^6-\frac{1}{2}bd^3n\log^2(x)+\frac{1}{12}\left(18d^2ex^2+\right.$$

Mathematica [A]
time = 0.05, size = 116, normalized size = 0.89

$$\frac{1}{144}\left(-108bd^2enx^2-27bde^2nx^4-4be^3nx^6+216d^2ex^2(a+b\log(cx^n))+108de^2x^4(a+b\log(cx^n))+24e^3x^6(a+b\log(cx^n))+\frac{72d^3(a+b\log(cx^n))^2}{bn}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-108*b*d^2*e*n*x^2 - 27*b*d*e^2*n*x^4 - 4*b*e^3*n*x^6 + 216*d^2*e*x^2*(a +
 b*Log[c*x^n]) + 108*d*e^2*x^4*(a + b*Log[c*x^n]) + 24*e^3*x^6*(a + b*Log[c
*x^n]) + (72*d^3*(a + b*Log[c*x^n])^2)/(b*n))/144
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.17, size = 595, normalized size = 4.58

method	result
risch	$\frac{\ln(c)b\,e^3x^6}{6}+\frac{x^6a\,e^3}{6}+\frac{3x^4ad\,e^2}{4}+a\,d^3\ln(x)+\frac{3a\,d^2x^2e}{2}-\frac{i\pi b\,e^3x^6\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)}{12}+\frac{3\ln(c)b\,d^2x^2e}{2}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*ln(c)*b*e^3*x^6+1/6*x^6*a*e^3+1/2*I*ln(x)*Pi*b*d^3*csgn(I*x^n)*csgn(I*c
*x^n)^2+3/4*x^4*a*d*e^2+a*d^3*ln(x)+3/2*a*d^2*x^2*e+3/4*I*Pi*b*d^2*x^2*csgn
(I*x^n)*csgn(I*c*x^n)^2*e+3/4*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+3/
2*ln(c)*b*d^2*x^2*e+ln(x)*ln(c)*b*d^3-1/2*I*ln(x)*Pi*b*d^3*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)-1/12*I*Pi*b*e^3*x^6*csgn(I*c*x^n)^3+(1/6*x^6*b*e^3+3/4*
x^4*b*d*e^2+3/2*b*d^2*e*x^2+b*d^3*ln(x))*ln(x^n)+3/8*I*Pi*b*d*e^2*x^4*csgn(
I*c)*csgn(I*c*x^n)^2+3/8*I*Pi*b*d*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+3/4*l
n(c)*b*d*e^2*x^4-3/4*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1
/36*b*e^3*n*x^6-3/8*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/
8*I*Pi*b*d*e^2*x^4*csgn(I*c*x^n)^3+1/2*I*ln(x)*Pi*b*d^3*csgn(I*c)*csgn(I*c*
x^n)^2-1/2*b*d^3*n*ln(x)^2-3/16*b*d*e^2*n*x^4-3/4*b*d^2*e*n*x^2-1/12*I*Pi*b
*e^3*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*ln(x)*Pi*b*d^3*csgn(I*c*
x^n)^3-3/4*I*Pi*b*d^2*e*x^2*csgn(I*c*x^n)^3+1/12*I*Pi*b*e^3*x^6*csgn(I*c)*c
sgn(I*c*x^n)^2+1/12*I*Pi*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2
```

<u>Maxima</u> [A]
time = 0.27, size = 130, normalized size = 1.00

$$-\frac{1}{36}\,bnx^6e^3+\frac{1}{6}\,bx^6e^3\log\left(cx^n\right)+\frac{1}{6}\,ax^6e^3-\frac{3}{16}\,bdnx^4e^2+\frac{3}{4}\,bdx^4e^2\log\left(cx^n\right)+\frac{3}{4}\,adx^4e^2-\frac{3}{4}\,bd^2nx^2e+\frac{3}{2}\,bd^2x^2e\log\left(cx^n\right)+\frac{3}{2}\,ad^2x^2e+\frac{bd^3\log\left(cx^n\right)^2}{2\,n}+ad^3\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -1/36*b*n*x^6*e^3 + 1/6*b*x^6*e^3*log(c*x^n) + 1/6*a*x^6*e^3 - 3/16*b*d*n*x
^4*e^2 + 3/4*b*d*x^4*e^2*log(c*x^n) + 3/4*a*d*x^4*e^2 - 3/4*b*d^2*n*x^2*e +
 3/2*b*d^2*x^2*e*log(c*x^n) + 3/2*a*d^2*x^2*e + 1/2*b*d^3*log(c*x^n)^2/n +
a*d^3*log(x)
```

<u>Fricas</u> [A]
time = 0.40, size = 145, normalized size = 1.12

$$-\frac{1}{36}\,(bn-6\,a)x^6e^3+\frac{1}{2}\,bd^3n\log\left(x\right)^2-\frac{3}{16}\,(bdn-4\,ad)x^4e^2-\frac{3}{4}\,\left(bd^2n-2\,ad^2\right)x^2e+\frac{1}{12}\,\left(2\,bx^6e^3+9\,bdx^4e^2+18\,bd^2x^2e\right)\log\left(c\right)+\frac{1}{12}\,\left(2\,bnx^6e^3+9\,bdnx^4e^2+18\,bd^2nx^2e+12\,bd^3\log\left(c\right)+12\,ad^3\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] -1/36*(b*n - 6*a)*x^6*e^3 + 1/2*b*d^3*n*log(x)^2 - 3/16*(b*d*n - 4*a*d)*x^4
*e^2 - 3/4*(b*d^2*n - 2*a*d^2)*x^2*e + 1/12*(2*b*x^6*e^3 + 9*b*d*x^4*e^2 +
18*b*d^2*x^2*e)*log(c) + 1/12*(2*b*n*x^6*e^3 + 9*b*d*n*x^4*e^2 + 18*b*d^2*n
*x^2*e + 12*b*d^3*log(c) + 12*a*d^3)*log(x)
```

Sympy [A]
time = 1.51, size = 212, normalized size = 1.63

$$\begin{cases} \frac{ad^3\log(cx^n)}{n} + \frac{3ad^2ex^2}{2} + \frac{3ade^2x^4}{4} + \frac{ae^3x^6}{6} + \frac{bd^3\log(cx^n)^2}{2n} - \frac{3bd^2enx^2}{4} + \frac{3bd^2ex^2\log(cx^n)}{2} - \frac{3bde^2nx^4}{16} + \frac{3bde^2x^4\log(cx^n)}{4} - \frac{be^3nx^6}{36} + \frac{be^3x^6\log(cx^n)}{6} & \text{for } n \neq 0 \\ (a + b\log(c))\left(d^3\log(x) + \frac{3d^2ex^2}{2} + \frac{3de^2x^4}{4} + \frac{e^3x^6}{6}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**2/2 + 3*a*d*e**2*x**4/4 + a
*e**3*x**6/6 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x**2/4 + 3*b*d**2
*e*x**2*log(c*x**n)/2 - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**n)/
4 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6, Ne(n, 0)), ((a + b*log(c)
)*(d**3*log(x) + 3*d**2*e*x**2/2 + 3*d*e**2*x**4/4 + e**3*x**6/6), True))
```

Giac [A]
time = 4.79, size = 158, normalized size = 1.22

$$\frac{1}{6}bnx^6e^3\log(x) - \frac{1}{36}bnx^6e^3 + \frac{1}{6}bx^6e^3\log(c) + \frac{3}{4}bdnx^4e^2\log(x) + \frac{1}{6}ax^6e^3 - \frac{3}{16}bdnx^4e^2 + \frac{3}{4}bdx^4e^2\log(c) + \frac{3}{2}bd^2nx^2e\log(x) + \frac{3}{4}adx^4e^2 - \frac{3}{4}bd^2nx^2e + \frac{3}{2}bd^2x^2e\log(c) + \frac{1}{2}bd^3n\log(x)^2 + \frac{3}{2}ad^2x^2e + bd^3\log(c)\log(x) + ad^3\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/6*b*n*x^6*e^3*log(x) - 1/36*b*n*x^6*e^3 + 1/6*b*x^6*e^3*log(c) + 3/4*b*d*
n*x^4*e^2*log(x) + 1/6*a*x^6*e^3 - 3/16*b*d*n*x^4*e^2 + 3/4*b*d*x^4*e^2*log
(c) + 3/2*b*d^2*n*x^2*e*log(x) + 3/4*a*d*x^4*e^2 - 3/4*b*d^2*n*x^2*e + 3/2*
b*d^2*x^2*e*log(c) + 1/2*b*d^3*n*log(x)^2 + 3/2*a*d^2*x^2*e + b*d^3*log(c)*
log(x) + a*d^3*log(x)
```

Mupad [B]
time = 3.67, size = 112, normalized size = 0.86

$$\ln(c\,x^n)\,\left(\frac{3\,b\,d^2\,e\,x^2}{2} + \frac{3\,b\,d\,e^2\,x^4}{4} + \frac{b\,e^3\,x^6}{6}\right) + \frac{e^3\,x^6\,(6\,a - b\,n)}{36} + a\,d^3\,\ln(x) + \frac{b\,d^3\ln(c\,x^n)^2}{2\,n} + \frac{3\,d^2\,e\,x^2\,(2\,a - b\,n)}{4} + \frac{3\,d\,e^2\,x^4\,(4\,a - b\,n)}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x,x)
```

```
[Out] log(c*x^n)*((b*e^3*x^6)/6 + (3*b*d^2*e*x^2)/2 + (3*b*d*e^2*x^4)/4) + (e^3*x
^6*(6*a - b*n))/36 + a*d^3*log(x) + (b*d^3*log(c*x^n)^2)/(2*n) + (3*d^2*e*x
^2*(2*a - b*n))/4 + (3*d*e^2*x^4*(4*a - b*n))/16
```

3.200 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=131

$$-\frac{bd^3n}{4x^2}-\frac{3}{4}bde^2nx^2-\frac{1}{16}be^3nx^4-\frac{3}{2}bd^2en\log^2(x)-\frac{d^3(a+b\log(cx^n))}{2x^2}+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log$$

```
[Out] -1/4*b*d^3*n/x^2-3/4*b*d*e^2*n*x^2-1/16*b*e^3*n*x^4-3/2*b*d^2*e*n*ln(x)^2-1
/2*d^3*(a+b*ln(c*x^n))/x^2+3/2*d*e^2*x^2*(a+b*ln(c*x^n))+1/4*e^3*x^4*(a+b*l
n(c*x^n))+3*d^2*e*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]

time = 0.09, antiderivative size = 131, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}+3d^2e\log(x)(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log(cx^n))-\frac{bd^3n}{4x^2}-\frac{3}{2}bd^2en\log^2(x)-\frac{3}{4}bde^2nx^2-\frac{1}{16}be^3nx^4$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^3*n)/x^2 - (3*b*d*e^2*n*x^2)/4 - (b*e^3*n*x^4)/16 - (3*b*d^2*e*n*
Log[x]^2)/2 - (d^3*(a + b*Log[c*x^n]))/(2*x^2) + (3*d*e^2*x^2*(a + b*Log[c*
x^n]))/2 + (e^3*x^4*(a + b*Log[c*x^n]))/4 + 3*d^2*e*Log[x]*(a + b*Log[c*x^n
])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = -\frac{1}{4}\left(\frac{2d^3}{x^2}-6de^2x^2-e^3x^4-12d^2e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int$$
$$= -\frac{1}{4}\left(\frac{2d^3}{x^2}-6de^2x^2-e^3x^4-12d^2e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}(bn)\int$$
$$= -\frac{1}{4}\left(\frac{2d^3}{x^2}-6de^2x^2-e^3x^4-12d^2e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}(bn)\int$$
$$= -\frac{1}{4}\left(\frac{2d^3}{x^2}-6de^2x^2-e^3x^4-12d^2e\log(x)\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}(bn)\int$$
$$= -\frac{3}{2}bd^2en\log^2(x)-\frac{1}{4}\left(\frac{2d^3}{x^2}-6de^2x^2-e^3x^4-12d^2e\log(x)\right)\left(a+b\log\right.$$
$$= -\frac{bd^3n}{4x^2}-\frac{3}{4}bde^2nx^2-\frac{1}{16}be^3nx^4-\frac{3}{2}bd^2en\log^2(x)-\frac{1}{4}\left(\frac{2d^3}{x^2}-6de^2x^2\right.$$

Mathematica [A]
time = 0.06, size = 115, normalized size = 0.88

$$\frac{1}{16}\left(-\frac{4bd^3n}{x^2}-12bde^2nx^2-be^3nx^4-\frac{8d^3\left(a+b\log\left(cx^n\right)\right)}{x^2}+24de^2x^2\left(a+b\log\left(cx^n\right)\right)+4e^3x^4\left(a+b\log\left(cx^n\right)\right)+\frac{24d^2e\left(a+b\log\left(cx^n\right)\right)^2}{bn}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^3,x]
```

[Out] ((-4*b*d^3*n)/x^2 - 12*b*d*e^2*n*x^2 - b*e^3*n*x^4 - (8*d^3*(a + b*Log[c*x^
n]))/x^2 + 24*d*e^2*x^2*(a + b*Log[c*x^n]) + 4*e^3*x^4*(a + b*Log[c*x^n]) +
 (24*d^2*e*(a + b*Log[c*x^n])^2)/(b*n))/16

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.31, size = 4039, normalized size = 30.83

method	result	size
risch	Expression too large to display	4039

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)

[Out] -1/4*b*(-e^3*x^6-6*d*e^2*x^4-12*d^2*e*ln(x)*x^2-9*d^2*e*x^2+2*d^3)/x^2*ln(x
^n)-1/16*(-8*Pi^2*b^2*d^3*csgn(I*c*x^n)^6+96*I*ln(x)*Pi*b^2*d^2*e*n*x^2*csg
n(I*x^n)*csgn(I*c*x^n)^2-96*ln(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)^
2*csgn(I*c*x^n)^3+192*ln(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)^4+48*ln(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^
n)^2+96*Pi^2*b^2*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+48*I*Pi*b^
2*d^2*e*n*x^2*csgn(I*c)*csgn(I*c*x^n)^2*ln(x)^2-72*I*Pi*b^2*d^2*e*n*x^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-96*I*ln(x)*Pi*b^2*d^2*e*n*x^2*csgn(I*c*x^n
)^3-8*Pi^2*b^2*e^3*x^6*csgn(I*c)*csgn(I*c*x^n)^5+4*Pi^2*b^2*e^3*x^6*csgn(I*
x^n)^2*csgn(I*c*x^n)^4-8*Pi^2*b^2*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^5-8*Pi^
2*b^2*d^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-96*I*Pi*a*b*d*e^2*x^4*c
sgn(I*x^n)*csgn(I*c*x^n)^2-192*ln(x)*a^2*d^2*e*x^2+72*ln(c)*b^2*d*e^2*n*x^4
-192*ln(c)*a*b*d*e^2*x^4+144*ln(c)*b^2*d^2*e*n*x^2-288*ln(c)*a*b*d^2*e*x^2-
192*ln(x)*ln(c)^2*b^2*d^2*e*x^2-24*b^2*d^2*e*n^2*x^2*ln(x)^2-36*I*Pi*b^2*d*
e^2*n*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*ln(c)*b^2*d^3*n+64*ln(c)*a*
b*d^3-16*ln(c)^2*b^2*e^3*x^6+36*Pi^2*b^2*d^2*e*x^2*csgn(I*x^n)^2*csgn(I*c*x
^n)^4-72*Pi^2*b^2*d^2*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^5+4*Pi^2*b^2*e^3*x^6*
csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+72*I*Pi*b^2*d^2*e*n*x^2*csgn(I*c)
*csgn(I*c*x^n)^2+32*a^2*d^3+192*ln(x)*ln(c)*b^2*d^2*e*n*x^2-384*ln(x)*ln(c)
*a*b*d^2*e*x^2+32*ln(c)^2*b^2*d^3+16*Pi^2*b^2*d^3*csgn(I*c)^2*csgn(I*x^n)*c
sgn(I*c*x^n)^3+16*Pi^2*b^2*d^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-32*P
i^2*b^2*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-32*I*Pi*ln(c)*b^2*d^3*csg
n(I*c*x^n)^3-4*I*Pi*b^2*d^3*n*csgn(I*c*x^n)^3-32*I*Pi*a*b*d^3*csgn(I*c*x^n)
^3-16*a^2*e^3*x^6-4*b^2*d^3*n^2-4*I*Pi*b^2*e^3*n*x^6*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-48*I*Pi*b^2*d^2*e*n*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*l
n(x)^2+8*a*b*d^3*n-b^2*e^3*n^2*x^6-96*a^2*d*e^2*x^4-144*a^2*d^2*e*x^2-144*I
*Pi*ln(c)*b^2*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-96*I*Pi*a*b*d*e^2*x^4*csg
n(I*c)*csgn(I*c*x^n)^2+96*I*Pi*a*b*d*e^2*x^4*csgn(I*c*x^n)^3+144*I*Pi*ln(c)
*b^2*d^2*e*x^2*csgn(I*c*x^n)^3+4*I*Pi*b^2*d^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2
+32*I*Pi*a*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+32*I*Pi*a*b*d^3*csgn(I*x^n)*csgn
(I*c*x^n)^2-16*I*Pi*a*b*e^3*x^6*csgn(I*c)*csgn(I*c*x^n)^2-32*I*Pi*a*b*d^3*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-16*I*Pi*ln(c)*b^2*e^3*x^6*csgn(I*x^n)*cs

```
gn(I*c*x^n)^2+4*I*Pi*b^2*e^3*n*x^6*csgn(I*c)*csgn(I*c*x^n)^2-8*Pi^2*b^2*d^3
*csgn(I*c)^2*csgn(I*c*x^n)^4-192*I*ln(x)*Pi*ln(c)*b^2*d^2*e*x^2*csgn(I*x^n)
*csgn(I*c*x^n)^2+192*I*ln(x)*Pi*a*b*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+96*I*Pi*a*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-192*I*ln(x
)*Pi*a*b*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+36*Pi^2*b^2*d^2*e*x^2*csgn(I*c
)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-72*Pi^2*b^2*d^2*e*x^2*csgn(I*c)^2*csgn(I*
x^n)*csgn(I*c*x^n)^3+96*I*Pi*ln(c)*b^2*d*e^2*x^4*csgn(I*c*x^n)^3-36*I*Pi*b^
2*d*e^2*n*x^4*csgn(I*c*x^n)^3+96*I*ln(x)*Pi*b^2*d^2*e*n*x^2*csgn(I*c)*csgn(
I*c*x^n)^2+8*a*b*e^3*n*x^6+144*I*Pi*a*b*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+192*I*ln(x)*Pi*a*b*d^2*e*x^2*csgn(I*c*x^n)^3+16*Pi^2*b^2*d^3*csg
n(I*c)*csgn(I*c*x^n)^5-8*Pi^2*b^2*d^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+16*Pi^2
*b^2*d^3*csgn(I*x^n)*csgn(I*c*x^n)^5-48*Pi^2*b^2*d*e^2*x^4*csgn(I*c)*csgn(I
*c*x^n)^5+24*Pi^2*b^2*d*e^2*x^4*csgn(I*x^n)^2*csgn(I*c*x^n)^4-48*Pi^2*b^2*d
*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^5+36*Pi^2*b^2*d^2*e*x^2*csgn(I*c)^2*csgn
(I*c*x^n)^4+96*I*Pi*ln(c)*b^2*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+16*I*Pi*ln(c)*b^2*e^3*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-48*I*Pi*b^2*
d^2*e*n*x^2*csgn(I*c*x^n)^3*ln(x)^2+72*a*b*d*e^2*n*x^4+144*a*b*d^2*e*n*x^2+
192*ln(x)*a*b*d^2*e*n*x^2-72*Pi^2*b^2*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^5+4
8*ln(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c*x^n)^6-4*I*Pi*b^2*e^3*n*x^6*csgn(I*c*x^
n)^3+16*I*Pi*a*b*e^3*x^6*csgn(I*c*x^n)^3+4*Pi^2*b^2*e^3*x^6*csgn(I*c*x^n)^6
+16*I*Pi*ln(c)*b^2*e^3*x^6*csgn(I*c*x^n)^3+32*I*Pi*ln(c)*b^2*d^3*csgn(I*c)*
csgn(I*c*x^n)^2+32*I*Pi*ln(c)*b^2*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b^
2*d^3*n*csgn(I*c)*csgn(I*c*x^n)^2-96*ln(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*x^n)*c
sgn(I*c*x^n)^5+48*ln(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c)^2*csgn(I*c*x^n)^4-96*l
n(x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^5+48*ln(x)*Pi^2*b^2*d^2*e*x
^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+144*I*Pi*a*b*d^2*e*x^2*csgn(I*c*x^n)^3-16*
I*Pi*a*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2+96*ln(c)*b^2*d^2*e*n*x^2*ln(x)
^2+96*a*b*d^2*e*n*x^2*ln(x)^2-144*I*Pi*a*b*d^2*e*x^2*csgn(I*x^n)*csgn(I*c*x
^n)^2-32*I*Pi*ln(c)*b^2*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*b^2*
d^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-36*ln(x)*b^2*d^2*e*n^2*x^2-96*ln(
x)*Pi^2*b^2*d^2*e*x^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+48*I*Pi*b^2*d
^2*e*n*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2*ln(x)^2-72*I*Pi*b^2*d^2*e*n*x^2*csgn
(I*c*x^n)^3+4*I*Pi*b^2*e^3*n*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*b^2*d*
e^2*n*x^4*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*b^2*d*e^2*n*x^4*csgn(I*x^n)*csg
n(I*c*x^n)^2-12*b^2*d*e^2*n^2*x^4-36*b^2*d^2*e*...
```

Maxima [A]

time = 0.27, size = 129, normalized size = 0.98

$$-\frac{1}{16}\,bnx^4e^3+\frac{1}{4}\,bx^4e^3\log\left(cx^n\right)+\frac{1}{4}\,ax^4e^3-\frac{3}{4}\,bdnx^2e^2+\frac{3}{2}\,bdx^2e^2\log\left(cx^n\right)+\frac{3}{2}\,adx^2e^2+\frac{3\,bd^2e\log\left(cx^n\right)^2}{2\,n}+3\,ad^2e\log\left(x\right)-\frac{bd^3n}{4\,x^2}-\frac{bd^3\log\left(cx^n\right)}{2\,x^2}-\frac{ad^3}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] -1/16*b*n*x^4*e^3 + 1/4*b*x^4*e^3*log(c*x^n) + 1/4*a*x^4*e^3 - 3/4*b*d*n*x^
2*e^2 + 3/2*b*d*x^2*e^2*log(c*x^n) + 3/2*a*d*x^2*e^2 + 3/2*b*d^2*e*log(c*x^
```

n)^2/n + 3*a*d^2*e*log(x) - 1/4*b*d^3*n/x^2 - 1/2*b*d^3*log(c*x^n)/x^2 - 1/2*a*d^3/x^2

Fricas [A]
time = 0.38, size = 146, normalized size = 1.11

$$\frac{24\,bd^{2}nx^{2}e\log\left(x\right)^{2} - (bn - 4\,a)x^{6}e^{3} - 12\,(bdn - 2\,ad)x^{4}e^{2} - 4\,bd^{3}n - 8\,ad^{3} + 4\,(bx^{6}e^{3} + 6\,bdx^{4}e^{2} - 2\,bd^{3})\log\left(c\right) + 4\,(bnx^{6}e^{3} + 6\,bdnx^{4}e^{2} + 12\,bd^{2}x^{2}e\log\left(c\right) + 12\,ad^{2}x^{2}e - 2\,bd^{3}n)\log\left(x\right)}{16\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] 1/16*(24*b*d^2*n*x^2*e*log(x)^2 - (b*n - 4*a)*x^6*e^3 - 12*(b*d*n - 2*a*d)*
x^4*e^2 - 4*b*d^3*n - 8*a*d^3 + 4*(b*x^6*e^3 + 6*b*d*x^4*e^2 - 2*b*d^3)*log
(c) + 4*(b*n*x^6*e^3 + 6*b*d*n*x^4*e^2 + 12*b*d^2*x^2*e*log(c) + 12*a*d^2*x
^2*e - 2*b*d^3*n)*log(x))/x^2
```

Sympy [A]
time = 1.54, size = 209, normalized size = 1.60

$$\begin{cases} - \frac{ad^{3}}{2x^{2}} + \frac{3ad^{2}e\log\left(cx^{n}\right)}{n} + \frac{3ade^{2}x^{2}}{2} + \frac{ae^{3}x^{4}}{4} - \frac{bd^{3}n}{4x^{2}} - \frac{bd^{3}\log\left(cx^{n}\right)}{2x^{2}} + \frac{3bd^{2}e\log\left(cx^{n}\right)^{2}}{2n} - \frac{3bde^{2}nx^{2}}{4} + \frac{3bde^{2}x^{2}\log\left(cx^{n}\right)}{2} - \frac{be^{3}nx^{4}}{16} + \frac{be^{3}x^{4}\log\left(cx^{n}\right)}{4} & \text{for}\: n \neq 0 \\\left(a + b\log\left(c\right)\right)\left(- \frac{d^{3}}{2x^{2}} + 3d^{2}e\log\left(x\right) + \frac{3de^{2}x^{2}}{2} + \frac{e^{3}x^{4}}{4}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Piecewise((-a*d**3/(2*x**2) + 3*a*d**2*e*log(c*x**n)/n + 3*a*d*e**2*x**2/2
+ a*e**3*x**4/4 - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) + 3*b*d**
2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n
)/2 - b*e**3*n*x**4/16 + b*e**3*x**4*log(c*x**n)/4, Ne(n, 0)), ((a + b*log(
c))*(-d**3/(2*x**2) + 3*d**2*e*log(x) + 3*d*e**2*x**2/2 + e**3*x**4/4), Tru
e))
```

Giac [A]
time = 2.30, size = 160, normalized size = 1.22

$$\frac{4\,bnx^{6}e^{3}\log\left(x\right) - bnx^{6}e^{3} + 4\,bx^{6}e^{3}\log\left(c\right) + 24\,bdnx^{4}e^{2}\log\left(x\right) + 24\,bd^{2}nx^{2}e\log\left(x\right)^{2} + 4\,ax^{6}e^{3} - 12\,bdnx^{4}e^{2} + 24\,bdx^{4}e^{2}\log\left(c\right) + 48\,bd^{2}x^{2}e\log\left(c\right)\log\left(x\right) + 24\,adx^{4}e^{2} + 48\,ad^{2}x^{2}e\log\left(x\right) - 8\,bd^{3}n\log\left(x\right) - 4\,bd^{3}n - 8\,bd^{3}\log\left(c\right) - 8\,ad^{3}}{16\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] 1/16*(4*b*n*x^6*e^3*log(x) - b*n*x^6*e^3 + 4*b*x^6*e^3*log(c) + 24*b*d*n*x^
4*e^2*log(x) + 24*b*d^2*n*x^2*e*log(x)^2 + 4*a*x^6*e^3 - 12*b*d*n*x^4*e^2 +
 24*b*d*x^4*e^2*log(c) + 48*b*d^2*x^2*e*log(c)*log(x) + 24*a*d*x^4*e^2 + 48
*a*d^2*x^2*e*log(x) - 8*b*d^3*n*log(x) - 4*b*d^3*n - 8*b*d^3*log(c) - 8*a*d
^3)/x^2
```

Mupad [B]
time = 3.64, size = 163, normalized size = 1.24

$$\ln\left(c\,x^n\right)\,\left(\frac{\frac{3\,b\,e^3\,x^6}{4}+3\,b\,d\,e^2\,x^4}{x^2}-\frac{\frac{b\,d^3}{2}+\frac{3\,b\,d^2\,e\,x^2}{2}+\frac{3\,b\,d\,e^2\,x^4}{2}+\frac{b\,e^3\,x^6}{2}}{x^2}\right)-\frac{\frac{a\,d^3}{2}+\frac{b\,d^3\,n}{4}}{x^2}+\ln\left(x\right)\,\left(3\,a\,d^2\,e+\frac{3\,b\,d^2\,e\,n}{2}\right)+\frac{e^3\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{3\,d\,e^2\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{3\,b\,d^2\,e\,\ln\left(c\,x^n\right)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] log(c*x^n)*(((3*b*e^3*x^6)/4 + 3*b*d*e^2*x^4)/x^2 - ((b*d^3)/2 + (b*e^3*x^6
)/2 + (3*b*d^2*e*x^2)/2 + (3*b*d*e^2*x^4)/2)/x^2) - ((a*d^3)/2 + (b*d^3*n)/
4)/x^2 + log(x)*(3*a*d^2*e + (3*b*d^2*e*n)/2) + (e^3*x^4*(4*a - b*n))/16 +
(3*d*e^2*x^2*(2*a - b*n))/4 + (3*b*d^2*e*log(c*x^n)^2)/(2*n)
```

3.201 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=131

$$-\frac{bd^3n}{16x^4}-\frac{3bd^2en}{4x^2}-\frac{1}{4}be^3nx^2-\frac{3}{2}bde^2n\log^2(x)-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+\frac{1}{2}e^3x^2(a+b\log(cx^n$$

```
[Out] -1/16*b*d^3*n/x^4-3/4*b*d^2*e*n/x^2-1/4*b*e^3*n*x^2-3/2*b*d*e^2*n*ln(x)^2-1
/4*d^3*(a+b*ln(c*x^n))/x^4-3/2*d^2*e*(a+b*ln(c*x^n))/x^2+1/2*e^3*x^2*(a+b*l
n(c*x^n))+3*d*e^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]

time = 0.09, antiderivative size = 131, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)\,(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))-\frac{bd^3n}{16x^4}-\frac{3bd^2en}{4x^2}-\frac{3}{2}bde^2n\log^2(x)-\frac{1}{4}be^3nx^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d^3*n)/x^4 - (3*b*d^2*e*n)/(4*x^2) - (b*e^3*n*x^2)/4 - (3*b*d*e^2*
n*Log[x]^2)/2 - (d^3*(a + b*Log[c*x^n]))/(4*x^4) - (3*d^2*e*(a + b*Log[c*x^
n]))/(2*x^2) + (e^3*x^2*(a + b*Log[c*x^n]))/2 + 3*d*e^2*Log[x]*(a + b*Log[c
*x^n])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6d^2e}{x^2}-2e^3x^2-12de^2\log(x)\right)(a+b\log(cx^n))-(bn)\int \frac{-c$$
$$= -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6d^2e}{x^2}-2e^3x^2-12de^2\log(x)\right)(a+b\log(cx^n))-\frac{1}{4}(bn)\int \frac{-}{-}$$
$$= -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6d^2e}{x^2}-2e^3x^2-12de^2\log(x)\right)(a+b\log(cx^n))-\frac{1}{4}(bn)\int \Big($$
$$= -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6d^2e}{x^2}-2e^3x^2-12de^2\log(x)\right)(a+b\log(cx^n))-\frac{1}{4}(bn)\int \frac{-}{-}$$
$$= -\frac{3}{2}bde^2n\log^2(x)-\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6d^2e}{x^2}-2e^3x^2-12de^2\log(x)\right)(a+b\log(c$$
$$= -\frac{bd^3n}{16x^4}-\frac{3bd^2en}{4x^2}-\frac{1}{4}be^3nx^2-\frac{3}{2}bde^2n\log^2(x)-\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6d^2e}{x^2}-2e^3x$$

Mathematica [A]
time = 0.06, size = 115, normalized size = 0.88

$$\frac{1}{16}\left(-\frac{bd^3n}{x^4}-\frac{12bd^2en}{x^2}-4be^3nx^2-\frac{4d^3(a+b\log(cx^n))}{x^4}-\frac{24d^2e(a+b\log(cx^n))}{x^2}+8e^3x^2(a+b\log(cx^n))+\frac{24de^2(a+b\log(cx^n))^2}{bn}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] (-((b*d^3*n)/x^4) - (12*b*d^2*e*n)/x^2 - 4*b*e^3*n*x^2 - (4*d^3*(a + b*Log[
c*x^n]))/x^4 - (24*d^2*e*(a + b*Log[c*x^n]))/x^2 + 8*e^3*x^2*(a + b*Log[c*x
^n]) + (24*d*e^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.17, size = 602, normalized size = 4.60

method	result
risch	$-\frac{b\left(-2e^{3}x^{6}-12d\,e^{2}\ln(x)x^{4}+6d^{2}e\,x^{2}+d^{3}\right)\ln(x^{n})}{4x^{4}}-\frac{-8\ln(c)b\,e^{3}x^{6}-8x^{6}a\,e^{3}-4i\pi b\,e^{3}x^{6}\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^{n})^{2}-24i\ln(x)\pi bd\,e^{2}\mathrm{csgn}(i$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(-2*e^3*x^6-12*d*e^2*ln(x)*x^4+6*d^2*e*x^2+d^3)/x^4*ln(x^n)-1/16*(-8
*ln(c)*b*e^3*x^6-8*x^6*a*e^3+24*a*d^2*x^2*e+4*a*d^3+12*I*Pi*b*d^2*e*x^2*csg
n(I*c)*csgn(I*c*x^n)^2+4*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+2*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(
I*c*x^n)^2*e+24*I*ln(x)*Pi*b*d*e^2*csgn(I*c*x^n)^3*x^4+b*d^3*n+4*d^3*b*ln(c
)+24*ln(c)*b*d^2*x^2*e+24*I*ln(x)*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)*x^4-12*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*b*e^3*n
*x^6-4*I*Pi*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*b*d^2*e*x^2*csgn(
I*c*x^n)^3-2*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-24*I*ln(x)*Pi*b
*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*x^4+12*b*d^2*e*n*x^2-48*ln(x)*a*d*e^2*x^4+
2*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*e^3*x^6*csgn(I*c*x^n)^3-4
8*ln(x)*ln(c)*b*d*e^2*x^4+24*e^2*d*b*n*ln(x)^2*x^4-2*I*Pi*b*d^3*csgn(I*c*x^
n)^3-4*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*c*x^n)^2-24*I*ln(x)*Pi*b*d*e^2*csgn(
I*x^n)*csgn(I*c*x^n)^2*x^4)/x^4
```

Maxima [A]
time = 0.27, size = 131, normalized size = 1.00

$$-\frac{1}{4}\,bnx^{2}e^{3}+\frac{1}{2}\,bx^{2}e^{3}\log\left(cx^{n}\right)+\frac{1}{2}\,ax^{2}e^{3}+\frac{3\,bde^{2}\log\left(cx^{n}\right)^{2}}{2\,n}+3\,ade^{2}\log\left(x\right)-\frac{3\,bd^{2}ne}{4\,x^{2}}-\frac{3\,bd^{2}e\log\left(cx^{n}\right)}{2\,x^{2}}-\frac{3\,ad^{2}e}{2\,x^{2}}-\frac{bd^{3}n}{16\,x^{4}}-\frac{bd^{3}\log\left(cx^{n}\right)}{4\,x^{4}}-\frac{ad^{3}}{4\,x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*x^2*e^3 + 1/2*b*x^2*e^3*log(c*x^n) + 1/2*a*x^2*e^3 + 3/2*b*d*e^2*l
og(c*x^n)^2/n + 3*a*d*e^2*log(x) - 3/4*b*d^2*n*e/x^2 - 3/2*b*d^2*e*log(c*x^
n)/x^2 - 3/2*a*d^2*e/x^2 - 1/16*b*d^3*n/x^4 - 1/4*b*d^3*log(c*x^n)/x^4 - 1/
4*a*d^3/x^4
```

Fricas [A]
time = 0.37, size = 150, normalized size = 1.15

$$\frac{24\,bdnx^{4}e^{2}\log\left(x\right)^{2}-4\,(bn-2\,a)x^{6}e^{3}-bd^{3}n-4\,ad^{3}-12\,(bd^{2}n+2\,ad^{2})x^{2}e+4\,(2\,bx^{6}e^{3}-6\,bd^{2}x^{2}e-bd^{3})\log\left(c\right)+4\,(2\,bnx^{6}e^{3}+12\,bdx^{4}e^{2}\log\left(c\right)+12\,adx^{4}e^{2}-6\,bd^{2}nx^{2}e-bd^{3}n)\log\left(x\right)}{16\,x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] 1/16*(24*b*d*n*x^4*e^2*log(x)^2 - 4*(b*n - 2*a)*x^6*e^3 - b*d^3*n - 4*a*d^3
 - 12*(b*d^2*n + 2*a*d^2)*x^2*e + 4*(2*b*x^6*e^3 - 6*b*d^2*x^2*e - b*d^3)*l
og(c) + 4*(2*b*n*x^6*e^3 + 12*b*d*x^4*e^2*log(c) + 12*a*d*x^4*e^2 - 6*b*d^2
*n*x^2*e - b*d^3*n)*log(x))/x^4
```

Sympy [A]
time = 1.59, size = 209, normalized size = 1.60

$$\begin{cases} -\frac{ad^3}{4x^4} - \frac{3ad^2e}{2x^2} + \frac{3ade^2\log(cx^n)}{n} + \frac{ae^3x^2}{2} - \frac{bd^3n}{16x^4} - \frac{bd^3\log(cx^n)}{4x^4} - \frac{3bd^2en}{4x^2} - \frac{3bd^2e\log(cx^n)}{2x^2} + \frac{3bde^2\log(cx^n)^2}{2n} - \frac{be^3nx^2}{4} + \frac{be^3x^2\log(cx^n)}{2} & \text{for}\: n \neq 0 \\ (a + b\log(c))\left(-\frac{d^3}{4x^4} - \frac{3d^2e}{2x^2} + 3de^2\log(x) + \frac{e^3x^2}{2}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] Piecewise((-a*d**3/(4*x**4) - 3*a*d**2*e/(2*x**2) + 3*a*d*e**2*log(c*x**n)/
n + a*e**3*x**2/2 - b*d**3*n/(16*x**4) - b*d**3*log(c*x**n)/(4*x**4) - 3*b*
d**2*e*n/(4*x**2) - 3*b*d**2*e*log(c*x**n)/(2*x**2) + 3*b*d*e**2*log(c*x**n
)**2/(2*n) - b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x**n)/2, Ne(n, 0)), ((a +
b*log(c))*(-d**3/(4*x**4) - 3*d**2*e/(2*x**2) + 3*d*e**2*log(x) + e**3*x**2
/2), True))
```

Giac [A]
time = 3.92, size = 162, normalized size = 1.24

$$\frac{8\,bnx^6e^3\log(x) + 24\,bdnx^4e^2\log(x)^2 - 4\,bnx^6e^3 + 8\,bx^6e^3\log(c) + 48\,bdx^4e^2\log(c)\log(x) + 8\,ax^6e^3 + 48\,adx^4e^2\log(x) - 24\,bd^2nx^2e\log(x) - 12\,bd^2nx^2e - 24\,bd^2x^2e\log(c) - 24\,ad^2x^2e - 4\,bd^3n\log(x) - bd^3n - 4\,bd^3\log(c) - 4\,ad^3}{16\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

```
[Out] 1/16*(8*b*n*x^6*e^3*log(x) + 24*b*d*n*x^4*e^2*log(x)^2 - 4*b*n*x^6*e^3 + 8*
b*x^6*e^3*log(c) + 48*b*d*x^4*e^2*log(c)*log(x) + 8*a*x^6*e^3 + 48*a*d*x^4*
e^2*log(x) - 24*b*d^2*n*x^2*e*log(x) - 12*b*d^2*n*x^2*e - 24*b*d^2*x^2*e*lo
g(c) - 24*a*d^2*x^2*e - 4*b*d^3*n*log(x) - b*d^3*n - 4*b*d^3*log(c) - 4*a*d
^3)/x^4
```

Mupad [B]
time = 3.66, size = 149, normalized size = 1.14

$$\ln(x)\,\left(3\,a\,d\,e^2 + \frac{9\,b\,d\,e^2\,n}{4}\right) - \ln(c\,x^n)\,\left(\frac{\frac{b\,d^3}{4} + \frac{3\,b\,d^2\,e\,x^2}{2} + \frac{9\,b\,d\,e^2\,x^4}{4} + b\,e^3\,x^6}{x^4} - \frac{3\,b\,e^3\,x^2}{2}\right) - \frac{a\,d^3 + x^2\,(6\,a\,d^2\,e + 3\,b\,d^2\,e\,n) + \frac{b\,d^3\,n}{4}}{4\,x^4} + \frac{e^3\,x^2\,(2\,a - b\,n)}{4} + \frac{3\,b\,d\,e^2\,\ln(c\,x^n)^2}{2\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^5,x)
```

```
[Out] log(x)*(3*a*d*e^2 + (9*b*d*e^2*n)/4) - log(c*x^n)*(((b*d^3)/4 + b*e^3*x^6 +
 (3*b*d^2*e*x^2)/2 + (9*b*d*e^2*x^4)/4)/x^4 - (3*b*e^3*x^2)/2) - (a*d^3 + x
^2*(6*a*d^2*e + 3*b*d^2*e*n) + (b*d^3*n)/4)/(4*x^4) + (e^3*x^2*(2*a - b*n))
/4 + (3*b*d*e^2*log(c*x^n)^2)/(2*n)
```

3.202 $\int x^4(d+ex^2)^3\,(a+b\log(cx^n))\;dx$

Optimal. Leaf size=100

$$-\frac{1}{25}bd^3nx^5-\frac{3}{49}bd^2enx^7-\frac{1}{27}bde^2nx^9-\frac{1}{121}be^3nx^{11}+\frac{(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11})\,(a+b\log$$

```
[Out] -1/25*b*d^3*n*x^5-3/49*b*d^2*e*n*x^7-1/27*b*d*e^2*n*x^9-1/121*b*e^3*n*x^11+
1/1155*(105*e^3*x^11+385*d*e^2*x^9+495*d^2*e*x^7+231*d^3*x^5)*(a+b*ln(c*x^n
))
```

Rubi [A]
time = 0.07, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {276, 2371}

$$\frac{(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11})\,(a+b\log(cx^n))}{1155}-\frac{1}{25}bd^3nx^5-\frac{3}{49}bd^2enx^7-\frac{1}{27}bde^2nx^9-\frac{1}{121}be^3nx^{11}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d^3*n*x^5) - (3*b*d^2*e*n*x^7)/49 - (b*d*e^2*n*x^9)/27 - (b*e^3*n*
x^11)/121 + ((231*d^3*x^5 + 495*d^2*e*x^7 + 385*d*e^2*x^9 + 105*e^3*x^11)*(
a + b*Log[c*x^n]))/1155
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^4\left(d+ex^2\right)^3\,(a+b\log(cx^n))\;dx&=\frac{(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11})\,(a+b\log(cx^n))}{1155}-(bn\\&=-\frac{1}{25}bd^3nx^5-\frac{3}{49}bd^2enx^7-\frac{1}{27}bde^2nx^9-\frac{1}{121}be^3nx^{11}+\frac{(231d^3x^5+\end{aligned}$$

Mathematica [A]
time = 0.03, size = 133, normalized size = 1.33

$$-\frac{1}{25}bd^3nx^5-\frac{3}{49}bd^2enx^7-\frac{1}{27}bde^2nx^9-\frac{1}{121}be^3nx^{11}+\frac{1}{5}d^3x^5(a+b\log(cx^n))+\frac{3}{7}d^2ex^7(a+b\log(cx^n))+\frac{1}{3}de^2x^9(a+b\log(cx^n))+\frac{1}{11}e^3x^{11}(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d^3*n*x^5) - (3*b*d^2*e*n*x^7)/49 - (b*d*e^2*n*x^9)/27 - (b*e^3*n*
x^11)/121 + (d^3*x^5*(a + b*Log[c*x^n]))/5 + (3*d^2*e*x^7*(a + b*Log[c*x^n]
))/7 + (d*e^2*x^9*(a + b*Log[c*x^n]))/3 + (e^3*x^11*(a + b*Log[c*x^n]))/11
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 602, normalized size = 6.02

method	result
risch	$\frac{x^{11}a\,e^3}{11}+\frac{x^5a\,d^3}{5}-\frac{i\pi b\,d^3x^5\mathrm{csgn}(ic\,x^n)^3}{10}+\frac{x^9ad\,e^2}{3}+\frac{3x^7a\,d^2e}{7}-\frac{i\pi b\,e^3x^{11}\mathrm{csgn}(ic\,x^n)^3}{22}+\frac{i\pi bd\,e^2x^9\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{6}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/11*x^11*a*e^3+1/5*x^5*a*d^3-1/6*I*Pi*b*d*e^2*x^9*csgn(I*c*x^n)^3+1/3*x^9*
a*d*e^2+3/7*x^7*a*d^2*e+3/14*I*Pi*b*d^2*e*x^7*csgn(I*c)*csgn(I*c*x^n)^2-1/2
2*I*Pi*b*e^3*x^11*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/6*I*Pi*b*d*e^2*x^9*
csgn(I*c)*csgn(I*c*x^n)^2+1/6*I*Pi*b*d*e^2*x^9*csgn(I*x^n)*csgn(I*c*x^n)^2+
1/11*ln(c)*b*e^3*x^11+1/5*ln(c)*b*d^3*x^5+1/3*ln(c)*b*d*e^2*x^9+3/7*ln(c)*b
*d^2*e*x^7-1/10*I*Pi*b*d^3*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3/14*I*P
i*b*d^2*e*x^7*csgn(I*x^n)*csgn(I*c*x^n)^2-1/22*I*Pi*b*e^3*x^11*csgn(I*c*x^n
)^3-1/10*I*Pi*b*d^3*x^5*csgn(I*c*x^n)^3+1/1155*b*x^5*(105*e^3*x^6+385*d*e^2
*x^4+495*d^2*e*x^2+231*d^3)*ln(x^n)+1/22*I*Pi*b*e^3*x^11*csgn(I*c)*csgn(I*c
*x^n)^2-1/25*b*d^3*n*x^5-1/121*b*e^3*n*x^11-3/14*I*Pi*b*d^2*e*x^7*csgn(I*c*
x^n)^3+1/10*I*Pi*b*d^3*x^5*csgn(I*c)*csgn(I*c*x^n)^2-1/6*I*Pi*b*d*e^2*x^9*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/14*I*Pi*b*d^2*e*x^7*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)+1/22*I*Pi*b*e^3*x^11*csgn(I*x^n)*csgn(I*c*x^n)^2-3/49*b*d
^2*e*n*x^7-1/27*b*d*e^2*n*x^9+1/10*I*Pi*b*d^3*x^5*csgn(I*x^n)*csgn(I*c*x^n)
^2
```

Maxima [A]
time = 0.26, size = 140, normalized size = 1.40

$$-\frac{1}{121}bnx^{11}e^3+\frac{1}{11}bx^{11}e^3\log(cx^n)+\frac{1}{11}ax^{11}e^3-\frac{1}{27}bdnx^9e^2+\frac{1}{3}bdx^9e^2\log(cx^n)+\frac{1}{3}adx^9e^2-\frac{3}{49}bd^2nx^7e+\frac{3}{7}bd^2x^7e\log(cx^n)+\frac{3}{7}ad^2x^7e-\frac{1}{25}bd^3nx^5+\frac{1}{5}bd^3x^5\log(cx^n)+\frac{1}{5}ad^3x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/121*b*n*x^11*e^3 + 1/11*b*x^11*e^3*log(c*x^n) + 1/11*a*x^11*e^3 - 1/27*b
*d*n*x^9*e^2 + 1/3*b*d*x^9*e^2*log(c*x^n) + 1/3*a*d*x^9*e^2 - 3/49*b*d^2*n*
x^7*e + 3/7*b*d^2*x^7*e*log(c*x^n) + 3/7*a*d^2*x^7*e - 1/25*b*d^3*n*x^5 + 1
/5*b*d^3*x^5*log(c*x^n) + 1/5*a*d^3*x^5
```

Fricas [A]
time = 0.37, size = 157, normalized size = 1.57

$$-\frac{1}{121}(bn-11a)x^{11}e^3-\frac{1}{27}(bdn-9ad)x^9e^2-\frac{3}{49}(bd^2n-7ad^2)x^7e-\frac{1}{25}(bd^3n-5ad^3)x^5+\frac{1}{1155}(105bx^{11}e^3+385bdx^9e^2+495bd^2x^7e+231bd^3x^5)\log(c)+\frac{1}{1155}(105bnx^{11}e^3+385bdnx^9e^2+495bd^2nx^7e+231bd^3nx^5)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/121*(b*n - 11*a)*x^11*e^3 - 1/27*(b*d*n - 9*a*d)*x^9*e^2 - 3/49*(b*d^2*n
 - 7*a*d^2)*x^7*e - 1/25*(b*d^3*n - 5*a*d^3)*x^5 + 1/1155*(105*b*x^11*e^3 +
 385*b*d*x^9*e^2 + 495*b*d^2*x^7*e + 231*b*d^3*x^5)*log(c) + 1/1155*(105*b*
n*x^11*e^3 + 385*b*d*n*x^9*e^2 + 495*b*d^2*n*x^7*e + 231*b*d^3*n*x^5)*log(x
)
```

Sympy [A]
time = 3.35, size = 170, normalized size = 1.70

$$\frac{ad^3x^5}{5}+\frac{3ad^2ex^7}{7}+\frac{ade^2x^9}{3}+\frac{ae^3x^{11}}{11}-\frac{bd^3nx^5}{25}+\frac{bd^3x^5\log(cx^n)}{5}-\frac{3bd^2enx^7}{49}+\frac{3bd^2ex^7\log(cx^n)}{7}-\frac{bde^2nx^9}{27}+\frac{bde^2x^9\log(cx^n)}{3}-\frac{be^3nx^{11}}{121}+\frac{be^3x^{11}\log(cx^n)}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**5/5 + 3*a*d**2*e*x**7/7 + a*d*e**2*x**9/3 + a*e**3*x**11/11 - b*d
**3*n*x**5/25 + b*d**3*x**5*log(c*x**n)/5 - 3*b*d**2*e*n*x**7/49 + 3*b*d**2
*e*x**7*log(c*x**n)/7 - b*d*e**2*n*x**9/27 + b*d*e**2*x**9*log(c*x**n)/3 -
b*e**3*n*x**11/121 + b*e**3*x**11*log(c*x**n)/11
```

Giac [A]
time = 3.38, size = 173, normalized size = 1.73

$$\frac{1}{11}bnx^{11}e^3\log(x)-\frac{1}{121}bnx^{11}e^3+\frac{1}{11}bx^{11}e^3\log(c)+\frac{1}{3}bdnx^9e^2\log(x)+\frac{1}{11}ax^{11}e^3-\frac{1}{27}bdnx^9e^2+\frac{1}{3}bdx^9e^2\log(c)+\frac{3}{7}bd^2nx^7e\log(x)+\frac{1}{3}adx^9e^2-\frac{3}{49}bd^2nx^7e+\frac{3}{7}bd^2x^7e\log(c)+\frac{3}{7}ad^2x^7e+\frac{1}{5}bd^3nx^5\log(x)-\frac{1}{25}bd^3nx^5+\frac{1}{5}bd^3x^5\log(c)+\frac{1}{5}ad^3x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/11*b*n*x^11*e^3*log(x) - 1/121*b*n*x^11*e^3 + 1/11*b*x^11*e^3*log(c) + 1/
3*b*d*n*x^9*e^2*log(x) + 1/11*a*x^11*e^3 - 1/27*b*d*n*x^9*e^2 + 1/3*b*d*x^9
*e^2*log(c) + 3/7*b*d^2*n*x^7*e*log(x) + 1/3*a*d*x^9*e^2 - 3/49*b*d^2*n*x^7
*e + 3/7*b*d^2*x^7*e*log(c) + 3/7*a*d^2*x^7*e + 1/5*b*d^3*n*x^5*log(x) - 1/
25*b*d^3*n*x^5 + 1/5*b*d^3*x^5*log(c) + 1/5*a*d^3*x^5
```

Mupad [B]
time = 3.73, size = 113, normalized size = 1.13

$$\ln(c\,x^n)\,\left(\frac{b\,d^3\,x^5}{5}+\frac{3\,b\,d^2\,e\,x^7}{7}+\frac{b\,d\,e^2\,x^9}{3}+\frac{b\,e^3\,x^{11}}{11}\right)+\frac{d^3\,x^5\,(5\,a-b\,n)}{25}+\frac{e^3\,x^{11}\,(11\,a-b\,n)}{121}+\frac{3\,d^2\,e\,x^7\,(7\,a-b\,n)}{49}+\frac{d\,e^2\,x^9\,(9\,a-b\,n)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^3*x^5)/5 + (b*e^3*x^11)/11 + (3*b*d^2*e*x^7)/7 + (b*d*e^2*
x^9)/3) + (d^3*x^5*(5*a - b*n))/25 + (e^3*x^11*(11*a - b*n))/121 + (3*d^2*e
*x^7*(7*a - b*n))/49 + (d*e^2*x^9*(9*a - b*n))/27
```

3.203 $\int x^2(d+ex^2)^3(a+b\log(cx^n))\,dx$

Optimal. Leaf size=100

$$-\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log$$

```
[Out] -1/9*b*d^3*n*x^3-3/25*b*d^2*e*n*x^5-3/49*b*d*e^2*n*x^7-1/81*b*e^3*n*x^9+1/3
15*(35*e^3*x^9+135*d*e^2*x^7+189*d^2*e*x^5+105*d^3*x^3)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {276, 2371}

$$\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))-\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^5)/25 - (3*b*d*e^2*n*x^7)/49 - (b*e^3*n
*x^9)/81 + ((105*d^3*x^3 + 189*d^2*e*x^5 + 135*d*e^2*x^7 + 35*e^3*x^9)*(a +
 b*Log[c*x^n]))/315
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^2\left(d+ex^2\right)^3(a+b\log(cx^n))\,dx=\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))-($$

$$=-\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{315}\left(105d^3x^3+\right.$$

Mathematica [A]
time = 0.04, size = 133, normalized size = 1.33

$$-\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{3}d^3x^3(a+b\log(cx^n))+\frac{3}{5}d^2ex^5(a+b\log(cx^n))+\frac{3}{7}de^2x^7(a+b\log(cx^n))+\frac{1}{9}e^3x^9(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^5)/25 - (3*b*d*e^2*n*x^7)/49 - (b*e^3*n
*x^9)/81 + (d^3*x^3*(a + b*Log[c*x^n]))/3 + (3*d^2*e*x^5*(a + b*Log[c*x^n])
)/5 + (3*d*e^2*x^7*(a + b*Log[c*x^n]))/7 + (e^3*x^9*(a + b*Log[c*x^n]))/9
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 602, normalized size = 6.02

method	result
risch	$\frac{\ln(c) b\, d^3 x^3}{3}+\frac{x^3 a\, d^3}{3}+\frac{x^9 a\, e^3}{9}+\frac{3x^7 a d\, e^2}{7}-\frac{i\pi b\, e^3 x^9 \mathrm{csgn}(ic\, x^n)^3}{18}-\frac{i\pi b\, d^3 x^3 \mathrm{csgn}(ic\, x^n)^3}{6}+\frac{3i\pi b\, d^2 e\, x^5 \mathrm{csgn}(ic)\mathrm{csgn}(ic\, x^n)^2}{10}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*ln(c)*b*d^3*x^3+1/3*x^3*a*d^3+1/9*x^9*a*e^3+3/14*I*Pi*b*d*e^2*x^7*csgn(
I*c)*csgn(I*c*x^n)^2+3/7*x^7*a*d*e^2-1/6*I*Pi*b*d^3*x^3*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-1/18*I*Pi*b*e^3*x^9*csgn(I*c*x^n)^3+3/14*I*Pi*b*d*e^2*x^7*
csgn(I*x^n)*csgn(I*c*x^n)^2-1/18*I*Pi*b*e^3*x^9*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+3/10*I*Pi*b*d^2*e*x^5*csgn(I*c)*csgn(I*c*x^n)^2+1/9*ln(c)*b*e^3*x^
9+3/10*I*Pi*b*d^2*e*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2-1/6*I*Pi*b*d^3*x^3*csgn
(I*c*x^n)^3+3/7*ln(c)*b*d*e^2*x^7+1/315*b*x^3*(35*e^3*x^6+135*d*e^2*x^4+189
*d^2*e*x^2+105*d^3)*ln(x^n)-3/10*I*Pi*b*d^2*e*x^5*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)-3/14*I*Pi*b*d*e^2*x^7*csgn(I*c*x^n)^3+1/18*I*Pi*b*e^3*x^9*csgn(I
*c)*csgn(I*c*x^n)^2-1/9*b*d^3*n*x^3-3/25*b*d^2*e*n*x^5-1/81*b*e^3*n*x^9+1/1
8*I*Pi*b*e^3*x^9*csgn(I*x^n)*csgn(I*c*x^n)^2-3/10*I*Pi*b*d^2*e*x^5*csgn(I*c
*x^n)^3+1/6*I*Pi*b*d^3*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-3/49*b*d*e^2*n*x^7+3
/5*ln(c)*b*d^2*e*x^5+1/6*I*Pi*b*d^3*x^3*csgn(I*c)*csgn(I*c*x^n)^2-3/14*I*Pi
*b*d*e^2*x^7*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3/5*a*d^2*e*x^5
```

Maxima [A]
time = 0.27, size = 140, normalized size = 1.40

$$-\frac{1}{81}bnx^9e^3+\frac{1}{9}bx^9e^3\log(cx^n)+\frac{1}{9}ax^9e^3-\frac{3}{49}bdnx^7e^2+\frac{3}{7}bdx^7e^2\log(cx^n)+\frac{3}{7}adx^7e^2-\frac{3}{25}bd^2nx^5e+\frac{3}{5}bd^2x^5e\log(cx^n)+\frac{3}{5}ad^2x^5e-\frac{1}{9}bd^3nx^3+\frac{1}{3}bd^3x^3\log(cx^n)+\frac{1}{3}ad^3x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/81*b*n*x^9*e^3 + 1/9*b*x^9*e^3*log(c*x^n) + 1/9*a*x^9*e^3 - 3/49*b*d*n*x
^7*e^2 + 3/7*b*d*x^7*e^2*log(c*x^n) + 3/7*a*d*x^7*e^2 - 3/25*b*d^2*n*x^5*e
+ 3/5*b*d^2*x^5*e*log(c*x^n) + 3/5*a*d^2*x^5*e - 1/9*b*d^3*n*x^3 + 1/3*b*d^
3*x^3*log(c*x^n) + 1/3*a*d^3*x^3
```

Fricas [A]
time = 0.34, size = 157, normalized size = 1.57

$$-\frac{1}{81}\,(bn-9\,a)x^9e^3-\frac{3}{49}\,(bdn-7\,ad)x^7e^2-\frac{3}{25}\,\left(bd^2n-5\,ad^2\right)x^5e-\frac{1}{9}\,\left(bd^3n-3\,ad^3\right)x^3+\frac{1}{315}\,\left(35\,bx^9e^3+135\,bdx^7e^2+189\,bd^2x^5e+105\,bd^3x^3\right)\log\left(c\right)+\frac{1}{315}\,\left(35\,bnx^9e^3+135\,bdnx^7e^2+189\,bd^2nx^5e+105\,bd^3nx^3\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/81*(b*n - 9*a)*x^9*e^3 - 3/49*(b*d*n - 7*a*d)*x^7*e^2 - 3/25*(b*d^2*n -
5*a*d^2)*x^5*e - 1/9*(b*d^3*n - 3*a*d^3)*x^3 + 1/315*(35*b*x^9*e^3 + 135*b*
d*x^7*e^2 + 189*b*d^2*x^5*e + 105*b*d^3*x^3)*log(c) + 1/315*(35*b*n*x^9*e^3
 + 135*b*d*n*x^7*e^2 + 189*b*d^2*n*x^5*e + 105*b*d^3*n*x^3)*log(x)
```

Sympy [A]
time = 1.75, size = 175, normalized size = 1.75

$$\frac{ad^3x^3}{3}+\frac{3ad^2ex^5}{5}+\frac{3ade^2x^7}{7}+\frac{ae^3x^9}{9}-\frac{bd^3nx^3}{9}+\frac{bd^3x^3\log\left(cx^n\right)}{3}-\frac{3bd^2enx^5}{25}+\frac{3bd^2ex^5\log\left(cx^n\right)}{5}-\frac{3bde^2nx^7}{49}+\frac{3bde^2x^7\log\left(cx^n\right)}{7}-\frac{be^3nx^9}{81}+\frac{be^3x^9\log\left(cx^n\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x**3/3 + 3*a*d**2*e*x**5/5 + 3*a*d*e**2*x**7/7 + a*e**3*x**9/9 - b*d
**3*n*x**3/9 + b*d**3*x**3*log(c*x**n)/3 - 3*b*d**2*e*n*x**5/25 + 3*b*d**2*
e*x**5*log(c*x**n)/5 - 3*b*d*e**2*n*x**7/49 + 3*b*d*e**2*x**7*log(c*x**n)/7
 - b*e**3*n*x**9/81 + b*e**3*x**9*log(c*x**n)/9
```

Giac [A]
time = 4.51, size = 173, normalized size = 1.73

$$\frac{1}{9}\,bnx^9e^3\log\left(x\right)-\frac{1}{81}\,bnx^9e^3+\frac{1}{9}\,bx^9e^3\log\left(c\right)+\frac{3}{7}\,bdnx^7e^2\log\left(x\right)+\frac{1}{9}\,ax^9e^3-\frac{3}{49}\,bdnx^7e^2+\frac{3}{7}\,bdx^7e^2\log\left(c\right)+\frac{3}{5}\,bd^2nx^5e\log\left(x\right)+\frac{3}{7}\,adx^7e^2-\frac{3}{25}\,bd^2nx^5e+\frac{3}{5}\,bd^2x^5e\log\left(c\right)+\frac{3}{5}\,ad^2x^5e+\frac{1}{3}\,bd^3nx^3\log\left(x\right)-\frac{1}{9}\,bd^3nx^3+\frac{1}{3}\,bd^3x^3\log\left(c\right)+\frac{1}{3}\,ad^3x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/9*b*n*x^9*e^3*log(x) - 1/81*b*n*x^9*e^3 + 1/9*b*x^9*e^3*log(c) + 3/7*b*d*
n*x^7*e^2*log(x) + 1/9*a*x^9*e^3 - 3/49*b*d*n*x^7*e^2 + 3/7*b*d*x^7*e^2*log
(c) + 3/5*b*d^2*n*x^5*e*log(x) + 3/7*a*d*x^7*e^2 - 3/25*b*d^2*n*x^5*e + 3/5
*b*d^2*x^5*e*log(c) + 3/5*a*d^2*x^5*e + 1/3*b*d^3*n*x^3*log(x) - 1/9*b*d^3*
n*x^3 + 1/3*b*d^3*x^3*log(c) + 1/3*a*d^3*x^3
```

Mupad [B]
time = 3.63, size = 113, normalized size = 1.13

$$\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^3}{3}+\frac{3\,b\,d^2\,e\,x^5}{5}+\frac{3\,b\,d\,e^2\,x^7}{7}+\frac{b\,e^3\,x^9}{9}\right)+\frac{d^3\,x^3\,\left(3\,a-b\,n\right)}{9}+\frac{e^3\,x^9\,\left(9\,a-b\,n\right)}{81}+\frac{3\,d^2\,e\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{3\,d\,e^2\,x^7\,\left(7\,a-b\,n\right)}{49}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*d^3*x^3)/3 + (b*e^3*x^9)/9 + (3*b*d^2*e*x^5)/5 + (3*b*d*e^2*
x^7)/7) + (d^3*x^3*(3*a - b*n))/9 + (e^3*x^9*(9*a - b*n))/81 + (3*d^2*e*x^5
*(5*a - b*n))/25 + (3*d*e^2*x^7*(7*a - b*n))/49
```

3.204 $\int (d+ex^2)^3 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=121

$$-bd^3nx-\frac{1}{3}bd^2enx^3-\frac{3}{25}bde^2nx^5-\frac{1}{49}be^3nx^7+d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log$$

```
[Out] -b*d^3*n*x-1/3*b*d^2*e*n*x^3-3/25*b*d*e^2*n*x^5-1/49*b*e^3*n*x^7+d^3*x*(a+b
*ln(c*x^n))+d^2*e*x^3*(a+b*ln(c*x^n))+3/5*d*e^2*x^5*(a+b*ln(c*x^n))+1/7*e^3
*x^7*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.04, antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {200, 2350}

$$d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))-bd^3nx-\frac{1}{3}bd^2enx^3-\frac{3}{25}bde^2nx^5-\frac{1}{49}be^3nx^7$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d^3*n*x) - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*n*x^7)/49
+ d^3*x*(a + b*Log[c*x^n]) + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*d*e^2*x^5*(a
 + b*Log[c*x^n]))/5 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

Rule 200

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[ExpandIntegrand[(a + b*
x^n)^p, x], x] /; FreeQ[{a, b}, x] && IGtQ[n, 0] && IGtQ[p, 0]
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex^2)^3 (a+b\log(cx^n))\, dx &= \frac{1}{35}\left(35d^3x+35d^2ex^3+21de^2x^5+5e^3x^7\right)(a+b\log(cx^n))-(bn)\int \Big(d\\ &= -bd^3nx-\frac{1}{3}bd^2enx^3-\frac{3}{25}bde^2nx^5-\frac{1}{49}be^3nx^7+\frac{1}{35}\big(35d^3x+35d^2ex^3\end{aligned}$$

Mathematica [A]
time = 0.03, size = 124, normalized size = 1.02

$$ad^3x-bd^3nx-\frac{1}{3}bd^2enx^3-\frac{3}{25}bde^2nx^5-\frac{1}{49}be^3nx^7+bd^3x\log(cx^n)+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] a*d^3*x - b*d^3*n*x - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*n*x
^7)/49 + b*d^3*x*Log[c*x^n] + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*d*e^2*x^5*(
a + b*Log[c*x^n]))/5 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 582, normalized size = 4.81

method	result
risch	$xa\,d^3+\frac{x^7 a\,e^3}{7}+\frac{3\ln(c) bd\,e^2 x^5}{5}+x^3 a\,d^2 e+\frac{3x^5 ad\,e^2}{5}+\frac{3i\pi bd\,e^2 x^5 \mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{10}-b\,d^3 nx+\ln(c)\,b\,d^3 x$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] x*a*d^3+1/7*x^7*a*e^3+3/5*ln(c)*b*d*e^2*x^5-1/2*I*Pi*b*d^2*e*x^3*csgn(I*c*x
^n)^3+1/2*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2*x+1/2*I*Pi*b*d^3*csgn(I*x^n)
*csgn(I*c*x^n)^2*x+x^3*a*d^2*e+3/5*x^5*a*d*e^2+1/2*I*Pi*b*d^2*e*x^3*csgn(I*
c)*csgn(I*c*x^n)^2+1/2*I*Pi*b*d^2*e*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/14*I*
Pi*b*e^3*x^7*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*I*Pi*b*d^3*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*x+3/10*I*Pi*b*d*e^2*x^5*csgn(I*c)*csgn(I*c*x^n)^2+
3/10*I*Pi*b*d*e^2*x^5*csgn(I*x^n)*csgn(I*c*x^n)^2+1/14*I*Pi*b*e^3*x^7*csgn(
I*c)*csgn(I*c*x^n)^2-3/10*I*Pi*b*d*e^2*x^5*csgn(I*c*x^n)^3-b*d^3*n*x+ln(c)*
b*d^3*x+1/35*b*x*(5*e^3*x^6+21*d*e^2*x^4+35*d^2*e*x^2+35*d^3)*ln(x^n)+ln(c)
*b*d^2*e*x^3-1/2*I*Pi*b*d^2*e*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/10*
I*Pi*b*d*e^2*x^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/49*b*e^3*n*x^7-3/25*
b*d*e^2*n*x^5-1/3*b*d^2*e*n*x^3+1/14*I*Pi*b*e^3*x^7*csgn(I*x^n)*csgn(I*c*x^
n)^2-1/14*I*Pi*b*e^3*x^7*csgn(I*c*x^n)^3-1/2*I*Pi*b*d^3*csgn(I*c*x^n)^3*x+1
/7*ln(c)*b*e^3*x^7
```

Maxima [A]
time = 0.26, size = 130, normalized size = 1.07

$$-\frac{1}{49}bnx^7e^3+\frac{1}{7}bx^7e^3\log(cx^n)+\frac{1}{7}ax^7e^3-\frac{3}{25}bdnx^5e^2+\frac{3}{5}bdx^5e^2\log(cx^n)+\frac{3}{5}adx^5e^2-\frac{1}{3}bd^2nx^3e+bd^2x^3e\log(cx^n)+ad^2x^3e-bd^3nx+bd^3x\log(cx^n)+ad^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/49*b*n*x^7*e^3 + 1/7*b*x^7*e^3*log(c*x^n) + 1/7*a*x^7*e^3 - 3/25*b*d*n*x
^5*e^2 + 3/5*b*d*x^5*e^2*log(c*x^n) + 3/5*a*d*x^5*e^2 - 1/3*b*d^2*n*x^3*e +
 b*d^2*x^3*e*log(c*x^n) + a*d^2*x^3*e - b*d^3*n*x + b*d^3*x*log(c*x^n) + a*
d^3*x
```

Fricas [A]
time = 0.38, size = 151, normalized size = 1.25

$$-\frac{1}{49}\left(bn-7\,a\right)x^{7}e^{3}-\frac{3}{25}\left(bdn-5\,ad\right)x^{5}e^{2}-\frac{1}{3}\left(bd^{2}n-3\,ad^{2}\right)x^{3}e-\left(bd^{3}n-ad^{3}\right)x+\frac{1}{35}\left(5\,bx^{7}e^{3}+21\,bdx^{5}e^{2}+35\,bd^{2}x^{3}e+35\,bd^{3}x\right)\log\left(c\right)+\frac{1}{35}\left(5\,bnx^{7}e^{3}+21\,bdnx^{5}e^{2}+35\,bd^{2}nx^{3}e+35\,bd^{3}nx\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] -1/49*(b*n - 7*a)*x^7*e^3 - 3/25*(b*d*n - 5*a*d)*x^5*e^2 - 1/3*(b*d^2*n - 3
*a*d^2)*x^3*e - (b*d^3*n - a*d^3)*x + 1/35*(5*b*x^7*e^3 + 21*b*d*x^5*e^2 +
35*b*d^2*x^3*e + 35*b*d^3*x)*log(c) + 1/35*(5*b*n*x^7*e^3 + 21*b*d*n*x^5*e^
2 + 35*b*d^2*n*x^3*e + 35*b*d^3*n*x)*log(x)
```

Sympy [A]
time = 0.97, size = 156, normalized size = 1.29

$$ad^{3}x+ad^{2}ex^{3}+\frac{3ade^{2}x^{5}}{5}+\frac{ae^{3}x^{7}}{7}-bd^{3}nx+bd^{3}x\log\left(cx^{n}\right)-\frac{bd^{2}enx^{3}}{3}+bd^{2}ex^{3}\log\left(cx^{n}\right)-\frac{3bde^{2}nx^{5}}{25}+\frac{3bde^{2}x^{5}\log\left(cx^{n}\right)}{5}-\frac{be^{3}nx^{7}}{49}+\frac{be^{3}x^{7}\log\left(cx^{n}\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x + a*d**2*e*x**3 + 3*a*d*e**2*x**5/5 + a*e**3*x**7/7 - b*d**3*n*x +
 b*d**3*x*log(c*x**n) - b*d**2*e*n*x**3/3 + b*d**2*e*x**3*log(c*x**n) - 3*b
*d*e**2*n*x**5/25 + 3*b*d*e**2*x**5*log(c*x**n)/5 - b*e**3*n*x**7/49 + b*e*
*3*x**7*log(c*x**n)/7
```

Giac [A]
time = 3.92, size = 159, normalized size = 1.31

$$\frac{1}{7}\,bnx^{7}e^{3}\log\left(x\right)-\frac{1}{49}\,bnx^{7}e^{3}+\frac{1}{7}\,bx^{7}e^{3}\log\left(c\right)+\frac{3}{5}\,bdnx^{5}e^{2}\log\left(x\right)+\frac{1}{7}\,ax^{7}e^{3}-\frac{3}{25}\,bdnx^{5}e^{2}+\frac{3}{5}\,bdx^{5}e^{2}\log\left(c\right)+bd^{2}nx^{3}e\log\left(x\right)+\frac{3}{5}\,adx^{5}e^{2}-\frac{1}{3}\,bd^{2}nx^{3}e+bd^{2}x^{3}e\log\left(c\right)+ad^{2}x^{3}e+bd^{3}nx\log\left(x\right)-bd^{3}nx+bd^{3}x\log\left(c\right)+ad^{3}x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/7*b*n*x^7*e^3*log(x) - 1/49*b*n*x^7*e^3 + 1/7*b*x^7*e^3*log(c) + 3/5*b*d*
n*x^5*e^2*log(x) + 1/7*a*x^7*e^3 - 3/25*b*d*n*x^5*e^2 + 3/5*b*d*x^5*e^2*log
(c) + b*d^2*n*x^3*e*log(x) + 3/5*a*d*x^5*e^2 - 1/3*b*d^2*n*x^3*e + b*d^2*x^
3*e*log(c) + a*d^2*x^3*e + b*d^3*n*x*log(x) - b*d^3*n*x + b*d^3*x*log(c) +
a*d^3*x
```

Mupad [B]
time = 3.72, size = 104, normalized size = 0.86

$$\ln\left(c\,x^n\right)\,\left(b\,d^3\,x+b\,d^2\,e\,x^3+\frac{3\,b\,d\,e^2\,x^5}{5}+\frac{b\,e^3\,x^7}{7}\right)+\frac{e^3\,x^7\,\left(7\,a-b\,n\right)}{49}+d^3\,x\,\left(a-b\,n\right)+\frac{d^2\,e\,x^3\,\left(3\,a-b\,n\right)}{3}+\frac{3\,d\,e^2\,x^5\,\left(5\,a-b\,n\right)}{25}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] log(c*x^n)*((b*e^3*x^7)/7 + b*d^3*x + b*d^2*e*x^3 + (3*b*d*e^2*x^5)/5) + (e
^3*x^7*(7*a - b*n))/49 + d^3*x*(a - b*n) + (d^2*e*x^3*(3*a - b*n))/3 + (3*d
*e^2*x^5*(5*a - b*n))/25
```

3.205 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2} dx$

Optimal. Leaf size=118

$$-\frac{bd^3n}{x}-3bd^2enx-\frac{1}{3}bde^2nx^3-\frac{1}{25}be^3nx^5-\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n))+de^2x^3(a+b\log(cx^n)$$

```
[Out] -b*d^3*n/x-3*b*d^2*e*n*x-1/3*b*d*e^2*n*x^3-1/25*b*e^3*n*x^5-d^3*(a+b*ln(c*x
^n))/x+3*d^2*e*x*(a+b*ln(c*x^n))+d*e^2*x^3*(a+b*ln(c*x^n))+1/5*e^3*x^5*(a+b
*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 118, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {276, 2372}

$$-\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n))+de^2x^3(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))-\frac{bd^3n}{x}-3bd^2enx-\frac{1}{3}bde^2nx^3-\frac{1}{25}be^3nx^5$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^3*n)/x) - 3*b*d^2*e*n*x - (b*d*e^2*n*x^3)/3 - (b*e^3*n*x^5)/25 - (d^
3*(a + b*Log[c*x^n]))/x + 3*d^2*e*x*(a + b*Log[c*x^n]) + d*e^2*x^3*(a + b*L
og[c*x^n]) + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2} dx = -\frac{1}{5}\left(\frac{5d^3}{x}-15d^2ex-5de^2x^3-e^3x^5\right)(a+b\log(cx^n))-(bn)\int\left(3d^2e\right.$$

$$= -\frac{bd^3n}{x}-3bd^2enx-\frac{1}{3}bde^2nx^3-\frac{1}{25}be^3nx^5-\frac{1}{5}\left(\frac{5d^3}{x}-15d^2ex-5de^2\right.$$

Mathematica [A]
time = 0.04, size = 123, normalized size = 1.04

$$-\frac{bd^3n}{x}+3ad^2ex-3bd^2enx-\frac{1}{3}bde^2nx^3-\frac{1}{25}be^3nx^5+3bd^2ex\log\left(cx^n\right)-\frac{d^3(a+b\log\left(cx^n\right))}{x}+de^2x^3(a+b\log\left(cx^n\right))+\frac{1}{5}e^3x^5(a+b\log\left(cx^n\right))$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^3*n)/x) + 3*a*d^2*e*x - 3*b*d^2*e*n*x - (b*d*e^2*n*x^3)/3 - (b*e^3*n
*x^5)/25 + 3*b*d^2*e*x*Log[c*x^n] - (d^3*(a + b*Log[c*x^n]))/x + d*e^2*x^3*
(a + b*Log[c*x^n]) + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 587, normalized size = 4.97

method	result
risch	$-\frac{b(-e^3x^6-5d\,e^2x^4-15d^2e\,x^2+5d^3)\ln(x^n)}{5x}-\frac{-30\ln(c)b\,e^3x^6-30x^6a\,e^3-15i\pi b\,e^3x^6\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-225i\pi b\,d^2x^2\mathrm{csgn}(ix^n)\mathrm{cs}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/5*b*(-e^3*x^6-5*d*e^2*x^4-15*d^2*e*x^2+5*d^3)/x*ln(x^n)-1/150*(-30*ln(c)
*b*e^3*x^6-30*x^6*a*e^3-225*I*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2*e-15
0*x^4*a*d*e^2-450*a*d^2*x^2*e-75*I*Pi*b*d*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)
^2-225*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+150*a*d^3-75*I*Pi*b*d*e^2
*x^4*csgn(I*c)*csgn(I*c*x^n)^2+225*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+15*I*Pi*b*e^3*x^6*csgn(I*c*x^n)^3+75*I*Pi*b*d^3*csgn(I*c)*csgn
(I*c*x^n)^2+75*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+15*I*Pi*b*e^3*x^6*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+150*b*d^3*n+150*d^3*b*ln(c)-450*ln(c)*b*d^
2*x^2*e-150*ln(c)*b*d*e^2*x^4+6*b*e^3*n*x^6+75*I*Pi*b*d*e^2*x^4*csgn(I*c*x^
n)^3+225*I*Pi*b*d^2*e*x^2*csgn(I*c*x^n)^3-75*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+50*b*d*e^2*n*x^4+450*b*d^2*e*n*x^2-15*I*Pi*b*e^3*x^6*csgn(
I*c)*csgn(I*c*x^n)^2-15*I*Pi*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-75*I*Pi*
b*d^3*csgn(I*c*x^n)^3+75*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n))/x
```

Maxima [A]
time = 0.29, size = 132, normalized size = 1.12

$$-\frac{1}{25}\,bnx^5e^3+\frac{1}{5}\,bx^5e^3\log\left(cx^n\right)+\frac{1}{5}\,ax^5e^3-\frac{1}{3}\,bdnx^3e^2+bdx^3e^2\log\left(cx^n\right)+adx^3e^2-3\,bd^2nxe+3\,bd^2xe\log\left(cx^n\right)+3\,ad^2xe-\frac{bd^3n}{x}-\frac{bd^3\log\left(cx^n\right)}{x}-\frac{ad^3}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] -1/25*b*n*x^5*e^3 + 1/5*b*x^5*e^3*log(c*x^n) + 1/5*a*x^5*e^3 - 1/3*b*d*n*x^
3*e^2 + b*d*x^3*e^2*log(c*x^n) + a*d*x^3*e^2 - 3*b*d^2*n*x*e + 3*b*d^2*x*e*
log(c*x^n) + 3*a*d^2*x*e - b*d^3*n/x - b*d^3*log(c*x^n)/x - a*d^3/x
```

Fricas [A]
time = 0.35, size = 149, normalized size = 1.26

$$-\frac{3\,(bn-5\,a)x^6e^3+25\,(bdn-3\,ad)x^4e^2+75\,bd^3n+75\,ad^3+225\,(bd^2n-ad^2)x^2e-15\,(bx^6e^3+5\,bdx^4e^2+15\,bd^2x^2e-5\,bd^3)\log(c)-15\,(bnx^6e^3+5\,bdnx^4e^2+15\,bd^2nx^2e-5\,bd^3n)\log(x)}{75\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] -1/75*(3*(b*n - 5*a)*x^6*e^3 + 25*(b*d*n - 3*a*d)*x^4*e^2 + 75*b*d^3*n + 75
*a*d^3 + 225*(b*d^2*n - a*d^2)*x^2*e - 15*(b*x^6*e^3 + 5*b*d*x^4*e^2 + 15*b
*d^2*x^2*e - 5*b*d^3)*log(c) - 15*(b*n*x^6*e^3 + 5*b*d*n*x^4*e^2 + 15*b*d^2
*n*x^2*e - 5*b*d^3*n)*log(x))/x
```

Sympy [A]
time = 0.97, size = 146, normalized size = 1.24

$$-\frac{ad^3}{x}+3ad^2ex+ade^2x^3+\frac{ae^3x^5}{5}-\frac{bd^3n}{x}-\frac{bd^3\log(cx^n)}{x}-3bd^2enx+3bd^2ex\log(cx^n)-\frac{bde^2nx^3}{3}+bde^2x^3\log(cx^n)-\frac{be^3nx^5}{25}+\frac{be^3x^5\log(cx^n)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] -a*d**3/x + 3*a*d**2*e*x + a*d*e**2*x**3 + a*e**3*x**5/5 - b*d**3*n/x - b*d
**3*log(c*x**n)/x - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c*x**n) - b*d*e**2*n*
x**3/3 + b*d*e**2*x**3*log(c*x**n) - b*e**3*n*x**5/25 + b*e**3*x**5*log(c*x
**n)/5
```

Giac [A]
time = 3.84, size = 166, normalized size = 1.41

$$\frac{15\,bnx^6e^3\log(x)-3\,bnx^6e^3+15\,bx^6e^3\log(c)+75\,bdnx^4e^2\log(x)+15\,ax^6e^3-25\,bdnx^4e^2+75\,bdx^4e^2\log(c)+225\,bd^2nx^2e\log(x)+75\,adx^4e^2-225\,bd^2nx^2e+225\,bd^2x^2e\log(c)+225\,ad^2x^2e-75\,bd^3n\log(x)-75\,bd^3n-75\,bd^3\log(c)-75\,ad^3}{75\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] 1/75*(15*b*n*x^6*e^3*log(x) - 3*b*n*x^6*e^3 + 15*b*x^6*e^3*log(c) + 75*b*d*
n*x^4*e^2*log(x) + 15*a*x^6*e^3 - 25*b*d*n*x^4*e^2 + 75*b*d*x^4*e^2*log(c)
+ 225*b*d^2*n*x^2*e*log(x) + 75*a*d*x^4*e^2 - 225*b*d^2*n*x^2*e + 225*b*d^2
*x^2*e*log(c) + 225*a*d^2*x^2*e - 75*b*d^3*n*log(x) - 75*b*d^3*n - 75*b*d^3
*log(c) - 75*a*d^3)/x
```

Mupad [B]
time = 3.52, size = 145, normalized size = 1.23

$$\ln\left(c\,x^n\right)\,\left(\frac{6\,b\,d^2\,e\,x^2+4\,b\,d\,e^2\,x^4+\frac{6\,b\,e^3\,x^6}{5}}{x}-\frac{b\,d^3+3\,b\,d^2\,e\,x^2+3\,b\,d\,e^2\,x^4+b\,e^3\,x^6}{x}\right)-\frac{a\,d^3+b\,d^3\,n}{x}+\frac{e^3\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{d\,e^2\,x^3\,\left(3\,a-b\,n\right)}{3}+3\,d^2\,e\,x\,\left(a-b\,n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^2,x)
```

```
[Out] log(c*x^n)*(((6*b*e^3*x^6)/5 + 6*b*d^2*e*x^2 + 4*b*d*e^2*x^4)/x - (b*d^3 +
b*e^3*x^6 + 3*b*d^2*e*x^2 + 3*b*d*e^2*x^4)/x) - (a*d^3 + b*d^3*n)/x + (e^3*
x^5*(5*a - b*n))/25 + (d*e^2*x^3*(3*a - b*n))/3 + 3*d^2*e*x*(a - b*n)
```

3.206 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=121

$$-\frac{bd^3n}{9x^3}-\frac{3bd^2en}{x}-3bde^2nx-\frac{1}{9}be^3nx^3-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}$$

```
[Out] -1/9*b*d^3*n/x^3-3*b*d^2*e*n/x-3*b*d*e^2*n*x-1/9*b*e^3*n*x^3-1/3*d^3*(a+b*l
n(c*x^n))/x^3-3*d^2*e*(a+b*ln(c*x^n))/x+3*d*e^2*x*(a+b*ln(c*x^n))+1/3*e^3*x
^3*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {276, 2372, 12}

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))-\frac{bd^3n}{9x^3}-\frac{3bd^2en}{x}-3bde^2nx-\frac{1}{9}be^3nx^3$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^3*n)/x^3 - (3*b*d^2*e*n)/x - 3*b*d*e^2*n*x - (b*e^3*n*x^3)/9 - (d
^3*(a + b*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/x + 3*d*e^2*x
*(a + b*Log[c*x^n]) + (e^3*x^3*(a + b*Log[c*x^n]))/3
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx = -\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{9d^2e}{x}-9de^2x-e^3x^3\right)(a+b\log(cx^n))-(bn)\int\frac{1}{3}\Bigg(9de^2-\frac{d}{x}$$
$$= -\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{9d^2e}{x}-9de^2x-e^3x^3\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int\Bigg(9de^2-\frac{d}{x}$$
$$= -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{x}-3bde^2nx-\frac{1}{9}be^3nx^3-\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{9d^2e}{x}-9de^2x-e^3x^3\right.$$

Mathematica [A]
time = 0.04, size = 112, normalized size = 0.93

$$-\frac{3a(d^3+9d^2ex^2-9de^2x^4-e^3x^6)+bn(d^3+27d^2ex^2+27de^2x^4+e^3x^6)+3b(d^3+9d^2ex^2-9de^2x^4-e^3x^6)\log(cx^n)}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(3*a*(d^3 + 9*d^2*e*x^2 - 9*d*e^2*x^4 - e^3*x^6) + b*n*(d^3 + 27*d^2*e
*x^2 + 27*d*e^2*x^4 + e^3*x^6) + 3*b*(d^3 + 9*d^2*e*x^2 - 9*d*e^2*x^4 - e^3
*x^6)*Log[c*x^n])/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 585, normalized size = 4.83

method	result
risch	$-\frac{b(-e^3x^6-9d\,e^2x^4+9d^2e\,x^2+d^3)\ln(x^n)}{3x^3}-\frac{-6\ln(c)b\,e^3x^6-6x^6a\,e^3-3i\pi b\,e^3x^6\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+27i\pi b\,d^2x^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(-e^3*x^6-9*d*e^2*x^4+9*d^2*e*x^2+d^3)/x^3*ln(x^n)-1/18*(-6*ln(c)*b*
e^3*x^6-6*x^6*a*e^3-54*x^4*a*d*e^2+54*a*d^2*x^2*e-27*I*Pi*b*d^2*e*x^2*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*a*d^3+27*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I
*c*x^n)^2+27*I*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2*e+2*b*d^3*n+6*d^3*b
*ln(c)+54*ln(c)*b*d^2*x^2*e+3*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-27*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-27*I*Pi*b*d*e^2*x^4*csg
n(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b*d^3*csgn(I*c*x^n)^3-54*ln(c)*b*d*e^2*x^4+
27*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*b*e^3*n*x^6+54*b*
d*e^2*n*x^4+54*b*d^2*e*n*x^2-3*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*c*x^n)^2+3*I
*Pi*b*e^3*x^6*csgn(I*c*x^n)^3+3*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi
*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-27*I*Pi*b*d^2*e*x^2*csgn(I*c*x^n)^3-3*I*
Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I*Pi*b*e^3*x^6*csgn(I*x^n)*c
sgn(I*c*x^n)^2+27*I*Pi*b*d*e^2*x^4*csgn(I*c*x^n)^3)/x^3
```

Maxima [A]
time = 0.26, size = 134, normalized size = 1.11

$$-\frac{1}{9}\,bnx^{3}e^{3}+\frac{1}{3}\,bx^{3}e^{3}\log\left(cx^{n}\right)+\frac{1}{3}\,ax^{3}e^{3}-3\,bdnxe^{2}+3\,bdxe^{2}\log\left(cx^{n}\right)+3\,adxe^{2}-\frac{3\,bd^{2}ne}{x}-\frac{3\,bd^{2}e\log\left(cx^{n}\right)}{x}-\frac{3\,ad^{2}e}{x}-\frac{bd^{3}n}{9\,x^{3}}-\frac{bd^{3}\log\left(cx^{n}\right)}{3\,x^{3}}-\frac{ad^{3}}{3\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*x^3*e^3 + 1/3*b*x^3*e^3*log(c*x^n) + 1/3*a*x^3*e^3 - 3*b*d*n*x*e^2
 + 3*b*d*x*e^2*log(c*x^n) + 3*a*d*x*e^2 - 3*b*d^2*n*e/x - 3*b*d^2*e*log(c*x
^n)/x - 3*a*d^2*e/x - 1/9*b*d^3*n/x^3 - 1/3*b*d^3*log(c*x^n)/x^3 - 1/3*a*d^
3/x^3
```

Fricas [A]
time = 0.36, size = 146, normalized size = 1.21

$$-\frac{(bn-3\,a)x^{6}e^{3}+27\,(bdn-ad)x^{4}e^{2}+bd^{3}n+3\,ad^{3}+27\,(bd^{2}n+ad^{2})x^{2}e-3\,(bx^{6}e^{3}+9\,bdx^{4}e^{2}-9\,bd^{2}x^{2}e-bd^{3})\log\left(c\right)-3\,(bnx^{6}e^{3}+9\,bdnx^{4}e^{2}-9\,bd^{2}nx^{2}e-bd^{3}n)\log\left(x\right)}{9\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/9*((b*n - 3*a)*x^6*e^3 + 27*(b*d*n - a*d)*x^4*e^2 + b*d^3*n + 3*a*d^3 +
27*(b*d^2*n + a*d^2)*x^2*e - 3*(b*x^6*e^3 + 9*b*d*x^4*e^2 - 9*b*d^2*x^2*e -
 b*d^3)*log(c) - 3*(b*n*x^6*e^3 + 9*b*d*n*x^4*e^2 - 9*b*d^2*n*x^2*e - b*d^3
*n)*log(x))/x^3
```

Sympy [A]
time = 1.05, size = 155, normalized size = 1.28

$$-\frac{ad^{3}}{3x^{3}}-\frac{3ad^{2}e}{x}+3ade^{2}x+\frac{ae^{3}x^{3}}{3}-\frac{bd^{3}n}{9x^{3}}-\frac{bd^{3}\log\left(cx^{n}\right)}{3x^{3}}-\frac{3bd^{2}en}{x}-\frac{3bd^{2}e\log\left(cx^{n}\right)}{x}-3bde^{2}nx+3bde^{2}x\log\left(cx^{n}\right)-\frac{be^{3}nx^{3}}{9}+\frac{be^{3}x^{3}\log\left(cx^{n}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d**3/(3*x**3) - 3*a*d**2*e/x + 3*a*d*e**2*x + a*e**3*x**3/3 - b*d**3*n/(
9*x**3) - b*d**3*log(c*x**n)/(3*x**3) - 3*b*d**2*e*n/x - 3*b*d**2*e*log(c*x
**n)/x - 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n) - b*e**3*n*x**3/9 + b*e*
*3*x**3*log(c*x**n)/3
```

Giac [A]
time = 4.22, size = 166, normalized size = 1.37

$$\frac{3\,bnx^{6}e^{3}\log\left(x\right)-bnx^{6}e^{3}+3\,bx^{6}e^{3}\log\left(c\right)+27\,bdnx^{4}e^{2}\log\left(x\right)+3\,ax^{6}e^{3}-27\,bdnx^{4}e^{2}+27\,bdx^{4}e^{2}\log\left(c\right)-27\,bd^{2}nx^{2}e\log\left(x\right)+27\,adx^{4}e^{2}-27\,bd^{2}nx^{2}e-27\,bd^{2}x^{2}e\log\left(c\right)-27\,ad^{2}x^{2}e-3\,bd^{3}n\log\left(x\right)-bd^{3}n-3\,bd^{3}\log\left(c\right)-3\,ad^{3}}{9\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] 1/9*(3*b*n*x^6*e^3*log(x) - b*n*x^6*e^3 + 3*b*x^6*e^3*log(c) + 27*b*d*n*x^4
*e^2*log(x) + 3*a*x^6*e^3 - 27*b*d*n*x^4*e^2 + 27*b*d*x^4*e^2*log(c) - 27*b
*d^2*n*x^2*e*log(x) + 27*a*d*x^4*e^2 - 27*b*d^2*n*x^2*e - 27*b*d^2*x^2*e*lo
g(c) - 27*a*d^2*x^2*e - 3*b*d^3*n*log(x) - b*d^3*n - 3*b*d^3*log(c) - 3*a*d
^3)/x^3
```

Mupad [B]
time = 3.53, size = 141, normalized size = 1.17

$$\ln\left(c\,x^n\right)\,\left(\frac{\frac{8\,b\,e^3\,x^6}{3}+8\,b\,d\,e^2\,x^4}{x^3}-\frac{\frac{b\,d^3}{3}+3\,b\,d^2\,e\,x^2+5\,b\,d\,e^2\,x^4+\frac{7\,b\,e^3\,x^6}{3}}{x^3}\right)-\frac{a\,d^3+x^2\,\left(9\,a\,d^2\,e+9\,b\,d^2\,e\,n\right)+\frac{b\,d^3\,n}{3}}{3\,x^3}+\frac{e^3\,x^3\,\left(3\,a-b\,n\right)}{9}+3\,d\,e^2\,x\,\left(a-b\,n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] log(c*x^n)*(((8*b*e^3*x^6)/3 + 8*b*d*e^2*x^4)/x^3 - ((b*d^3)/3 + (7*b*e^3*x
^6)/3 + 3*b*d^2*e*x^2 + 5*b*d*e^2*x^4)/x^3) - (a*d^3 + x^2*(9*a*d^2*e + 9*b
*d^2*e*n) + (b*d^3*n)/3)/(3*x^3) + (e^3*x^3*(3*a - b*n))/9 + 3*d*e^2*x*(a -
 b*n)
```

3.207 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=118

$$-\frac{bd^3n}{25x^5}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{x}-be^3nx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+$$

```
[Out] -1/25*b*d^3*n/x^5-1/3*b*d^2*e*n/x^3-3*b*d*e^2*n/x-b*e^3*n*x-1/5*d^3*(a+b*ln
(c*x^n))/x^5-d^2*e*(a+b*ln(c*x^n))/x^3-3*d*e^2*(a+b*ln(c*x^n))/x+e^3*x*(a+b
*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 118, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {276, 2372}

$$-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))-\frac{bd^3n}{25x^5}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{x}-be^3nx$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d^3*n)/x^5 - (b*d^2*e*n)/(3*x^3) - (3*b*d*e^2*n)/x - b*e^3*n*x - (
d^3*(a + b*Log[c*x^n]))/(5*x^5) - (d^2*e*(a + b*Log[c*x^n]))/x^3 - (3*d*e^2
*(a + b*Log[c*x^n]))/x + e^3*x*(a + b*Log[c*x^n])
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{1}{5}\left(\frac{d^3}{x^5}+\frac{5d^2e}{x^3}+\frac{15de^2}{x}-5e^3x\right)(a+b\log(cx^n))-(bn)\int\left(e^3-\frac{d^3}{5x^6}\right.$$
$$=-\frac{bd^3n}{25x^5}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{x}-be^3nx-\frac{1}{5}\left(\frac{d^3}{x^5}+\frac{5d^2e}{x^3}+\frac{15de^2}{x}-5e^3x\right)$$

Mathematica [A]
time = 0.04, size = 115, normalized size = 0.97

$$-\frac{15a(d^3+5d^2ex^2+15de^2x^4-5e^3x^6)+bn(3d^3+25d^2ex^2+225de^2x^4+75e^3x^6)+15b(d^3+5d^2ex^2+15de^2x^4-5e^3x^6)\log(cx^n)}{75x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/75*(15*a*(d^3 + 5*d^2*e*x^2 + 15*d*e^2*x^4 - 5*e^3*x^6) + b*n*(3*d^3 + 2
5*d^2*e*x^2 + 225*d*e^2*x^4 + 75*e^3*x^6) + 15*b*(d^3 + 5*d^2*e*x^2 + 15*d*
e^2*x^4 - 5*e^3*x^6)*Log[c*x^n])/x^5
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 585, normalized size = 4.96

method	result
risch	$-\frac{b(-5e^3x^6+15d\,e^2x^4+5d^2e\,x^2+d^3)\ln(x^n)}{5x^5}-\frac{-150\ln(c)b\,e^3x^6-150x^6a\,e^3-75i\pi b\,e^3x^6\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+75i\pi b\,d^2x^2\mathrm{csgn}(ix^n)\mathrm{c}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/5*b*(-5*e^3*x^6+15*d*e^2*x^4+5*d^2*e*x^2+d^3)/x^5*ln(x^n)-1/150*(-150*ln
(c)*b*e^3*x^6-150*x^6*a*e^3-75*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*c*x^n)^2-75*
I*Pi*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2+450*x^4*a*d*e^2+150*a*d^2*x^2*e+
30*a*d^3-15*I*Pi*b*d^3*csgn(I*c*x^n)^3+225*I*Pi*b*d*e^2*x^4*csgn(I*x^n)*csg
n(I*c*x^n)^2+75*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+75*I*Pi*b*d^2*x^
2*csgn(I*x^n)*csgn(I*c*x^n)^2*e+6*b*d^3*n+75*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+30*d^3*b*ln(c)+150*ln(c)*b*d^2*x^2*e+450*ln(c)*b*d*e^2
*x^4+225*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-225*I*Pi*b*d*e^2*x^4*cs
gn(I*c*x^n)^3-75*I*Pi*b*d^2*e*x^2*csgn(I*c*x^n)^3+150*b*e^3*n*x^6+450*b*d*e
^2*n*x^4+50*b*d^2*e*n*x^2-15*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-225*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-75*I*Pi*b*d^2*e*x
^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+15*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n
)^2+15*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+75*I*Pi*b*e^3*x^6*csgn(I*c*x^
n)^3)/x^5
```

Maxima [A]
time = 0.28, size = 132, normalized size = 1.12

$$-bnxe^3+bxe^3\log(cx^n)+axe^3-\frac{3\,bdne^2}{x}-\frac{3\,bde^2\log(cx^n)}{x}-\frac{3\,ade^2}{x}-\frac{bd^2ne}{3\,x^3}-\frac{bd^2e\log(cx^n)}{x^3}-\frac{ad^2e}{x^3}-\frac{bd^3n}{25\,x^5}-\frac{bd^3\log(cx^n)}{5\,x^5}-\frac{ad^3}{5\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] -b*n*x*e^3 + b*x*e^3*log(c*x^n) + a*x*e^3 - 3*b*d*n*e^2/x - 3*b*d*e^2*log(c
*x^n)/x - 3*a*d*e^2/x - 1/3*b*d^2*n*e/x^3 - b*d^2*e*log(c*x^n)/x^3 - a*d^2*
e/x^3 - 1/25*b*d^3*n/x^5 - 1/5*b*d^3*log(c*x^n)/x^5 - 1/5*a*d^3/x^5
```

Fricas [A]
time = 0.37, size = 150, normalized size = 1.27

$$-\frac{75\,(bn-a)x^6e^3+225\,(bdn+ad)x^4e^2+3\,bd^3n+15\,ad^3+25\,(bd^2n+3\,ad^2)x^2e-15\,(5\,bx^6e^3-15\,bdx^4e^2-5\,bd^2x^2e-bd^3)\log\left(c\right)-15\,(5\,bnx^6e^3-15\,bdnx^4e^2-5\,bd^2nx^2e-bd^3n)\log\left(x\right)}{75\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/75*(75*(b*n - a)*x^6*e^3 + 225*(b*d*n + a*d)*x^4*e^2 + 3*b*d^3*n + 15*a*
d^3 + 25*(b*d^2*n + 3*a*d^2)*x^2*e - 15*(5*b*x^6*e^3 - 15*b*d*x^4*e^2 - 5*b
*d^2*x^2*e - b*d^3)*log(c) - 15*(5*b*n*x^6*e^3 - 15*b*d*n*x^4*e^2 - 5*b*d^2
*n*x^2*e - b*d^3*n)*log(x))/x^5
```

Sympy [A]
time = 1.11, size = 146, normalized size = 1.24

$$-\frac{ad^3}{5x^5}-\frac{ad^2e}{x^3}-\frac{3ade^2}{x}+ae^3x-\frac{bd^3n}{25x^5}-\frac{bd^3\log\left(cx^n\right)}{5x^5}-\frac{bd^2en}{3x^3}-\frac{bd^2e\log\left(cx^n\right)}{x^3}-\frac{3bde^2n}{x}-\frac{3bde^2\log\left(cx^n\right)}{x}-be^3nx+be^3x\log\left(cx^n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] -a*d**3/(5*x**5) - a*d**2*e/x**3 - 3*a*d*e**2/x + a*e**3*x - b*d**3*n/(25*x
**5) - b*d**3*log(c*x**n)/(5*x**5) - b*d**2*e*n/(3*x**3) - b*d**2*e*log(c*x
**n)/x**3 - 3*b*d*e**2*n/x - 3*b*d*e**2*log(c*x**n)/x - b*e**3*n*x + b*e**3
*x*log(c*x**n)
```

Giac [A]
time = 5.65, size = 166, normalized size = 1.41

$$\frac{75\,bnx^6e^3\log\left(x\right)-75\,bnx^6e^3+75\,bx^6e^3\log\left(c\right)-225\,bdnx^4e^2\log\left(x\right)+75\,ax^6e^3-225\,bdnx^4e^2-225\,bdx^4e^2\log\left(c\right)-75\,bd^2nx^2e\log\left(x\right)-225\,adx^4e^2-25\,bd^2nx^2e-75\,bd^2x^2e\log\left(c\right)-75\,ad^2x^2e-15\,bd^3n\log\left(x\right)-3\,bd^3n-15\,bd^3\log\left(c\right)-15\,ad^3}{75\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] 1/75*(75*b*n*x^6*e^3*log(x) - 75*b*n*x^6*e^3 + 75*b*x^6*e^3*log(c) - 225*b*
d*n*x^4*e^2*log(x) + 75*a*x^6*e^3 - 225*b*d*n*x^4*e^2 - 225*b*d*x^4*e^2*log
(c) - 75*b*d^2*n*x^2*e*log(x) - 225*a*d*x^4*e^2 - 25*b*d^2*n*x^2*e - 75*b*d
^2*x^2*e*log(c) - 75*a*d^2*x^2*e - 15*b*d^3*n*log(x) - 3*b*d^3*n - 15*b*d^3
*log(c) - 15*a*d^3)/x^5
```

Mupad [B]
time = 3.58, size = 125, normalized size = 1.06

$$e^3\,x\,\left(a-b\,n\right)-\frac{a\,d^3+x^2\,\left(5\,a\,d^2\,e+\frac{5\,b\,d^2\,e\,n}{3}\right)+x^4\,\left(15\,a\,d\,e^2+15\,b\,d\,e^2\,n\right)+\frac{b\,d^3\,n}{5}}{5\,x^5}-\ln\left(c\,x^n\right)\,\left(\frac{\frac{b\,d^3}{5}+b\,d^2\,e\,x^2+3\,b\,d\,e^2\,x^4+\frac{11\,b\,e^3\,x^6}{5}}{x^5}-\frac{16\,b\,e^3\,x}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^6,x)
```

```
[Out] e^3*x*(a - b*n) - (a*d^3 + x^2*(5*a*d^2*e + (5*b*d^2*e*n)/3) + x^4*(15*a*d*
e^2 + 15*b*d*e^2*n) + (b*d^3*n)/5)/(5*x^5) - log(c*x^n)*(((b*d^3)/5 + (11*b
*e^3*x^6)/5 + b*d^2*e*x^2 + 3*b*d*e^2*x^4)/x^5 - (16*b*e^3*x)/5)
```

3.208 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}\,dx$

Optimal. Leaf size=127

$$-\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x}-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\ldots}{\ldots}$$

```
[Out] -1/49*b*d^3*n/x^7-3/25*b*d^2*e*n/x^5-1/3*b*d*e^2*n/x^3-b*e^3*n/x-1/7*d^3*(a
+b*ln(c*x^n))/x^7-3/5*d^2*e*(a+b*ln(c*x^n))/x^5-d*e^2*(a+b*ln(c*x^n))/x^3-e
^3*(a+b*ln(c*x^n))/x
```

Rubi [A]
time = 0.07, antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}-\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^3*n)/x^7 - (3*b*d^2*e*n)/(25*x^5) - (b*d*e^2*n)/(3*x^3) - (b*e^3
*n)/x - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (3*d^2*e*(a + b*Log[c*x^n]))/(5*
x^5) - (d*e^2*(a + b*Log[c*x^n]))/x^3 - (e^3*(a + b*Log[c*x^n]))/x
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}\,dx = -\frac{1}{35}\left(\frac{5d^3}{x^7}+\frac{21d^2e}{x^5}+\frac{35de^2}{x^3}+\frac{35e^3}{x}\right)(a+b\log(cx^n)) - (bn)\int \frac{-5d^3-$$
$$= -\frac{1}{35}\left(\frac{5d^3}{x^7}+\frac{21d^2e}{x^5}+\frac{35de^2}{x^3}+\frac{35e^3}{x}\right)(a+b\log(cx^n)) - \frac{1}{35}(bn)\int \frac{-5d^3$$
$$= -\frac{1}{35}\left(\frac{5d^3}{x^7}+\frac{21d^2e}{x^5}+\frac{35de^2}{x^3}+\frac{35e^3}{x}\right)(a+b\log(cx^n)) - \frac{1}{35}(bn)\int \Bigg(-\frac{5}{}$$
$$= -\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x}-\frac{1}{35}\left(\frac{5d^3}{x^7}+\frac{21d^2e}{x^5}+\frac{35de^2}{x^3}+\frac{35e^3}{x}\right)$$

Mathematica [A]
time = 0.04, size = 127, normalized size = 1.00

$$-\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x}-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^3*n)/x^7 - (3*b*d^2*e*n)/(25*x^5) - (b*d*e^2*n)/(3*x^3) - (b*e^3
*n)/x - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (3*d^2*e*(a + b*Log[c*x^n]))/(5*
x^5) - (d*e^2*(a + b*Log[c*x^n]))/x^3 - (e^3*(a + b*Log[c*x^n]))/x
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 587, normalized size = 4.62

method	result
risch	$-\frac{b(35e^3x^6+35de^2x^4+21d^2ex^2+5d^3)\ln(x^n)}{35x^7}-\frac{7350\ln(c)be^3x^6+7350x^6ae^3+3675i\pi be^3x^6\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+2205i\pi bd^2x^2\mathrm{csgn}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

```
[Out] -1/35*b*(35*e^3*x^6+35*d*e^2*x^4+21*d^2*e*x^2+5*d^3)/x^7*ln(x^n)-1/7350*(73
50*ln(c)*b*e^3*x^6+7350*x^6*a*e^3-3675*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+3675*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+7350*x^4*a*d
*e^2+4410*a*d^2*x^2*e+1050*a*d^3+2205*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*c*x
```

```
^n)^2+150*b*d^3*n+1050*d^3*b*ln(c)+2205*I*Pi*b*d^2*x^2*csgn(I*x^n)*csgn(I*c
*x^n)^2*e+4410*ln(c)*b*d^2*x^2*e-3675*I*Pi*b*d*e^2*x^4*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)-525*I*Pi*b*d^3*csgn(I*c*x^n)^3+7350*ln(c)*b*d*e^2*x^4+3675*
I*Pi*b*d*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-525*I*Pi*b*d^3*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+3675*I*Pi*b*e^3*x^6*csgn(I*c)*csgn(I*c*x^n)^2+7350*b*e
^3*n*x^6+3675*I*Pi*b*e^3*x^6*csgn(I*x^n)*csgn(I*c*x^n)^2-3675*I*Pi*b*d*e^2*
x^4*csgn(I*c*x^n)^3-2205*I*Pi*b*d^2*e*x^2*csgn(I*c*x^n)^3+2450*b*d*e^2*n*x^
4+882*b*d^2*e*n*x^2-2205*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)-3675*I*Pi*b*e^3*x^6*csgn(I*c*x^n)^3+525*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^
n)^2+525*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2)/x^7
```

Maxima [A]
time = 0.27, size = 140, normalized size = 1.10

$$-\frac{bne^3}{x}-\frac{be^3\log(cx^n)}{x}-\frac{ae^3}{x}-\frac{bdne^2}{3x^3}-\frac{bde^2\log(cx^n)}{x^3}-\frac{ade^2}{x^3}-\frac{3bd^2ne}{25x^5}-\frac{3bd^2e\log(cx^n)}{5x^5}-\frac{3ad^2e}{5x^5}-\frac{bd^3n}{49x^7}-\frac{bd^3\log(cx^n)}{7x^7}-\frac{ad^3}{7x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

```
[Out] -b*n*e^3/x - b*e^3*log(c*x^n)/x - a*e^3/x - 1/3*b*d*n*e^2/x^3 - b*d*e^2*log
(c*x^n)/x^3 - a*d*e^2/x^3 - 3/25*b*d^2*n*e/x^5 - 3/5*b*d^2*e*log(c*x^n)/x^5
 - 3/5*a*d^2*e/x^5 - 1/49*b*d^3*n/x^7 - 1/7*b*d^3*log(c*x^n)/x^7 - 1/7*a*d^
3/x^7
```

Fricas [A]
time = 0.36, size = 149, normalized size = 1.17

$$-\frac{3675(bn+a)x^6e^3+1225(bdn+3ad)x^4e^2+75bd^3n+525ad^3+441(bd^2n+5ad^2)x^2e+105(35bx^6e^3+35bdx^4e^2+21bd^2x^2e+5bd^3)\log(c)+105(35bnx^6e^3+35bdnx^4e^2+21bd^2nx^2e+5bd^3n)\log(x)}{3675x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

```
[Out] -1/3675*(3675*(b*n + a)*x^6*e^3 + 1225*(b*d*n + 3*a*d)*x^4*e^2 + 75*b*d^3*n
 + 525*a*d^3 + 441*(b*d^2*n + 5*a*d^2)*x^2*e + 105*(35*b*x^6*e^3 + 35*b*d*x
^4*e^2 + 21*b*d^2*x^2*e + 5*b*d^3)*log(c) + 105*(35*b*n*x^6*e^3 + 35*b*d*n*
x^4*e^2 + 21*b*d^2*n*x^2*e + 5*b*d^3*n)*log(x))/x^7
```

Sympy [A]
time = 1.57, size = 158, normalized size = 1.24

$$-\frac{ad^3}{7x^7}-\frac{3ad^2e}{5x^5}-\frac{ade^2}{x^3}-\frac{ae^3}{x}-\frac{bd^3n}{49x^7}-\frac{bd^3\log(cx^n)}{7x^7}-\frac{3bd^2en}{25x^5}-\frac{3bd^2e\log(cx^n)}{5x^5}-\frac{bde^2n}{3x^3}-\frac{bde^2\log(cx^n)}{x^3}-\frac{be^3n}{x}-\frac{be^3\log(cx^n)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**8,x)
```

```
[Out] -a*d**3/(7*x**7) - 3*a*d**2*e/(5*x**5) - a*d*e**2/x**3 - a*e**3/x - b*d**3*
n/(49*x**7) - b*d**3*log(c*x**n)/(7*x**7) - 3*b*d**2*e*n/(25*x**5) - 3*b*d*
*2*e*log(c*x**n)/(5*x**5) - b*d*e**2*n/(3*x**3) - b*d*e**2*log(c*x**n)/x**3
 - b*e**3*n/x - b*e**3*log(c*x**n)/x
```

Giac [A]
time = 7.91, size = 166, normalized size = 1.31

$$-\frac{3675\,bnx^6e^3\log\left(x\right)+3675\,bnx^6e^3+3675\,bx^6e^3\log\left(c\right)+3675\,bdnx^4e^2\log\left(x\right)+3675\,ax^6e^3+1225\,bdnx^4e^2+3675\,bdx^4e^2\log\left(c\right)+2205\,bd^2nx^2e\log\left(x\right)+3675\,adx^4e^2+441\,bd^2nx^2e+2205\,bd^2x^2e\log\left(c\right)+2205\,ad^2x^2e+525\,bd^3n\log\left(x\right)+75\,bd^3n+525\,bd^3\log\left(c\right)+525\,ad^3}{3675\,x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

```
[Out] -1/3675*(3675*b*n*x^6*e^3*log(x) + 3675*b*n*x^6*e^3 + 3675*b*x^6*e^3*log(c)
 + 3675*b*d*n*x^4*e^2*log(x) + 3675*a*x^6*e^3 + 1225*b*d*n*x^4*e^2 + 3675*b
*d*x^4*e^2*log(c) + 2205*b*d^2*n*x^2*e*log(x) + 3675*a*d*x^4*e^2 + 441*b*d^
2*n*x^2*e + 2205*b*d^2*x^2*e*log(c) + 2205*a*d^2*x^2*e + 525*b*d^3*n*log(x)
 + 75*b*d^3*n + 525*b*d^3*log(c) + 525*a*d^3)/x^7
```

Mupad [B]
time = 3.80, size = 123, normalized size = 0.97

$$-\frac{x^6\,\left(35\,a\,e^3+35\,b\,e^3\,n\right)+5\,a\,d^3+x^2\,\left(21\,a\,d^2\,e+\frac{21\,b\,d^2\,e\,n}{5}\right)+x^4\,\left(35\,a\,d\,e^2+\frac{35\,b\,d\,e^2\,n}{3}\right)+\frac{5\,b\,d^3\,n}{7}}{35\,x^7}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{7}+\frac{3\,b\,d^2\,e\,x^2}{5}+b\,d\,e^2\,x^4+b\,e^3\,x^6\right)}{x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^8,x)
```

```
[Out] - (x^6*(35*a*e^3 + 35*b*e^3*n) + 5*a*d^3 + x^2*(21*a*d^2*e + (21*b*d^2*e*n)
/5) + x^4*(35*a*d*e^2 + (35*b*d*e^2*n)/3) + (5*b*d^3*n)/7)/(35*x^7) - (log(
c*x^n)*((b*d^3)/7 + b*e^3*x^6 + (3*b*d^2*e*x^2)/5 + b*d*e^2*x^4))/x^7
```

3.209 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx$

Optimal. Leaf size=133

$$-\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+$$

```
[Out] -1/81*b*d^3*n/x^9-3/49*b*d^2*e*n/x^7-3/25*b*d*e^2*n/x^5-1/9*b*e^3*n/x^3-1/9
*d^3*(a+b*ln(c*x^n))/x^9-3/7*d^2*e*(a+b*ln(c*x^n))/x^7-3/5*d*e^2*(a+b*ln(c*
x^n))/x^5-1/3*e^3*(a+b*ln(c*x^n))/x^3
```

Rubi [A]
time = 0.07, antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}-\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^10,x]
```

```
[Out] -1/81*(b*d^3*n)/x^9 - (3*b*d^2*e*n)/(49*x^7) - (3*b*d*e^2*n)/(25*x^5) - (b*
e^3*n)/(9*x^3) - (d^3*(a + b*Log[c*x^n]))/(9*x^9) - (3*d^2*e*(a + b*Log[c*x
^n]))/(7*x^7) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*x^
n]))/(3*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{1}{315}\left(\frac{35d^3}{x^9}+\frac{135d^2e}{x^7}+\frac{189de^2}{x^5}+\frac{105e^3}{x^3}\right)(a+b\log(cx^n)) - (bn)\int -$$

$$= -\frac{1}{315}\left(\frac{35d^3}{x^9}+\frac{135d^2e}{x^7}+\frac{189de^2}{x^5}+\frac{105e^3}{x^3}\right)(a+b\log(cx^n)) - \frac{1}{315}(bn)$$

$$= -\frac{1}{315}\left(\frac{35d^3}{x^9}+\frac{135d^2e}{x^7}+\frac{189de^2}{x^5}+\frac{105e^3}{x^3}\right)(a+b\log(cx^n)) - \frac{1}{315}(bn)$$

$$= -\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{1}{315}\left(\frac{35d^3}{x^9}+\frac{135d^2e}{x^7}+\frac{189de^2}{x^5}+\right.$$

Mathematica [A]
time = 0.04, size = 133, normalized size = 1.00

$$-\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^10,x]
```

```
[Out] -1/81*(b*d^3*n)/x^9 - (3*b*d^2*e*n)/(49*x^7) - (3*b*d*e^2*n)/(25*x^5) - (b*
e^3*n)/(9*x^3) - (d^3*(a + b*Log[c*x^n]))/(9*x^9) - (3*d^2*e*(a + b*Log[c*x
^n]))/(7*x^7) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*x^
n]))/(3*x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 587, normalized size = 4.41

method	result
risch	$-\frac{b(105e^3x^6+189d\,e^2x^4+135d^2e\,x^2+35d^3)\ln(x^n)}{315x^9} - \frac{66150\ln(c)b\,e^3x^6+66150x^6a\,e^3+33075i\pi b\,e^3x^6\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+42525i\pi b}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^10,x,method=_RETURNVERBOSE)
```

```
[Out] -1/315*b*(105*e^3*x^6+189*d*e^2*x^4+135*d^2*e*x^2+35*d^3)/x^9*ln(x^n)-1/198
450*(66150*ln(c)*b*e^3*x^6+66150*x^6*a*e^3-33075*I*Pi*b*e^3*x^6*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+119070*x^4*a*d*e^2+33075*I*Pi*b*e^3*x^6*csgn(I*x^n
```

```
)*csgn(I*c*x^n)^2+85050*a*d^2*x^2*e+22050*a*d^3+59535*I*Pi*b*d*e^2*x^4*csgn
(I*c)*csgn(I*c*x^n)^2+59535*I*Pi*b*d*e^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+42
525*I*Pi*b*d^2*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2+42525*I*Pi*b*d^2*x^2*csgn(I*
x^n)*csgn(I*c*x^n)^2*e+2450*b*d^3*n+22050*d^3*b*ln(c)+85050*ln(c)*b*d^2*x^2
*e+119070*ln(c)*b*d*e^2*x^4-11025*I*Pi*b*d^3*csgn(I*c*x^n)^3+33075*I*Pi*b*e
^3*x^6*csgn(I*c)*csgn(I*c*x^n)^2+22050*b*e^3*n*x^6-59535*I*Pi*b*d*e^2*x^4*c
sgn(I*c*x^n)^3-42525*I*Pi*b*d^2*e*x^2*csgn(I*c*x^n)^3-42525*I*Pi*b*d^2*e*x^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-11025*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+23814*b*d*e^2*n*x^4+12150*b*d^2*e*n*x^2-59535*I*Pi*b*d*e^2*
x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-33075*I*Pi*b*e^3*x^6*csgn(I*c*x^n)^
3+11025*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+11025*I*Pi*b*d^3*csgn(I*x^n)*c
sgn(I*c*x^n)^2)/x^9
```

Maxima [A]
time = 0.26, size = 140, normalized size = 1.05

$$-\frac{bne^3}{9\,x^3}-\frac{be^3\log\left(cx^n\right)}{3\,x^3}-\frac{ae^3}{3\,x^3}-\frac{3\,bdne^2}{25\,x^5}-\frac{3\,bde^2\log\left(cx^n\right)}{5\,x^5}-\frac{3\,ade^2}{5\,x^5}-\frac{3\,bd^2ne}{49\,x^7}-\frac{3\,bd^2e\log\left(cx^n\right)}{7\,x^7}-\frac{3\,ad^2e}{7\,x^7}-\frac{bd^3n}{81\,x^9}-\frac{bd^3\log\left(cx^n\right)}{9\,x^9}-\frac{ad^3}{9\,x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

```
[Out] -1/9*b*n*e^3/x^3 - 1/3*b*e^3*log(c*x^n)/x^3 - 1/3*a*e^3/x^3 - 3/25*b*d*n*e^
2/x^5 - 3/5*b*d*e^2*log(c*x^n)/x^5 - 3/5*a*d*e^2/x^5 - 3/49*b*d^2*n*e/x^7 -
 3/7*b*d^2*e*log(c*x^n)/x^7 - 3/7*a*d^2*e/x^7 - 1/81*b*d^3*n/x^9 - 1/9*b*d^
3*log(c*x^n)/x^9 - 1/9*a*d^3/x^9
```

Fricas [A]
time = 0.35, size = 151, normalized size = 1.14

$$-\frac{11025\,(bn+3\,a)x^6e^3+11907\,(bdn+5\,ad)x^4e^2+1225\,bd^3n+11025\,ad^3+6075\,(bd^2n+7\,ad^2)x^2e+315\,(105\,bx^6e^3+189\,bdx^4e^2+135\,bd^2x^2e+35\,bd^3)\log\left(c\right)+315\,(105\,bnx^6e^3+189\,bdnx^4e^2+135\,bd^2nx^2e+35\,bd^3n)\log\left(x\right)}{99225\,x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

```
[Out] -1/99225*(11025*(b*n + 3*a)*x^6*e^3 + 11907*(b*d*n + 5*a*d)*x^4*e^2 + 1225*
b*d^3*n + 11025*a*d^3 + 6075*(b*d^2*n + 7*a*d^2)*x^2*e + 315*(105*b*x^6*e^3
 + 189*b*d*x^4*e^2 + 135*b*d^2*x^2*e + 35*b*d^3)*log(c) + 315*(105*b*n*x^6*
e^3 + 189*b*d*n*x^4*e^2 + 135*b*d^2*n*x^2*e + 35*b*d^3*n)*log(x))/x^9
```

Sympy [A]
time = 2.67, size = 177, normalized size = 1.33

$$-\frac{ad^3}{9x^9}-\frac{3ad^2e}{7x^7}-\frac{3ade^2}{5x^5}-\frac{ae^3}{3x^3}-\frac{bd^3n}{81x^9}-\frac{bd^3\log\left(cx^n\right)}{9x^9}-\frac{3bd^2en}{49x^7}-\frac{3bd^2e\log\left(cx^n\right)}{7x^7}-\frac{3bde^2n}{25x^5}-\frac{3bde^2\log\left(cx^n\right)}{5x^5}-\frac{be^3n}{9x^3}-\frac{be^3\log\left(cx^n\right)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**10,x)
```

```
[Out] -a*d**3/(9*x**9) - 3*a*d**2*e/(7*x**7) - 3*a*d*e**2/(5*x**5) - a*e**3/(3*x*
*3) - b*d**3*n/(81*x**9) - b*d**3*log(c*x**n)/(9*x**9) - 3*b*d**2*e*n/(49*x
**7) - 3*b*d**2*e*log(c*x**n)/(7*x**7) - 3*b*d*e**2*n/(25*x**5) - 3*b*d*e**
2*log(c*x**n)/(5*x**5) - b*e**3*n/(9*x**3) - b*e**3*log(c*x**n)/(3*x**3)
```

Giac [A]
time = 4.72, size = 166, normalized size = 1.25

$$-\frac{33075\,bnx^6e^3\log\left(x\right)+11025\,bnx^6e^3+33075\,bx^6e^3\log\left(c\right)+59535\,bdnx^4e^2\log\left(x\right)+33075\,ax^6e^3+11907\,bdnx^4e^2+59535\,bdx^4e^2\log\left(c\right)+42525\,bd^2nx^2e\log\left(x\right)+59535\,adx^4e^2+6075\,bd^2nx^2e+42525\,bd^2x^2e\log\left(c\right)+42525\,ad^2x^2e+11025\,bd^3n\log\left(x\right)+1225\,bd^3n+11025\,bd^3\log\left(c\right)+11025\,ad^3}{99225\,x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

```
[Out] -1/99225*(33075*b*n*x^6*e^3*log(x) + 11025*b*n*x^6*e^3 + 33075*b*x^6*e^3*lo
g(c) + 59535*b*d*n*x^4*e^2*log(x) + 33075*a*x^6*e^3 + 11907*b*d*n*x^4*e^2 +
 59535*b*d*x^4*e^2*log(c) + 42525*b*d^2*n*x^2*e*log(x) + 59535*a*d*x^4*e^2
+ 6075*b*d^2*n*x^2*e + 42525*b*d^2*x^2*e*log(c) + 42525*a*d^2*x^2*e + 11025
*b*d^3*n*log(x) + 1225*b*d^3*n + 11025*b*d^3*log(c) + 11025*a*d^3)/x^9
```

Mupad [B]
time = 3.70, size = 125, normalized size = 0.94

$$-\frac{x^6\,\left(105\,a\,e^3+35\,b\,e^3\,n\right)+35\,a\,d^3+x^2\,\left(135\,a\,d^2\,e+\frac{135\,b\,d^2\,e\,n}{7}\right)+x^4\,\left(189\,a\,d\,e^2+\frac{189\,b\,d\,e^2\,n}{5}\right)+\frac{35\,b\,d^3\,n}{9}}{315\,x^9}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3}{9}+\frac{3\,b\,d^2\,e\,x^2}{7}+\frac{3\,b\,d\,e^2\,x^4}{5}+\frac{b\,e^3\,x^6}{3}\right)}{x^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^10,x)
```

```
[Out] - (x^6*(105*a*e^3 + 35*b*e^3*n) + 35*a*d^3 + x^2*(135*a*d^2*e + (135*b*d^2*
e*n)/7) + x^4*(189*a*d*e^2 + (189*b*d*e^2*n)/5) + (35*b*d^3*n)/9)/(315*x^9)
 - (log(c*x^n)*((b*d^3)/9 + (b*e^3*x^6)/3 + (3*b*d^2*e*x^2)/7 + (3*b*d*e^2*
x^4)/5))/x^9
```

3.210 $\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal. Leaf size=121

$$\frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{d^2(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^3}+\frac{bd^2n\mathrm{Li}_2\left(-\frac{ex^2}{d}\right.}{4e^3}$$

```
[Out] 1/4*b*d*n*x^2/e^2-1/16*b*n*x^4/e-1/2*d*x^2*(a+b*ln(c*x^n))/e^2+1/4*x^4*(a+b
*ln(c*x^n))/e+1/2*d^2*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e^3+1/4*b*d^2*n*polylog
(2,-e*x^2/d)/e^3
```

Rubi [A]
time = 0.12, antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2393, 2341, 2375, 2438}

$$\frac{bd^2n\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}+\frac{d^2\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^3}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] (b*d*n*x^2)/(4*e^2) - (b*n*x^4)/(16*e) - (d*x^2*(a + b*Log[c*x^n]))/(2*e^2)
 + (x^4*(a + b*Log[c*x^n]))/(4*e) + (d^2*(a + b*Log[c*x^n])*Log[1 + (e*x^2)
/d])/(2*e^3) + (b*d^2*n*PolyLog[2, -((e*x^2)/d)])/(4*e^3)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx &= \int \left(-\frac{dx(a+b\log(cx^n))}{e^2}+\frac{x^3(a+b\log(cx^n))}{e}+\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)}\right)dx\\ &= -\frac{d\int x(a+b\log(cx^n))\,dx}{e^2}+\frac{d^2\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{e^2}+\frac{\int x^3(a+b\log(cx^n))\,dx}{e}\\ &= \frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{d^2(a+b\log(cx^n))}{2e^3}\\ &= \frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{d^2(a+b\log(cx^n))}{2e^3}\end{aligned}$$

Mathematica [A]
time = 0.08, size = 174, normalized size = 1.44

$$\frac{4bdenx^2-be^2nx^4-8dex^2(a+b\log(cx^n))+4e^2x^4(a+b\log(cx^n))+8d^2(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+8d^2(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)+8bd^2n\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+8bd^2n\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{16e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] (4*b*d*e*n*x^2 - b*e^2*n*x^4 - 8*d*e*x^2*(a + b*Log[c*x^n]) + 4*e^2*x^4*(a
+ b*Log[c*x^n]) + 8*d^2*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] +
```

```
8*d^2*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 8*b*d^2*n*Poly
Log[2, (Sqrt[e]*x)/Sqrt[-d]] + 8*b*d^2*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2
)])/(16*e^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 651, normalized size = 5.38

method	result
risch	$\frac{bn\,d^2\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^3}-\frac{bn\,d^2\ln(x)\ln(e\,x^2+d)}{2e^3}+\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)d\,x^2}{4e^2}+\frac{a\,x^4}{4e}-\frac{ad\,x^2}{2e^2}+\frac{bn\,d^2\,\mathrm{dil}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*n*d^2/e^3*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*d^2/e^3*l
n(x)*ln(e*x^2+d)+1/4*a/e*x^4-1/2*a/e^2*d*x^2-1/8*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)/e*x^4+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^3*ln(e*x^
2+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^3*ln(e*x^2+d)+1/8*I*b*Pi*csgn(I*c)*cs
gn(I*c*x^n)^2/e*x^4+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^3*ln(e*x^2
+d)+1/2*a*d^2/e^3*ln(e*x^2+d)-1/8*I*b*Pi*csgn(I*c*x^n)^3/e*x^4+1/2*b*n*d^2/
e^3*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n*d^2/e^3-1/4*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2/e^2*d*x^2+1/2*b*ln(c)*d^2/e^3*ln(e*x^2+d)+1/2*b*
ln(x^n)*d^2/e^3*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*d*x^2+
1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x^4+1/4*I*b*Pi*csgn(I*c*x^n)^3/e^2
*d*x^2+1/4*b*ln(x^n)/e*x^4-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d
^2/e^3*ln(e*x^2+d)+1/2*b*n*d^2/e^3*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+
1/2*b*n*d^2/e^3*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)/e^2*d*x^2+1/4*b*ln(c)/e*x^4-1/2*b*ln(c)/e^2*d*x^
2-1/2*b*ln(x^n)/e^2*d*x^2+1/4*b*d*n*x^2/e^2-1/16*b*n*x^4/e
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] 1/4*(2*d^2*e^(-3)*log(x^2*e + d) + (x^4*e - 2*d*x^2)*e^(-2))*a + b*integrat
e((x^5*log(c) + x^5*log(x^n))/(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*x^5*log(c*x^n) + a*x^5)/(x^2*e + d), x)
```

Sympy [A]
time = 45.85, size = 257, normalized size = 2.12

$$\frac{ad^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e^2}-\frac{adx^2}{2e^2}+\frac{ax^4}{4e}-\frac{bd^2n\left(\begin{cases}\frac{x^2}{2d} & \text{for } e=0\\ \frac{\begin{cases}-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{2e^2}+\frac{bd^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2}+\frac{bdnx^2}{4e^2}-\frac{bdx^2\log(cx^n)}{2e^2}-\frac{bnx^4}{16e}+\frac{bx^4\log(cx^n)}{4e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

```
[Out] a*d**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e**2) -
a*d*x**2/(2*e**2) + a*x**4/(4*e) - b*d**2*n*Piecewise((x**2/(2*d), Eq(e, 0)
), (Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/A
bs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x
) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x
) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1),
()), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True
))/e, True))/(2*e**2) + b*d**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**
2)/e, True))*log(c*x**n)/(2*e**2) + b*d*n*x**2/(4*e**2) - b*d*x**2*log(c*x*
*n)/(2*e**2) - b*n*x**4/(16*e) + b*x**4*log(c*x**n)/(4*e)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^5/(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{e\,x^2+d} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

```
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.211 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^2} dx$

Optimal. Leaf size=83

$$-\frac{bnx^2}{4e}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2}-\frac{bdn\text{Li}_2\left(-\frac{ex^2}{d}\right)}{4e^2}$$

```
[Out] -1/4*b*n*x^2/e+1/2*x^2*(a+b*ln(c*x^n))/e-1/2*d*(a+b*ln(c*x^n))*ln(1+e*x^2/d
)/e^2-1/4*b*d*n*polylog(2,-e*x^2/d)/e^2
```

Rubi [A]
time = 0.10, antiderivative size = 83, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2393, 2341, 2375, 2438}

$$-\frac{bdn\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}-\frac{d\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^2}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{bnx^2}{4e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] -1/4*(b*n*x^2)/e + (x^2*(a + b*Log[c*x^n]))/(2*e) - (d*(a + b*Log[c*x^n])*L
og[1 + (e*x^2)/d])/(2*e^2) - (b*d*n*PolyLog[2, -((e*x^2)/d)])/(4*e^2)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx &= \int \left(\frac{x(a+b\log(cx^n))}{e}-\frac{dx(a+b\log(cx^n))}{e(d+ex^2)}\right)dx\\ &= \frac{\int x(a+b\log(cx^n))\,dx}{e}-\frac{d\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{e}\\ &= -\frac{bnx^2}{4e}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2}+\frac{(bdn)\int \frac{\log\left(1+\frac{e}{}\right.}{x}}{2e^2}\\ &= -\frac{bnx^2}{4e}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2}-\frac{bdn\text{Li}_2\left(-\frac{ex^2}{d}\right)}{4e^2}\end{aligned}$$

Mathematica [A]
time = 0.05, size = 135, normalized size = 1.63

$$-\frac{benx^2-2ex^2(a+b\log(cx^n))+2d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+2d(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)+2bdn\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+2bdn\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{4e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] -1/4*(b*e*n*x^2 - 2*e*x^2*(a + b*Log[c*x^n]) + 2*d*(a + b*Log[c*x^n])*Log[1
 + (Sqrt[e]*x)/Sqrt[-d]] + 2*d*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d
```

```
)^(3/2)] + 2*b*d*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + 2*b*d*n*PolyLog[2, (d
*Sqrt[e]*x)/(-d)^(3/2)])/e^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 460, normalized size = 5.54

method	result
risch	$\frac{b\ln(x^n)x^2}{2e} - \frac{b\ln(x^n)d\ln(e\,x^2+d)}{2e^2} - \frac{bn\,x^2}{4e} - \frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^2} - \frac{bnd\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^2} + \frac{bnd\ln(x)\ln}{2e^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*ln(x^n)/e*x^2-1/2*b*ln(x^n)*d/e^2*ln(e*x^2+d)-1/4*b*n*x^2/e-1/2*b*n*d
/e^2*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*d/e^2*ln(x)*ln((e*x
+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n*d/e^2*ln(x)*ln(e*x^2+d)-1/2*b*n*d/e^2*
dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*d/e^2*dilog((e*x+(-e*d)^(1/
2))/(-e*d)^(1/2))+1/4*I*b*Pi*csgn(I*c*x^n)^3*d/e^2*ln(e*x^2+d)-1/4*I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2*d/e^2*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/e*x^2
+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^2*ln(e*x^2+d)-1/4*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x^2-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2*d/e^2*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x^2+1/4*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e*x^2+1/2*b*ln(c)/e*x^2-1/2*b*ln(c)*d/e^2*
ln(e*x^2+d)+1/2*a/e*x^2-1/2*a*d/e^2*ln(e*x^2+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] 1/2*(x^2*e^(-1) - d*e^(-2)*log(x^2*e + d))*a + b*integrate((x^3*log(c) + x^
3*log(x^n))/(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x^2*e + d), x)
```

Sympy [A]
time = 21.60, size = 202, normalized size = 2.43

$$-\frac{ad\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e}+\frac{ax^2}{2e}+\frac{bdn\left(\begin{cases}\frac{x^2}{2d} & \text{for } e=0\\ \frac{\begin{cases}-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{2e}-\frac{bd\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e}-\frac{bnx^2}{4e}+\frac{bx^2\log(cx^n)}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

```
[Out] -a*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e) + a*x**
2/(2*e) + b*d*n*Piecewise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e
*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x)
- polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) -
polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1
)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
 - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True))/e, True))/(2*e) - b*d*Pie
cewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/(2*e) - b
*n*x**2/(4*e) + b*x**2*log(c*x**n)/(2*e)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{e\,x^2+d} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.212 $\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal. Leaf size=49

$$\frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e}+\frac{bn\text{Li}_2\left(-\frac{ex^2}{d}\right)}{4e}$$

```
[Out] 1/2*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e+1/4*b*n*polylog(2,-e*x^2/d)/e
```

Rubi [A]
time = 0.03, antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2375, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e}+\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e) + (b*n*PolyLog[2, -((e*x^2)/d
)])/(4*e)
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx &= \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e}-\frac{(bn)\int \frac{\log\left(1+\frac{ex^2}{d}\right)}{x}\,dx}{2e}\\ &= \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e}+\frac{bn\text{Li}_2\left(-\frac{ex^2}{d}\right)}{4e}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 94, normalized size = 1.92

$$\frac{(a+b\log(cx^n))\left(\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)\right)+bn\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+bn\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{2e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] ((a + b*Log[c*x^n])*(Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + Log[1 + (d*Sqrt[e]*x)/
(-d)^(3/2)]) + b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + b*n*PolyLog[2, (d*Sqr
t[e]*x)/(-d)^(3/2)])/(2*e)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 299, normalized size = 6.10

method	result
risch	$\frac{b\ln(e\,x^2+d)\ln(x^n)}{2e}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e}+\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e}-\frac{bn\ln(x)\ln(e\,x^2+d)}{2e}+\frac{bn\,\text{dilog}\left(\frac{-ex+\sqrt{}}{\sqrt{-}}\right)}{2e}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b/e*ln(e*x^2+d)*ln(x^n)+1/2*b/e*n*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(
1/2))+1/2*b/e*n*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b/e*n*ln(x)*l
n(e*x^2+d)+1/2*b/e*n*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b/e*n*dilo
g((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*I/e*ln(e*x^2+d)*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+1/4*I/e*ln(e*x^2+d)*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/4
*I/e*ln(e*x^2+d)*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4*I/e*ln(e*x^2+d)*b*Pi*
csgn(I*c*x^n)^3+1/2/e*ln(e*x^2+d)*b*ln(c)+1/2*a/e*ln(e*x^2+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] 1/2*a*e^(-1)*log(x^2*e + d) + b*integrate((x*log(c) + x*log(x^n))/(x^2*e +
d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*x*log(c*x^n) + a*x)/(x^2*e + d), x)
```

Sympy [A]
time = 3.73, size = 141, normalized size = 2.88

$$\frac{a\log(d+ex^2)}{2e} - \frac{bn\left(\begin{cases} -\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(d)\log(x) - \frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right) - \frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d) - \frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise} \end{cases}\right)}{2e} + \frac{b\log(cx^n)\log(d+ex^2)}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

```
[Out] a*log(d + e*x**2)/(2*e) - b*n*Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)
/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*e
xp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp
_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*
log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*
exp_polar(I*pi)/d)/2, True))/(2*e) + b*log(c*x**n)*log(d + e*x**2)/(2*e)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.213 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx$

Optimal. Leaf size=49

$$-\frac{\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d}+\frac{bn\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d}$$

```
[Out] -1/2*ln(1+d/e/x^2)*(a+b*ln(c*x^n))/d+1/4*b*n*polylog(2,-d/e/x^2)/d
```

Rubi [A]
time = 0.05, antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2379, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)),x]
```

```
[Out] -1/2*(Log[1 + d/(e*x^2)]*(a + b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2
))])/(4*d)
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx &= -\frac{\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d}+\frac{(bn)\int \frac{\log\left(1+\frac{d}{ex^2}\right)}{x}\,dx}{2d}\\ &= -\frac{\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d}+\frac{bn\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d}\end{aligned}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 126 vs. 2(49) = 98.
time = 0.05, size = 126, normalized size = 2.57

$$-\frac{-\left((a+b\log(cx^n))\left(a+b\log(cx^n)-bn\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)-bn\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)\right)\right)+b^2n^2\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+b^2n^2\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{2bdn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)),x]
```

```
[Out] -1/2*(-((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - b*n*Log[1 + (Sqrt[e]*x)/Sqrt
[-d]] - b*n*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])) + b^2*n^2*PolyLog[2, (Sqrt[
e]*x)/Sqrt[-d]] + b^2*n^2*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(b*d*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 439, normalized size = 8.96

method	result
risch	$\frac{b\ln(x^n)\ln(x)}{d}-\frac{b\ln(x^n)\ln(e\,x^2+d)}{2d}-\frac{bn\ln(x)^2}{2d}+\frac{bn\ln(x)\ln(e\,x^2+d)}{2d}-\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d}-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{}}{\sqrt{}}\right.}{2d}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(x^n)/d*ln(x)-1/2*b*ln(x^n)/d*ln(e*x^2+d)-1/2*b*n/d*ln(x)^2+1/2*b*n/d*l
n(x)*ln(e*x^2+d)-1/2*b*n/d*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b
*n/d*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n/d*dilog((-e*x+(-e*d)
^(1/2))/(-e*d)^(1/2))-1/2*b*n/d*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*
I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^
n)^2/d*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(x)-1/2*I*b
*Pi*csgn(I*c*x^n)^3/d*ln(x)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*ln(e*x^2
+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(e*x^2+d)+1/4*I*b*Pi
*csgn(I*c*x^n)^3/d*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*ln(
e*x^2+d)+b*ln(c)/d*ln(x)-1/2*b*ln(c)/d*ln(e*x^2+d)+a/d*ln(x)-1/2*a/d*ln(e*x
^2+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] -1/2*a*(log(x^2*e + d)/d - 2*log(x)/d) + b*integrate((log(c) + log(x^n))/(x
^3*e + d*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^3*e + d*x), x)
```

Sympy [A]
time = 7.62, size = 144, normalized size = 2.94

$$\frac{a\log(x)}{d} - \frac{a\log(d+ex^2)}{2d} + \frac{bn\left(\begin{cases} \frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for}\ \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log(e)\log(x) + \frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for}\ |x| < 1 \\ -\log(e)\log\left(\frac{1}{x}\right) + \frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for}\ \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(e) + \frac{\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{otherwise} \end{cases}\right)}{2d} - \frac{b\log(cx^n)\log\left(\frac{d}{x^2}+e\right)}{2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x**2+d),x)
```

```
[Out] a*log(x)/d - a*log(d + e*x**2)/(2*d) + b*n*Piecewise((polylog(2, d*exp_pola
r(I*pi)/(e*x**2))/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polyl
og(2, d*exp_polar(I*pi)/(e*x**2))/2, Abs(x) < 1), (-log(e)*log(1/x) + polyl
og(2, d*exp_polar(I*pi)/(e*x**2))/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)),
 ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) +
polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, True))/(2*d) - b*log(c*x**n)*log(
d/x**2 + e)/(2*d)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(e\,x^2+d\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^2)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^2)), x)
```

3.214 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx$

Optimal. Leaf size=83

$$-\frac{bn}{4dx^2}-\frac{a+b\log\left(cx^n\right)}{2dx^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)\left(a+b\log\left(cx^n\right)\right)}{2d^2}-\frac{ben\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d^2}$$

```
[Out] -1/4*b*n/d/x^2+1/2*(-a-b*ln(c*x^n))/d/x^2+1/2*e*ln(1+d/e/x^2)*(a+b*ln(c*x^n
))/d^2-1/4*b*e*n*polylog(2,-d/e/x^2)/d^2
```

Rubi [A]
time = 0.10, antiderivative size = 83, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}=0.174$, Rules used = {2380, 2341, 2379, 2438}

$$-\frac{ben\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^2}+\frac{e\log\left(\frac{d}{ex^2}+1\right)\left(a+b\log\left(cx^n\right)\right)}{2d^2}-\frac{a+b\log\left(cx^n\right)}{2dx^2}-\frac{bn}{4dx^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)),x]
```

```
[Out] -1/4*(b*n)/(d*x^2) - (a + b*Log[c*x^n])/(2*d*x^2) + (e*Log[1 + d/(e*x^2)]*(
a + b*Log[c*x^n]))/(2*d^2) - (b*e*n*PolyLog[2, -(d/(e*x^2))])/(4*d^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^3} - \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^2x(a+b\log(cx^n))}{d^2(d+ex^2)}\right)dx$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{x}\,dx}{d^2} + \frac{e^2\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{d^2}$$

$$= -\frac{bn}{4dx^2} - \frac{a+b\log(cx^n)}{2dx^2} - \frac{e(a+b\log(cx^n))^2}{2bd^2n} + \frac{e(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2d^2} -$$

$$= -\frac{bn}{4dx^2} - \frac{a+b\log(cx^n)}{2dx^2} - \frac{e(a+b\log(cx^n))^2}{2bd^2n} + \frac{e(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2d^2} +$$

Mathematica [A]
time = 0.08, size = 157, normalized size = 1.89

$$\frac{-\frac{bdn}{x^2} - \frac{2d(a+b\log(cx^n))}{x^2} - \frac{2e(a+b\log(cx^n))^2}{bn} + 2e(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right) + 2e(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right) + 2ben\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right) + 2ben\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{4d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)),x]
```

```
[Out] (-((b*d*n)/x^2) - (2*d*(a + b*Log[c*x^n]))/x^2 - (2*e*(a + b*Log[c*x^n])^2)
/(b*n) + 2*e*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 2*e*(a + b*
Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 2*b*e*n*PolyLog[2, (Sqrt[e]
*x)/Sqrt[-d]] + 2*b*e*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(4*d^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 611, normalized size = 7.36

method	result
risch	$\frac{b\ln(x^n)e\ln(e\,x^2+d)}{2d^2} + \frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)e\ln(x)}{2d^2} - \frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)e\ln(e\,x^2+d)}{4d^2} - \frac{b\ln(c)}{2d\,x^2} + -$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*ln(x^n)*e/d^2*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2*
ln(e*x^2+d)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2*ln(x)-1/2*b*ln(c)/
```

```
d/x^2-1/2*b*n*e/d^2*ln(x)*ln(e*x^2+d)+1/2*b*n*e/d^2*ln(x)*ln((-e*x+(-e*d)^(
1/2))/(-e*d)^(1/2))+1/2*b*n*e/d^2*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))
+1/2*a*e/d^2*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/x^2+1/4*I
*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2*ln(e*x^2+d)-1/2*I*b*Pi*csgn(I*c)*cs
gn(I*c*x^n)^2*e/d^2*ln(x)-1/2*b*ln(x^n)/d/x^2-1/2*a/d/x^2-a*e/d^2*ln(x)-1/4
*I*b*Pi*csgn(I*c*x^n)^3*e/d^2*ln(e*x^2+d)+1/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^2*
ln(x)+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/x^2-1/4*I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2/d/x^2+1/2*b*ln(c)*e/d^2*ln(e*x^2+d)+1/2*b*n*e/d^2*dilo
g((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n*e/d^2*dilog((e*x+(-e*d)^(1/2))/
(-e*d)^(1/2))+1/4*I*b*Pi*csgn(I*c*x^n)^3/d/x^2-b*ln(x^n)*e/d^2*ln(x)+1/2*I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2*ln(x)-1/4*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*e/d^2*ln(e*x^2+d)-b*ln(c)*e/d^2*ln(x)+1/2*b*n*e/d^
2*ln(x)^2-1/4*b*n/d/x^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] 1/2*a*(e*log(x^2*e + d)/d^2 - 2*e*log(x)/d^2 - 1/(d*x^2)) + b*integrate((lo
g(c) + log(x^n))/(x^5*e + d*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^5*e + d*x^3), x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\left(e\,x^2+d\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)), x)
```

3.215 $\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx$

Optimal. Leaf size=121

$$-\frac{bn}{16dx^4}+\frac{ben}{4d^2x^2}-\frac{a+b\log(cx^n)}{4dx^4}+\frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{e^2\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d^3}+\frac{be^2n\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d^3}$$

```
[Out] -1/16*b*n/d/x^4+1/4*b*e*n/d^2/x^2+1/4*(-a-b*ln(c*x^n))/d/x^4+1/2*e*(a+b*ln(
c*x^n))/d^2/x^2-1/2*e^2*ln(1+d/e/x^2)*(a+b*ln(c*x^n))/d^3+1/4*b*e^2*n*polyl
og(2,-d/e/x^2)/d^3
```

Rubi [A]
time = 0.14, antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2380, 2341, 2379, 2438}

$$\frac{be^2n\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^3}-\frac{e^2\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d^3}+\frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{a+b\log(cx^n)}{4dx^4}+\frac{ben}{4d^2x^2}-\frac{bn}{16dx^4}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^5*(d + e*x^2)),x]
```

```
[Out] -1/16*(b*n)/(d*x^4) + (b*e*n)/(4*d^2*x^2) - (a + b*Log[c*x^n])/(4*d*x^4) +
(e*(a + b*Log[c*x^n]))/(2*d^2*x^2) - (e^2*Log[1 + d/(e*x^2)]*(a + b*Log[c*x
^n]))/(2*d^3) + (b*e^2*n*PolyLog[2, -(d/(e*x^2))])/(4*d^3)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^5}-\frac{e(a+b\log(cx^n))}{d^2x^3}+\frac{e^2(a+b\log(cx^n))}{d^3x}-\frac{e^3x(a+b\log(cx^n)}{d^3(d+ex^2)}\right.$$

$$=\frac{\int \frac{a+b\log(cx^n)}{x^5}\,dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3}\,dx}{d^2}+\frac{e^2\int \frac{a+b\log(cx^n)}{x}\,dx}{d^3}-\frac{e^3\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{d^3}$$

$$=-\frac{bn}{16dx^4}+\frac{ben}{4d^2x^2}-\frac{a+b\log(cx^n)}{4dx^4}+\frac{e(a+b\log(cx^n))}{2d^2x^2}+\frac{e^2(a+b\log(cx^n))^2}{2bd^3n}-\frac{e^2}{}$$

$$=-\frac{bn}{16dx^4}+\frac{ben}{4d^2x^2}-\frac{a+b\log(cx^n)}{4dx^4}+\frac{e(a+b\log(cx^n))}{2d^2x^2}+\frac{e^2(a+b\log(cx^n))^2}{2bd^3n}-\frac{e^2}{}$$

Mathematica [A]
time = 0.13, size = 196, normalized size = 1.62

$$-\frac{\frac{bd^2n}{x^4}-\frac{4bden}{x^2}+\frac{4d^2(a+b\log(cx^n))}{x^4}-\frac{8de(a+b\log(cx^n))}{x^2}-\frac{8e^2(a+b\log(cx^n))^2}{bn}+8e^2(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+8e^2(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)+8be^2n\,\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+8be^2n\,\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{16d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^5*(d + e*x^2)),x]
```

```
[Out] -1/16*((b*d^2*n)/x^4 - (4*b*d*e*n)/x^2 + (4*d^2*(a + b*Log[c*x^n]))/x^4 - (
8*d*e*(a + b*Log[c*x^n]))/x^2 - (8*e^2*(a + b*Log[c*x^n])^2)/(b*n) + 8*e^2*
(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 8*e^2*(a + b*Log[c*x^n])
*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 8*b*e^2*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[
-d]] + 8*b*e^2*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/d^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 805, normalized size = 6.65

method	result
risch	$-\frac{a\,e^2\ln(e\,x^2+d)}{2d^3}-\frac{bn\,e^2\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d^3}-\frac{bn\,e^2\,\mathrm{dilog}\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d^3}-\frac{b\ln(x^n)}{4d\,x^4}-\frac{ib\pi\mathrm{csgn}(ic\,x^n)^3e^2\ln(x)}{2d^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^5/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*a*e^2/d^3*ln(e*x^2+d)-1/2*b*n*e^2/d^3*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/x^2-1/4*I*b
*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3*ln(e*x^2+d)-1/4*b*ln(x^n)/d/x^4+1/4*I
*b*Pi*csgn(I*c*x^n)^3*e^2/d^3*ln(e*x^2+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^
3*ln(x)-1/4*a/d/x^4+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3*ln(x)+1/2*
I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3*ln(x)-1/2*b*n*e^2/d^3*ln(x)*ln((
e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+a*e^2/d^3*ln(x)+1/8*I*b*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)/d/x^4-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3*ln
(e*x^2+d)-1/2*b*n*e^2/d^3*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*e
^2/d^3*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*ln(c)*e/d^2/x^2+b*ln(x^
n)*e^2/d^3*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3*ln(
x)-1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/x^4+1/8*I*b*Pi*csgn(I*c*x^n)^3/
d/x^4+1/2*b*n*e^2/d^3*ln(x)*ln(e*x^2+d)+1/2*a*e/d^2/x^2-1/4*I*b*Pi*csgn(I*c
*x^n)^3*e/d^2/x^2+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2/x^2+1/4*I*b*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2/x^2+b*ln(c)*e^2/d^3*ln(x)-1/2*b*n*e^2/d^
3*ln(x)^2+1/2*b*ln(x^n)*e/d^2/x^2-1/2*b*ln(c)*e^2/d^3*ln(e*x^2+d)-1/4*b*ln(
c)/d/x^4-1/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/x^4+1/4*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*e^2/d^3*ln(e*x^2+d)-1/2*b*ln(x^n)*e^2/d^3*ln(e*x^2+
d)+1/4*b*e*n/d^2/x^2-1/16*b*n/d/x^4
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] -1/4*a*(2*e^2*log(x^2*e + d)/d^3 - 4*e^2*log(x)/d^3 - (2*x^2*e - d)/(d^2*x^
4)) + b*integrate((log(c) + log(x^n))/(x^7*e + d*x^5), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^7*e + d*x^5), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**5/(e*x**2+d),x)
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)*x^5), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^5\,\left(e\,x^2+d\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^5*(d + e*x^2)),x)
[Out] int((a + b*log(c*x^n))/(x^5*(d + e*x^2)), x)
```

3.216 $\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal. Leaf size=167

$$-\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^3}{9e}-\frac{bdx\log\left(cx^n\right)}{e^2}+\frac{x^3(a+b\log\left(cx^n\right))}{3e}+\frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{e^{5/2}}-\frac{ibd^{3/2}n\mathrm{Li}_2\Big(}{2e^{5/}}$$

```
[Out] -a*d*x/e^2+b*d*n*x/e^2-1/9*b*n*x^3/e-b*d*x*ln(c*x^n)/e^2+1/3*x^3*(a+b*ln(c*
x^n))/e+d^(3/2)*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)-1/2*I*b*d
^(3/2)*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/e^(5/2)+1/2*I*b*d^(3/2)*n*polylog(
2,I*x*e^(1/2)/d^(1/2))/e^(5/2)
```

Rubi [A]
time = 0.14, antiderivative size = 167, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {308, 211, 2393, 2332, 2341, 2361, 12, 4940, 2438}

$$-\frac{ibd^{3/2}n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{ibd^{3/2}n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{d^{3/2}\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{e^{5/2}}+\frac{x^3(a+b\log\left(cx^n\right))}{3e}-\frac{adx}{e^2}-\frac{bdx\log\left(cx^n\right)}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^3}{9e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] -((a*d*x)/e^2) + (b*d*n*x)/e^2 - (b*n*x^3)/(9*e) - (b*d*x*Log[c*x^n])/e^2 +
 (x^3*(a + b*Log[c*x^n]))/(3*e) + (d^(3/2)*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a +
 b*Log[c*x^n]))/e^(5/2) - ((I/2)*b*d^(3/2)*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sq
rt[d]])/e^(5/2) + ((I/2)*b*d^(3/2)*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/e^(
5/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 308

```
Int[(x_)^(m_)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Int[PolynomialDivide[x
^m, a + b*x^n, x], x] /; FreeQ[{a, b}, x] && IGtQ[m, 0] && IGtQ[n, 0] && Gt
Q[m, 2*n - 1]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \left(-\frac{d(a+b\log(cx^n))}{e^2} + \frac{x^2(a+b\log(cx^n))}{e} + \frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)}\right)dx$$

$$= -\frac{d\int (a+b\log(cx^n))\,dx}{e^2} + \frac{d^2\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{e^2} + \frac{\int x^2(a+b\log(cx^n))\,dx}{e}$$

$$= -\frac{adx}{e^2} - \frac{bnx^3}{9e} + \frac{x^3(a+b\log(cx^n))}{3e} + \frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}} - \frac{(b$$

$$= -\frac{adx}{e^2} + \frac{bdnx}{e^2} - \frac{bnx^3}{9e} - \frac{bdx\log(cx^n)}{e^2} + \frac{x^3(a+b\log(cx^n))}{3e} + \frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right.}{e}$$

$$= -\frac{adx}{e^2} + \frac{bdnx}{e^2} - \frac{bnx^3}{9e} - \frac{bdx\log(cx^n)}{e^2} + \frac{x^3(a+b\log(cx^n))}{3e} + \frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right.}{e}$$

$$= -\frac{adx}{e^2} + \frac{bdnx}{e^2} - \frac{bnx^3}{9e} - \frac{bdx\log(cx^n)}{e^2} + \frac{x^3(a+b\log(cx^n))}{3e} + \frac{d^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right.}{e}$$

Mathematica [A]
time = 0.10, size = 208, normalized size = 1.25

$$\frac{-18ad\sqrt{e}\,x + 18bd\sqrt{e}\,nx - 2be^{3/2}nx^3 - 18bd\sqrt{e}\,x\log(cx^n) + 6e^{3/2}x^3(a+b\log(cx^n)) + 9\sqrt{-d}\,d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right) + 9(-d)^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right) + 9b(-d)^{3/2}n\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right) - 9b(-d)^{3/2}n\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{18e^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] (-18*a*d*Sqrt[e]*x + 18*b*d*Sqrt[e]*n*x - 2*b*e^(3/2)*n*x^3 - 18*b*d*Sqrt[e
]*x*Log[c*x^n] + 6*e^(3/2)*x^3*(a + b*Log[c*x^n]) + 9*Sqrt[-d]*d*(a + b*Log
[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 9*(-d)^(3/2)*(a + b*Log[c*x^n])*Lo
g[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 9*b*(-d)^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/S
qrt[-d]] - 9*b*(-d)^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(18*e^(5/
2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 693, normalized size = 4.15

method	result
risch	$\frac{ib\pi\text{csgn}(ic\,x^n)^3 dx}{2e^2} + \frac{a\,x^3}{3e} + \frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2 x^3}{6e} - \frac{b\,d^2\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{e^2\sqrt{ed}} + \frac{bn\,d^2\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^2\sqrt{-ed}} -$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(x^4*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)

[Out] 1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*d*x+1/3*a/e*x^3-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x^3-1/6*I*b*Pi*csgn(I*c*x^n)^3/e*x^3+1/2*I*b*Pi*csgn(I*c*x^n)^3/e^2*d*x-b*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)+1/2*b*n*d^2/e^2/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*d^2/e^2/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x^3+b*ln(c)*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/3*b*ln(c)/e*x^3-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*d*x+b*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)+1/2*b*n*d^2/e^2/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*d^2/e^2/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-b*ln(x^n)/e^2*d*x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*d*x+a*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-b*ln(c)/e^2*d*x+1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e*x^3-a*d*x/e^2+1/3*b*ln(x^n)/e*x^3-1/9*b*n*x^3/e-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+b*d*n*x/e^2

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")

[Out] 1/3*(3*d^(3/2)*arctan(x*e^(1/2)/sqrt(d))*e^(-5/2) + (x^3*e - 3*d*x)*e^(-2))*a + b*integrate((x^4*log(c) + x^4*log(x^n))/(x^2*e + d), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")

[Out] integral((b*x^4*log(c*x^n) + a*x^4)/(x^2*e + d), x)

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^4(a + b\log{(cx^n)})}{d + ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

```
[Out] Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^4/(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^4\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

```
[Out] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.217 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal. Leaf size=132

$$\frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log\left(cx^n\right)}{e}-\frac{\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{e^{3/2}}+\frac{ib\sqrt{d}\,n\mathrm{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{ib\sqrt{d}\,n\mathrm{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{3/2}}$$

```
[Out] a*x/e-b*n*x/e+b*x*ln(c*x^n)/e-arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(
1/2)/e^(3/2)+1/2*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))*d^(1/2)/e^(3/2)-1/2*
I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))*d^(1/2)/e^(3/2)
```

Rubi [A]
time = 0.12, antiderivative size = 132, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {327, 211, 2393, 2332, 2361, 12, 4940, 2438}

$$\frac{ib\sqrt{d}\,n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{ib\sqrt{d}\,n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{\sqrt{d}\,\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{e^{3/2}}+\frac{ax}{e}+\frac{bx\log\left(cx^n\right)}{e}-\frac{bnx}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] (a*x)/e - (b*n*x)/e + (b*x*Log[c*x^n])/e - (Sqrt[d]*ArcTan[(Sqrt[e]*x)/Sqrt
[d]]*(a + b*Log[c*x^n]))/e^(3/2) + ((I/2)*b*Sqrt[d]*n*PolyLog[2, ((-I)*Sqrt
[e]*x)/Sqrt[d]])/e^(3/2) - ((I/2)*b*Sqrt[d]*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt
[d]])/e^(3/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \left(\frac{a+b\log(cx^n)}{e} - \frac{d(a+b\log(cx^n))}{e(d+ex^2)}\right)dx$$

$$= \frac{\int (a+b\log(cx^n))\,dx}{e} - \frac{d\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{e}$$

$$= \frac{ax}{e} - \frac{\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}} + \frac{b\int \log(cx^n)\,dx}{e} + \frac{(bdn)\int \frac{\tan^{-1}\left(\right.}{\sqrt{d}}}{e}$$

$$= \frac{ax}{e} - \frac{bnx}{e} + \frac{bx\log(cx^n)}{e} - \frac{\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}} + \frac{\left(b\sqrt{d}\,n\right)\int}{}$$

$$= \frac{ax}{e} - \frac{bnx}{e} + \frac{bx\log(cx^n)}{e} - \frac{\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}} + \frac{\left(ib\sqrt{d}\,n\right)\int}{}$$

$$= \frac{ax}{e} - \frac{bnx}{e} + \frac{bx\log(cx^n)}{e} - \frac{\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}} + \frac{ib\sqrt{d}\,n\text{Li}_2\left(\right.}{2e^3}$$

Mathematica [A]
time = 0.07, size = 170, normalized size = 1.29

$$\frac{2a\sqrt{e}\,x - 2b\sqrt{e}\,nx + 2b\sqrt{e}\,x\log(cx^n) - \sqrt{-d}\,(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right) + \sqrt{-d}\,(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right) + b\sqrt{-d}\,n\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right) - b\sqrt{-d}\,n\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{2e^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

```
[Out] (2*a*Sqrt[e]*x - 2*b*Sqrt[e]*n*x + 2*b*Sqrt[e]*x*Log[c*x^n] - Sqrt[-d]*(a +
 b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + Sqrt[-d]*(a + b*Log[c*x^n])*
Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + b*Sqrt[-d]*n*PolyLog[2, (Sqrt[e]*x)/Sqr
t[-d]] - b*Sqrt[-d]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(2*e^(3/2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 512, normalized size = 3.88

method	result
risch	$\frac{b\ln(x^n)x}{e} + \frac{bd\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{e\sqrt{ed}} - \frac{bd\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{e\sqrt{ed}} - \frac{bnx}{e} - \frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e\sqrt{-ed}} + \frac{bnd\ln(x)}{2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(x^n)/e*x+b*d/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)-b*d/e/(e*d)
^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)-b*n*x/e-1/2*b*n*d/e/(-e*d)^(1/2)*ln(
x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n*d/e/(-e*d)^(1/2)*ln(x)*ln((
e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*d/e/(-e*d)^(1/2)*dilog((-e*x+(-e*d)
^(1/2))/(-e*d)^(1/2))+1/2*b*n*d/e/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e/(e*d)^(1/2)*a
rctan(x*e/(e*d)^(1/2))-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x-1
/2*I*b*Pi*csgn(I*c*x^n)^3/e*x+1/2*I*b*Pi*csgn(I*c*x^n)^3*d/e/(e*d)^(1/2)*ar
ctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e*x-1/2*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2*d/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e*x-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e
/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+b*ln(c)/e*x-b*ln(c)*d/e/(e*d)^(1/2)*ar
ctan(x*e/(e*d)^(1/2))+a*x/e-a*d/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] -(sqrt(d)*arctan(x*e^(1/2)/sqrt(d))*e^(-3/2) - x*e^(-1))*a + b*integrate((x
^2*log(c) + x^2*log(x^n))/(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x^2*e + d), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log(cx^n))}{d + ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d),x)
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2),x)
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.218 $\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$

Optimal. Leaf size=105

$$\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{e}}-\frac{ibn\text{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,\sqrt{e}}+\frac{ibn\text{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,\sqrt{e}}$$

```
[Out] arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/e^(1/2)-1/2*I*b*n*polylog
(2,-I*x*e^(1/2)/d^(1/2))/d^(1/2)/e^(1/2)+1/2*I*b*n*polylog(2,I*x*e^(1/2)/d^
(1/2))/d^(1/2)/e^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {211, 2361, 12, 4940, 2438}

$$-\frac{ibn\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,\sqrt{e}}+\frac{ibn\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,\sqrt{e}}+\frac{\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^2),x]
```

```
[Out] (ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*Sqrt[e]) - ((I/2)
*b*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*Sqrt[e]) + ((I/2)*b*n*P
olyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*Sqrt[e])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx &= \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{e}} - (bn)\int \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{e}\,x}\,dx \\
&= \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{e}} - \frac{(bn)\int \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{x}\,dx}{\sqrt{d}\,\sqrt{e}} \\
&= \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{e}} - \frac{(ibn)\int \frac{\log\left(1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{x}\,dx}{2\sqrt{d}\,\sqrt{e}} + \frac{(ibn)\int \frac{\log\left(1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{x}}{2\sqrt{d}\,\sqrt{e}} \\
&= \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{e}} - \frac{ibn\mathrm{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,\sqrt{e}} + \frac{ibn\mathrm{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,\sqrt{e}}
\end{aligned}
$$

Mathematica [A]
time = 0.03, size = 107, normalized size = 1.02

$$
\frac{-\left((a+b\log(cx^n))\left(\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)-\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)\right)\right)+bn\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)-bn\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{2\sqrt{-d}\,\sqrt{e}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^2),x]
```

```
[Out] (-((a + b*Log[c*x^n])*(Log[1 + (Sqrt[e]*x)/Sqrt[-d]] - Log[1 + (d*Sqrt[e]*x
)/(-d)^(3/2)])) + b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] - b*n*PolyLog[2, (d*
Sqrt[e]*x)/(-d)^(3/2)])/(2*Sqrt[-d]*Sqrt[e])
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 332, normalized size = 3.16

method	result
risch	$-\frac{b\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{\sqrt{ed}}+\frac{b\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{\sqrt{ed}}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2\sqrt{-ed}}-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2\sqrt{-ed}}+$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)

[Out] -b/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)+b/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)+1/2*b*n/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*I/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*b*Pi*csgn(I*c*x^n)^3+1/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*b*ln(c)+a/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")

[Out] a*arctan(x*e^(1/2)/sqrt(d))*e^(-1/2)/sqrt(d) + b*integrate((log(c) + log(x^n))/(x^2*e + d), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")

[Out] integral((b*log(c*x^n) + a)/(x^2*e + d), x)

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log{(cx^n)}}{d + ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**2+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^2),x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^2), x)
```

3.219 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$

Optimal. Leaf size=134

$$-\frac{bn}{dx}-\frac{a+b\log\left(cx^n\right)}{dx}-\frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{d^{3/2}}+\frac{ib\sqrt{e}\,n\mathrm{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}}-\frac{ib\sqrt{e}\,n\mathrm{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}}$$

```
[Out] -b*n/d/x+(-a-b*ln(c*x^n))/d/x-arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*e^(
1/2)/d^(3/2)+1/2*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(3/2)-1/2*
I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(3/2)
```

Rubi [A]
time = 0.10, antiderivative size = 134, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2380, 2341, 211, 2361, 12, 4940, 2438}

$$\frac{ib\sqrt{e}\,n\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}}-\frac{ib\sqrt{e}\,n\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}}-\frac{\sqrt{e}\,\mathrm{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{d^{3/2}}-\frac{a+b\log\left(cx^n\right)}{dx}-\frac{bn}{dx}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)),x]
```

```
[Out] -((b*n)/(d*x)) - (a + b*Log[c*x^n])/(d*x) - (Sqrt[e]*ArcTan[(Sqrt[e]*x)/Sqr
t[d]]*(a + b*Log[c*x^n]))/d^(3/2) + ((I/2)*b*Sqrt[e]*n*PolyLog[2, ((-I)*Sqr
t[e]*x)/Sqrt[d]])/d^(3/2) - ((I/2)*b*Sqrt[e]*n*PolyLog[2, (I*Sqrt[e]*x)/Sqr
t[d]])/d^(3/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^2} - \frac{e(a+b\log(cx^n))}{d(d+ex^2)}\right)dx$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{d}$$

$$= -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{(ben)\int \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{e}\,x \ldots}}{d} \ldots$$

$$= -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{(b\sqrt{e}\,n)\int \frac{\tan^{-1}\left(\ldots\right)}{x}\ldots}{d^{3/2}} \ldots$$

$$= -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{(ib\sqrt{e}\,n)\int \frac{\log\left(1-\ldots\right)}{\ldots}}{2d^{3/2}} \ldots$$

$$= -\frac{bn}{dx} - \frac{a+b\log(cx^n)}{dx} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{ib\sqrt{e}\,n\mathrm{Li}_2\left(-\frac{i\sqrt{e}\ldots}{\sqrt{d}}\ldots\right)}{2d^{3/2}} \ldots$$

Mathematica [A]
time = 0.10, size = 173, normalized size = 1.29

$$\frac{d\left(-2b(-d)^{3/2}n+2\sqrt{-d}\,d(a+b\log(cx^n))-d\sqrt{e}\,x(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+d\sqrt{e}\,x(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)+bd\sqrt{e}\,nx\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)-bd\sqrt{e}\,nx\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)\right)}{2(-d)^{7/2}x}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)),x]
```

```
[Out] (d*(-2*b*(-d)^(3/2)*n + 2*Sqrt[-d]*d*(a + b*Log[c*x^n]) - d*Sqrt[e]*x*(a +
b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + d*Sqrt[e]*x*(a + b*Log[c*x^n]
)*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + b*d*Sqrt[e]*n*x*PolyLog[2, (Sqrt[e]*x
)/Sqrt[-d]] - b*d*Sqrt[e]*n*x*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)]))/(2*(-d
)^(7/2)*x)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 531, normalized size = 3.96

method	result
risch	$\frac{be\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{d\sqrt{ed}}-\frac{be\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{d\sqrt{ed}}-\frac{b\ln(x^n)}{dx}-\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d\sqrt{-ed}}+\frac{bne\ln(x)\ln\left(\frac{ex+\sqrt{-}}{\sqrt{-}}\right.}{2d\sqrt{-ed}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] b*e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)-b*e/d/(e*d)^(1/2)*arctan(
x*e/(e*d)^(1/2))*ln(x^n)-b*ln(x^n)/d/x-1/2*b*n*e/d/(-e*d)^(1/2)*ln(x)*ln((-
e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n*e/d/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*
d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*e/d/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/
(-e*d)^(1/2))+1/2*b*n*e/d/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2
))-b*n/d/x+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/x-1/2*I*b*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2/d/x+1/2*I*b*Pi*csgn(I*c*x^n)^3/d/x-1/2*I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2*e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/2*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2*e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi
*csgn(I*c*x^n)^3*e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/2*I*b*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2/d/x+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d
/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-b*ln(c)*e/d/(e*d)^(1/2)*arctan(x*e/(e*
d)^(1/2))-b*ln(c)/d/x-a*e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-a/d/x
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] -a*(arctan(x*e^(1/2)/sqrt(d))*e^(1/2)/d^(3/2) + 1/(d*x)) + b*integrate((log
(c) + log(x^n))/(x^4*e + d*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^4*e + d*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{(cx^n)}}{x^2 (d + ex^2)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a + b\, \ln(c\, x^n)}{x^2\, (e\, x^2 + d)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)), x)
```

3.220 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$

Optimal. Leaf size=165

$$-\frac{bn}{9dx^3}+\frac{ben}{d^2x}-\frac{a+b\log(cx^n)}{3dx^3}+\frac{e(a+b\log(cx^n))}{d^2x}+\frac{e^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{ibe^{3/2}n\mathrm{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right.}{2d^{5/2}}$$

```
[Out] -1/9*b*n/d/x^3+b*e*n/d^2/x+1/3*(-a-b*ln(c*x^n))/d/x^3+e*(a+b*ln(c*x^n))/d^2
/x+e^(3/2)*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)-1/2*I*b*e^(3/2
)*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(5/2)+1/2*I*b*e^(3/2)*n*polylog(2,I*x
*e^(1/2)/d^(1/2))/d^(5/2)
```

Rubi [A]

time = 0.16, antiderivative size = 165, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.304, Rules used = {2380, 2341, 211, 2361, 12, 4940, 2438}

$$-\frac{ibe^{3/2}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}}+\frac{ibe^{3/2}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}}+\frac{e^{3/2}\mathrm{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}+\frac{e(a+b\log(cx^n))}{d^2x}-\frac{a+b\log(cx^n)}{3dx^3}+\frac{ben}{d^2x}-\frac{bn}{9dx^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)),x]
```

```
[Out] -1/9*(b*n)/(d*x^3) + (b*e*n)/(d^2*x) - (a + b*Log[c*x^n])/(3*d*x^3) + (e*(a
 + b*Log[c*x^n]))/(d^2*x) + (e^(3/2)*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log
[c*x^n]))/d^(5/2) - ((I/2)*b*e^(3/2)*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]
)/d^(5/2) + ((I/2)*b*e^(3/2)*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/d^(5/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \left(\frac{a+b\log(cx^n)}{dx^4} - \frac{e(a+b\log(cx^n))}{d^2x^2} + \frac{e^2(a+b\log(cx^n))}{d^2(d+ex^2)}\right)dx$$

$$= \frac{\int \frac{a+b\log(cx^n)}{x^4}\,dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{x^2}\,dx}{d^2} + \frac{e^2\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{d^2}$$

$$= -\frac{bn}{9dx^3} + \frac{ben}{d^2x} - \frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

$$= -\frac{bn}{9dx^3} + \frac{ben}{d^2x} - \frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

$$= -\frac{bn}{9dx^3} + \frac{ben}{d^2x} - \frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

$$= -\frac{bn}{9dx^3} + \frac{ben}{d^2x} - \frac{a+b\log(cx^n)}{3dx^3} + \frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{d^{5/2}}$$

Mathematica [A]
time = 0.13, size = 211, normalized size = 1.28

$$\frac{1}{18}\left(-\frac{2bn}{dx^3}+\frac{18ben}{d^2x}-\frac{6(a+b\log(cx^n))}{dx^3}+\frac{18e(a+b\log(cx^n))}{d^2x}-\frac{9e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}}+\frac{9e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}+\frac{9be^{3/2}n\mathrm{Li}_2\left(\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}}-\frac{9be^{3/2}n\mathrm{Li}_2\left(\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)),x]
```

```
[Out] ((-2*b*n)/(d*x^3) + (18*b*e*n)/(d^2*x) - (6*(a + b*Log[c*x^n]))/(d*x^3) + (
18*e*(a + b*Log[c*x^n]))/(d^2*x) - (9*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (S
qrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (9*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (d*
Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2) + (9*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/
Sqrt[-d]])/(-d)^(5/2) - (9*b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)]
)/(-d)^(5/2))/18
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 706, normalized size = 4.28

method	result
risch	$-\frac{b\ln(c)}{3d\,x^3}-\frac{ib\pi\,\mathrm{csgn}(ic\,x^n)^3e}{2d^2x}+\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2e}{2d^2x}+\frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2e}{2d^2x}+\frac{b\,e^2\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{d^2\sqrt{ed}}-\frac{a}{3d\,x}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x^2+d),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(
1/2))-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/x-1/3*b*ln(c)/d/
x^3-1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/x^3+b*e^2/d^2/(e*d)^(1/2)*arct
an(x*e/(e*d)^(1/2))*ln(x^n)-1/3*a/d/x^3-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^2/
(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/
d^2/x+1/6*I*b*Pi*csgn(I*c*x^n)^3/d/x^3+a*e/d^2/x+1/6*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)/d/x^3-b*e^2/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*
ln(x)+1/2*b*n*e^2/d^2/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2
))-1/2*b*n*e^2/d^2/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+b
*ln(x^n)*e/d^2/x+b*ln(c)*e^2/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*b*
n*e^2/d^2/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n*e^2/
d^2/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+a*e^2/d^2/(e*d)^(1/
2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2/x-1
/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/x^3-1/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^2/
x-1/3*b*ln(x^n)/d/x^3+b*ln(c)*e/d^2/x-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)*e^2/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2*e^2/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+b*e*n/d^2/x-1
/9*b*n/d/x^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="maxima")
[Out] 1/3*a*(3*arctan(x*e^(1/2)/sqrt(d))*e^(3/2)/d^(5/2) + (3*x^2*e - d)/(d^2*x^3
)) + b*integrate((log(c) + log(x^n))/(x^6*e + d*x^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)/(x^6*e + d*x^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^n\right)}{x^4\left(d + ex^2\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d),x)
[Out] Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a + b\,\ln\left(c\,x^n\right)}{x^4\,\left(e\,x^2 + d\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)),x)
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)), x)
```

3.221 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=129

$$-\frac{bnx^2}{4e^2}+\frac{x^2(a+b\log(cx^n))}{2e^2}+\frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{bdn\log(d+ex^2)}{4e^3}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{e^3}-\frac{bdn\mathrm{l}}{}$$

```
[Out] -1/4*b*n*x^2/e^2+1/2*x^2*(a+b*ln(c*x^n))/e^2+1/2*d*x^2*(a+b*ln(c*x^n))/e^2/
(e*x^2+d)-1/4*b*d*n*ln(e*x^2+d)/e^3-d*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e^3-1/2
*b*d*n*polylog(2,-e*x^2/d)/e^3
```

Rubi [A]
time = 0.15, antiderivative size = 129, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {272, 45, 2393, 2341, 2373, 266, 2375, 2438}

$$-\frac{bdn\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{2e^3}-\frac{d\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)}+\frac{x^2(a+b\log(cx^n))}{2e^2}-\frac{bdn\log(d+ex^2)}{4e^3}-\frac{bnx^2}{4e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] -1/4*(b*n*x^2)/e^2 + (x^2*(a + b*Log[c*x^n]))/(2*e^2) + (d*x^2*(a + b*Log[c
*x^n]))/(2*e^2*(d + e*x^2)) - (b*d*n*Log[d + e*x^2])/(4*e^3) - (d*(a + b*Lo
g[c*x^n])*Log[1 + (e*x^2)/d])/e^3 - (b*d*n*PolyLog[2, -((e*x^2)/d)])/(2*e^3
)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \left(\frac{x(a+b\log(cx^n))}{e^2} + \frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)^2} - \frac{2dx(a+b\log(cx^n))}{e^2(d+ex^2)}\right) dx$$

$$= \frac{\int x(a+b\log(cx^n))\,dx}{e^2} - \frac{(2d)\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{e^2} + \frac{d^2\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx}{e^2}$$

$$= -\frac{bnx^2}{4e^2} + \frac{x^2(a+b\log(cx^n))}{2e^2} + \frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)} - \frac{d(a+b\log(cx^n))\log\left(1+\right.}{e^3}$$

$$= -\frac{bnx^2}{4e^2} + \frac{x^2(a+b\log(cx^n))}{2e^2} + \frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)} - \frac{bdn\log(d+ex^2)}{4e^3} - \frac{d(a+}{}$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.33, size = 287, normalized size = 2.22

$$\frac{2ex^2(a-bn\log(x)+b\log(cx^n)) - \frac{2d^2(a-bn\log(x)+b\log(cx^n))}{d+ex^2} - 4d(a-bn\log(x)+b\log(cx^n))\log(d+ex^2) + bn\left(\frac{d\sqrt{e}\,x\log(x)}{-i\sqrt{d}+\sqrt{e}\,x} + \frac{d\sqrt{e}\,x\log(x)}{i\sqrt{d}+\sqrt{e}\,x} + ex^2(-1+2\log(x)) - d\log\left(i\sqrt{d}-\sqrt{e}\,x\right) - d\log\left(i\sqrt{d}+\sqrt{e}\,x\right) - 4d\left(\log(x)\log\left(1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right) + \text{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right) - 4d\left(\log(x)\log\left(1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right) + \text{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right)\right)}{4e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] (2*e*x^2*(a - b*n*Log[x] + b*Log[c*x^n]) - (2*d^2*(a - b*n*Log[x] + b*Log[c
*x^n]))/(d + e*x^2) - 4*d*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] +
b*n*((d*Sqrt[e]*x*Log[x])/((-I)*Sqrt[d] + Sqrt[e]*x) + (d*Sqrt[e]*x*Log[x])
/(I*Sqrt[d] + Sqrt[e]*x) + e*x^2*(-1 + 2*Log[x]) - d*Log[I*Sqrt[d] - Sqrt[e
]*x] - d*Log[I*Sqrt[d] + Sqrt[e]*x] - 4*d*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqr
t[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) - 4*d*(Log[x]*Log[1 - (I*Sqrt
[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*e^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 687, normalized size = 5.33

method	result
risch	$\frac{ib\pi \mathrm{csgn}(ic\,x^n)^3 d\ln(e\,x^2+d)}{2e^3} - \frac{bnd\,\mathrm{dilog}\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{e^3} + \frac{b\ln(x^n)x^2}{2e^2} + \frac{a\,x^2}{2e^2} + \frac{b\ln(c)x^2}{2e^2} - \frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2 d\ln(e}{2e^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^3*d*ln(e*x^2+d)-1/4*I*b*Pi
*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^3/(e*x^2+d)+1/2*b*ln(x^n)/e^2*x^2+1/4*I*b*
Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*x^2-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
```

```
/e^3*d*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*x^2-1/4*I*b*P
i*csgn(I*c*x^n)^3/e^2*x^2+1/2*a/e^2*x^2-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n
)^2*d^2/e^3/(e*x^2+d)+1/2*b*ln(c)/e^2*x^2+1/2*b*n/e^3*d*ln(x)-b*n*d/e^3*dil
og((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-b*n*d/e^3*dilog((e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*x^2-b*n*d/e^3
*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+b*n*d/e^3*ln(x)*ln(e*x^2+d)-b*n*
d/e^3*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*a*d^2/e^3/(e*x^2+d)-a*
d/e^3*ln(e*x^2+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*d*ln(e*x^2+d)+1/
4*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^3/(e*x^2+d)+1/2*I*b*Pi*csgn(I*c*x^n)^3/e^3*d
*ln(e*x^2+d)-1/2*b*ln(c)*d^2/e^3/(e*x^2+d)-1/2*b*ln(x^n)*d^2/e^3/(e*x^2+d)-
b*ln(x^n)*d/e^3*ln(e*x^2+d)-b*ln(c)/e^3*d*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)*d^2/e^3/(e*x^2+d)-1/4*b*n*x^2/e^2-1/4*b*d*n*ln(e*
x^2+d)/e^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*(x^2*e^(-2) - 2*d*e^(-3)*log(x^2*e + d) - d^2/(x^2*e^4 + d*e^3))*a + b*
integrate((x^5*log(c) + x^5*log(x^n))/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^5*log(c*x^n) + a*x^5)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [A]
time = 53.80, size = 316, normalized size = 2.45

$$\frac{ad^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)}{2e^2}-\frac{ad\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log\left(d+ex^2\right)}{e} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{ax^2}{2e^2}-\frac{bd^2n\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x^2\right)}{2de} & \text{otherwise}\end{cases}\right)}{2e^2}+\frac{bd^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)}{2e^2}+\frac{bdn\left(\begin{cases}\frac{x^2}{2d} & \text{for } e=0\\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{bd\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log\left(d+ex^2\right)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)}{e^2}-\frac{bnx^2}{4e^2}+\frac{bx^2\log\left(cx^n\right)}{2e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

```
[Out] a*d**2*Piecewise((x**2/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))/(2*e*
*2) - a*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/e**2 + a
*x**2/(2*e**2) - b*d**2*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/(d*
e) + log(d/e + x**2)/(2*d*e), True))/(2*e**2) + b*d**2*Piecewise((x**2/d**2
, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))*log(c*x**n)/(2*e**2) + b*d*n*Pie
cewise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e*x**2*exp_polar(I*p
i)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2
*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*e
xp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x
)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x**
2*exp_polar(I*pi)/d)/2, True))/e, True))/e**2 - b*d*Piecewise((x**2/d, Eq(e
, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/e**2 - b*n*x**2/(4*e**2) + b*
x**2*log(c*x**n)/(2*e**2)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^5/(x^2*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

```
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.222 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=95

$$-\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\log(d+ex^2)}{4e^2}+\frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2}+\frac{bn\text{Li}_2\left(-\frac{ex^2}{d}\right)}{4e^2}$$

```
[Out] -1/2*x^2*(a+b*ln(c*x^n))/e/(e*x^2+d)+1/4*b*n*ln(e*x^2+d)/e^2+1/2*(a+b*ln(c*
x^n))*ln(1+e*x^2/d)/e^2+1/4*b*n*polylog(2,-e*x^2/d)/e^2
```

Rubi [A]
time = 0.14, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {272, 45, 2393, 2373, 266, 2375, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}+\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^2}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\log(d+ex^2)}{4e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] -1/2*(x^2*(a + b*Log[c*x^n]))/(e*(d + e*x^2)) + (b*n*Log[d + e*x^2])/(4*e^2
) + ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e^2) + (b*n*PolyLog[2, -((e*
x^2)/d)])/(4*e^2)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \left(-\frac{dx(a+b\log(cx^n))}{e(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{e(d+ex^2)}\right)dx$$

$$= \frac{\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{e} - \frac{d\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx}{e}$$

$$= -\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2} - \frac{(bn)\int \frac{\log\left(1+\frac{ex^2}{d}\right)}{x}\,dx}{2e^2} + \cdots$$

$$= -\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{bn\log(d+ex^2)}{4e^2} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2} + \frac{bn\mathrm{Li} \cdots}{\cdots}$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.15, size = 321, normalized size = 3.38

$$\frac{\frac{2d(a-bn\log(x)+b\log(cx^n))}{d+ex^2}+2(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)+\frac{bn\left(-2ex^2\log(x)+d\log\left(i\sqrt{d}-\sqrt{e}\,x\right)+ex^2\log\left(i\sqrt{d}-\sqrt{e}\,x\right)+d\log\left(i\sqrt{d}+\sqrt{e}\,x\right)+ex^2\log\left(i\sqrt{d}+\sqrt{e}\,x\right)+2d\log(x)\log\left(1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+2ex^2\log(x)\log\left(1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+2d\log(x)\log\left(1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+2ex^2\log(x)\log\left(1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+2(d+ex^2)\mathrm{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+2(d+ex^2)\mathrm{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right)}{d+ex^2}}{4e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] ((2*d*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^2) + 2*(a - b*n*Log[x] + b*
Log[c*x^n])*Log[d + e*x^2] + (b*n*(-2*e*x^2*Log[x] + d*Log[I*Sqrt[d] - Sqrt
[e]*x] + e*x^2*Log[I*Sqrt[d] - Sqrt[e]*x] + d*Log[I*Sqrt[d] + Sqrt[e]*x] +
e*x^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 2*d*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]
] + 2*e*x^2*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 2*d*Log[x]*Log[1 + (I*S
qrt[e]*x)/Sqrt[d]] + 2*e*x^2*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 2*(d +
 e*x^2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 2*(d + e*x^2)*PolyLog[2, (I*
Sqrt[e]*x)/Sqrt[d]]))/(d + e*x^2))/(4*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 511, normalized size = 5.38

method	result
risch	$\frac{b\ln(x^n)d}{2e^2(e\,x^2+d)}+\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e^2}-\frac{bn\ln(x)\ln(e\,x^2+d)}{2e^2}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^2}+\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^2}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*ln(x^n)*d/e^2/(e*x^2+d)+1/2*b*ln(x^n)/e^2*ln(e*x^2+d)-1/2*b*n/e^2*ln(
x)*ln(e*x^2+d)+1/2*b*n/e^2*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b
*n/e^2*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/e^2*dilog((-e*x+(-
e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/e^2*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2)
)-1/2*b*n/e^2*ln(x)+1/4*b*n*ln(e*x^2+d)/e^2-1/4*I*b*Pi*csgn(I*c*x^n)^3/e^2*
ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d/e^2/(e*x^2+d)-1/4*I*b*
Pi*csgn(I*c*x^n)^3*d/e^2/(e*x^2+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2
*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^2/(e*x^2+d)-1/4*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2/e^2*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)*d/e^2/(e*x^2+d)+1/2*b*ln(c)*d/e^2/(e*x^2+d)+1/2*b*ln(c)/e^2*ln(e*x^2+
d)+1/2*a*d/e^2/(e*x^2+d)+1/2*a/e^2*ln(e*x^2+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*(e^(-2)*log(x^2*e + d) + d/(x^2*e^3 + d*e^2))*a + b*integrate((x^3*log(
c) + x^3*log(x^n))/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a + b\log{(cx^n)})}{(d + ex^2)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
[Out] Integral(x**3*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^3/(x^2*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.223 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=50

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\log(d+ex^2)}{4de}$$

```
[Out] 1/2*x^2*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/4*b*n*ln(e*x^2+d)/d/e
```

Rubi [A]
time = 0.03, antiderivative size = 50, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.095$, Rules used = {2373, 266}

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\log(d+ex^2)}{4de}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] (x^2*(a + b*Log[c*x^n]))/(2*d*(d + e*x^2)) - (b*n*Log[d + e*x^2])/(4*d*e)
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx &= \frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{(bn)\int \frac{x}{d+ex^2}\,dx}{2d}\\ &= \frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\log(d+ex^2)}{4de}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 74, normalized size = 1.48

$$-\frac{2ad-2bn(d+ex^2)\log(x)+2bd\log(cx^n)+bdn\log(d+ex^2)+benx^2\log(d+ex^2)}{4de(d+ex^2)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] -1/4*(2*a*d - 2*b*n*(d + e*x^2)*Log[x] + 2*b*d*Log[c*x^n] + b*d*n*Log[d + e
*x^2] + b*e*n*x^2*Log[d + e*x^2])/(d*e*(d + e*x^2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 179, normalized size = 3.58

method	result
risch	$-\frac{b\ln(x^n)}{2e(e\,x^2+d)}-\frac{-i\pi bd\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi bd\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi bd\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-i\pi bd\mathrm{csgn}(ic\,x^n)^3-2\ln}{4(e\,x^2+d)ed}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b/e/(e*x^2+d)*ln(x^n)-1/4*(-I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-
I*Pi*b*d*csgn(I*c*x^n)^3-2*ln(x)*b*e*n*x^2+ln(e*x^2+d)*b*e*n*x^2-2*ln(x)*b*
d*n+ln(e*x^2+d)*b*d*n+2*d*b*ln(c)+2*a*d)/(e*x^2+d)/e/d
```

Maxima [A]
time = 0.28, size = 70, normalized size = 1.40

$$-\frac{1}{4}\,bn\left(\frac{e^{(-1)}\log\left(x^2e+d\right)}{d}-\frac{e^{(-1)}\log\left(x^2\right)}{d}\right)-\frac{b\log\left(cx^n\right)}{2\left(x^2e^2+de\right)}-\frac{a}{2\left(x^2e^2+de\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] -1/4*b*n*(e^(-1)*log(x^2*e + d)/d - e^(-1)*log(x^2)/d) - 1/2*b*log(c*x^n)/(
x^2*e^2 + d*e) - 1/2*a/(x^2*e^2 + d*e)
```

Fricas [A]
time = 0.37, size = 64, normalized size = 1.28

$$\frac{2\,bnx^2e\log\left(x\right)-2\,bd\log\left(c\right)-2\,ad-\left(bnx^2e+bdn\right)\log\left(x^2e+d\right)}{4\left(dx^2e^2+d^2e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] 1/4*(2*b*n*x^2*e*log(x) - 2*b*d*log(c) - 2*a*d - (b*n*x^2*e + b*d*n)*log(x^
2*e + d))/(d*x^2*e^2 + d^2*e)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 292 vs. $2(39) = 78$.

time = 27.00, size = 292, normalized size = 5.84

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}\right) & \text{for } d = 0 \wedge e = 0 \\ \frac{-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}}{e^2} & \text{for } d = 0 \\ \frac{\frac{ax^2}{2} - \frac{bnx^2}{4} + \frac{bx^2\log(cx^n)}{2}}{d^2} & \text{for } e = 0 \\ -\frac{2ad}{4d^2e+4de^2x^2} - \frac{bdn\log\left(x-\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2} - \frac{bdn\log\left(x+\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2} - \frac{benx^2\log\left(x-\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2} - \frac{benx^2\log\left(x+\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2} + \frac{2bex^2\log(cx^n)}{4d^2e+4de^2x^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

```
[Out] Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d,
 0) & Eq(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**
2, Eq(d, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**2, Eq(e, 0
)), (-2*a*d/(4*d**2*e + 4*d*e**2*x**2) - b*d*n*log(x - sqrt(-d/e))/(4*d**2*
e + 4*d*e**2*x**2) - b*d*n*log(x + sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) -
 b*e*n*x**2*log(x - sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) - b*e*n*x**2*log
(x + sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) + 2*b*e*x**2*log(c*x**n)/(4*d**
2*e + 4*d*e**2*x**2), True))
```

Giac [A]

time = 4.74, size = 70, normalized size = 1.40

$$-\frac{bnx^2e\log(x^2e+d) - 2\,bnx^2e\log(x) + bdn\log(x^2e+d) + 2\,bd\log(c) + 2\,ad}{4\,(dx^2e^2 + d^2e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] -1/4*(b*n*x^2*e*log(x^2*e + d) - 2*b*n*x^2*e*log(x) + b*d*n*log(x^2*e + d)
+ 2*b*d*log(c) + 2*a*d)/(d*x^2*e^2 + d^2*e)
```

Mupad [B]

time = 3.50, size = 73, normalized size = 1.46

$$\frac{b\,n\,\ln(x)}{2\,d\,e} - \frac{b\,\ln(c\,x^n)}{2\,(e^2\,x^2 + d\,e)} - \frac{b\,n\,\ln(e\,x^2+d)}{4\,d\,e} - \frac{a}{2\,e^2\,x^2 + 2\,d\,e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

```
[Out] (b*n*log(x))/(2*d*e) - (b*log(c*x^n))/(2*(d*e + e^2*x^2)) - (b*n*log(d + e*
x^2))/(4*d*e) - a/(2*d*e + 2*e^2*x^2)
```

3.224 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx$

Optimal. Leaf size=82

$$\frac{a+b\log\left(cx^n\right)}{2d\left(d+ex^2\right)}-\frac{\log\left(1+\frac{d}{ex^2}\right)\left(2a-bn+2b\log\left(cx^n\right)\right)}{4d^2}+\frac{bn\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d^2}$$

```
[Out] 1/2*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/4*ln(1+d/e/x^2)*(2*a-b*n+2*b*ln(c*x^n))/d
^2+1/4*b*n*polylog(2,-d/e/x^2)/d^2
```

Rubi [A]
time = 0.10, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2385, 2379, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^2}-\frac{\log\left(\frac{d}{ex^2}+1\right)\left(2a+2b\log\left(cx^n\right)-bn\right)}{4d^2}+\frac{a+b\log\left(cx^n\right)}{2d\left(d+ex^2\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^2),x]
```

```
[Out] (a + b*Log[c*x^n])/(2*d*(d + e*x^2)) - (Log[1 + d/(e*x^2)]*(2*a - b*n + 2*b
*Log[c*x^n]))/(4*d^2) + (b*n*PolyLog[2, -(d/(e*x^2))])/(4*d^2)
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \frac{a+b\log(cx^n)}{2d(d+ex^2)} - \frac{\int \frac{-2a+bn-2b\log(cx^n)}{x(d+ex^2)}\,dx}{2d}$$

$$= \frac{a+b\log(cx^n)}{2d(d+ex^2)} - \frac{\log\left(1+\frac{d}{ex^2}\right)(2a-bn+2b\log(cx^n))}{4d^2} + \frac{(bn)\int \frac{\log\left(1+\frac{d}{ex^2}\right)}{x}\,dx}{2d^2}$$

$$= \frac{a+b\log(cx^n)}{2d(d+ex^2)} - \frac{\log\left(1+\frac{d}{ex^2}\right)(2a-bn+2b\log(cx^n))}{4d^2} + \frac{bn\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d^2}$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.27, size = 279, normalized size = 3.40

$$\frac{a-bn\log(x)+b\log(cx^n)}{2d^2+2dex^2} + \frac{\log(x)(a-bn\log(x)+b\log(cx^n))}{d^2} - \frac{(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)}{2d^2} + \frac{bn\left(\frac{\sqrt{e}\,x\log(x)}{i\sqrt{d}-\sqrt{e}\,x} - \frac{\sqrt{e}\,x\log(x)}{i\sqrt{d}+\sqrt{e}\,x} + 2\log^2(x) + \log\left(i\sqrt{d}-\sqrt{e}\,x\right) + \log\left(i\sqrt{d}+\sqrt{e}\,x\right) - 2\left(\log(x)\log\left(1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right) + \text{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right) - 2\left(\log(x)\log\left(1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right) + \text{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right)\right)}{4d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^2),x]
```

```
[Out] (a - b*n*Log[x] + b*Log[c*x^n])/(2*d^2 + 2*d*e*x^2) + (Log[x]*(a - b*n*Log[
x] + b*Log[c*x^n]))/d^2 - ((a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2])/
(2*d^2) + (b*n*((Sqrt[e]*x*Log[x])/(I*Sqrt[d] - Sqrt[e]*x) - (Sqrt[e]*x*Log
[x])/(I*Sqrt[d] + Sqrt[e]*x) + 2*Log[x]^2 + Log[I*Sqrt[d] - Sqrt[e]*x] + Lo
g[I*Sqrt[d] + Sqrt[e]*x] - 2*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + PolyL
og[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) - 2*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]]
 + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*d^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 644, normalized size = 7.85

method	result
risch	$-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d^2} + \frac{bn\ln(x)\ln(e\,x^2+d)}{2d^2} - \frac{ib\pi\text{csgn}(ic\,x^n)^3}{4d(e\,x^2+d)} + \frac{ib\pi\text{csgn}(ic\,x^n)^3\ln(e\,x^2+d)}{4d^2} - \frac{ib\pi\text{csgn}(ic\,x^n)^3\ln(x}{2d^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*n/d^2*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/d^2*ln(x)*ln
(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/(e*x^2+d)+1/4*I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2*ln(e*x^2+d)-1/2*I*b*Pi*csgn(I*
c*x^n)^3/d^2*ln(x)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*ln(x)-1/2*b*n
/d^2*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2/d^2*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*ln(e*x
```

```
^2+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(e*x^2+d)-1/4*I*b*Pi*csgn(I*c*
x^n)^3/d/(e*x^2+d)-1/2*b*n/d^2*ln(x)^2-1/2*b*n/d^2*ln(x)-1/2*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2*ln(x)+a/d^2*ln(x)+1/4*I*b*Pi*csgn(I*c*x^n)
^3/d^2*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(e*x^2+d)+b*ln(
c)/d^2*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*ln(x)-1/2*a/d^2*ln(e*
x^2+d)+1/2*a/d/(e*x^2+d)+1/2*b*ln(c)/d/(e*x^2+d)-1/2*b*ln(c)/d^2*ln(e*x^2+d
)+b*ln(x^n)/d^2*ln(x)+1/2*b*ln(x^n)/d/(e*x^2+d)-1/2*b*ln(x^n)/d^2*ln(e*x^2+
d)+1/4*b*n/d^2*ln(e*x^2+d)-1/2*b*n/d^2*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/
2))-1/2*b*n/d^2*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*a*(1/(d*x^2*e + d^2) - log(x^2*e + d)/d^2 + 2*log(x)/d^2) + b*integrate
((log(c) + log(x^n))/(x^5*e^2 + 2*d*x^3*e + d^2*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^5*e^2 + 2*d*x^3*e + d^2*x), x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**2,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^2*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(e\,x^2+d\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^2)^2),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^2)^2), x)
```

3.225 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$

Optimal. Leaf size=126

$$-\frac{bn}{2d^2x^2}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}-\frac{4a-bn+4b\log(cx^n)}{4d^2x^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)(4a-bn+4b\log(cx^n))}{4d^3}-\frac{benLi_2\left(-\frac{d}{ex^2}\right)}{2d^3}$$

```
[Out] -1/2*b*n/d^2/x^2+1/2*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)+1/4*(-4*a+b*n-4*b*ln(c
*x^n))/d^2/x^2+1/4*e*ln(1+d/e/x^2)*(4*a-b*n+4*b*ln(c*x^n))/d^3-1/2*b*e*n*po
lylog(2,-d/e/x^2)/d^3
```

Rubi [A]
time = 0.17, antiderivative size = 126, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2385, 2380, 2341, 2379, 2438}

$$-\frac{ben\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{2d^3}+\frac{e\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-bn)}{4d^3}-\frac{4a+4b\log(cx^n)-bn}{4d^2x^2}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}-\frac{bn}{2d^2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^2),x]
```

```
[Out] -1/2*(b*n)/(d^2*x^2) + (a + b*Log[c*x^n])/(2*d*x^2*(d + e*x^2)) - (4*a - b*
n + 4*b*Log[c*x^n])/(4*d^2*x^2) + (e*Log[1 + d/(e*x^2)]*(4*a - b*n + 4*b*Lo
g[c*x^n]))/(4*d^3) - (b*e*n*PolyLog[2, -(d/(e*x^2))])/(2*d^3)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \frac{a+b\log(cx^n)}{2dx^2(d+ex^2)} - \frac{\int \frac{-4a+bn-4b\log(cx^n)}{x^3(d+ex^2)}\,dx}{2d}$$

$$= \frac{a+b\log(cx^n)}{2dx^2(d+ex^2)} - \frac{\int \left(\frac{-4a+bn-4b\log(cx^n)}{dx^3} - \frac{e(-4a+bn-4b\log(cx^n))}{d^2x} + \frac{e^2x(-4a+bn-4b\log(cx^n))}{d^2(d+ex^2)}\right)}{2d}$$

$$= \frac{a+b\log(cx^n)}{2dx^2(d+ex^2)} - \frac{\int \frac{-4a+bn-4b\log(cx^n)}{x^3}\,dx}{2d^2} + \frac{e\int \frac{-4a+bn-4b\log(cx^n)}{x}\,dx}{2d^3} - \frac{e^2\int \frac{x(-4a+bn-4b}{d+ex}}{2d^3}$$

$$= -\frac{bn}{2d^2x^2} + \frac{a+b\log(cx^n)}{2dx^2(d+ex^2)} - \frac{4a-bn+4b\log(cx^n)}{4d^2x^2} - \frac{e(4a-bn+4b\log(cx^n))^2}{16bd^3n} +$$

$$= -\frac{bn}{2d^2x^2} + \frac{a+b\log(cx^n)}{2dx^2(d+ex^2)} - \frac{4a-bn+4b\log(cx^n)}{4d^2x^2} - \frac{e(4a-bn+4b\log(cx^n))^2}{16bd^3n} +$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.36, size = 334, normalized size = 2.65

$$\frac{-\frac{2d(a-bn\log(x)+b\log(cx^n))}{x^2} - \frac{2de(a-bn\log(x)+b\log(cx^n))}{d+ex^2} - 8e\log(x)\left(a-bn\log(x)+b\log(cx^n)\right) + 4e(a-bn\log(x)+b\log(cx^n))\log(d+ex^2) + bn\left(\frac{e^{3/2}x\log(x)}{-i\sqrt{d}+\sqrt{e}\,x} - 4e\log^2(x) - \frac{d+2d\log(x)}{x^2} - e\log\left(i\sqrt{d}-\sqrt{e}\,x\right) + \frac{-ie^{3/2}x\log(x)+e\left(-\sqrt{d}+i\sqrt{e}\,x\right)\log\left(i\sqrt{d}+\sqrt{e}\,x\right)}{\sqrt{d}-i\sqrt{e}\,x} + 4e\left(\log(x)\log\left(1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+\mathrm{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right) + 4e\left(\log(x)\log\left(1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)+\mathrm{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)\right)\right)}{4d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^2),x]
```

```
[Out] ((-2*d*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - (2*d*e*(a - b*n*Log[x] + b*Lo
g[c*x^n]))/(d + e*x^2) - 8*e*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 4*e*(
a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] + b*n*((e^(3/2)*x*Log[x])/((-
I)*Sqrt[d] + Sqrt[e]*x) - 4*e*Log[x]^2 - (d + 2*d*Log[x])/x^2 - e*Log[I*Sqr
t[d] - Sqrt[e]*x] + ((-I)*e^(3/2)*x*Log[x] + e*(-Sqrt[d] + I*Sqrt[e]*x)*Log
```

```
[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d] - I*Sqrt[e]*x) + 4*e*(Log[x]*Log[1 + (I*S
qrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) + 4*e*(Log[x]*Lo
g[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 817, normalized size = 6.48

method	result
risch	$\frac{ib\pi \operatorname{csgn}(ic\,x^n)^3}{4d^2x^2}+\frac{bne\operatorname{dilog}\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{d^3}+\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{d^3}+\frac{bne\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{d^3}-\frac{bne\ln(x)\ln}{d^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*e*ln(e*x^2+d)-I*b*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2/d^3*e*ln(x)+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
/d^2/x^2+b*n/d^3*e*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+b*n/d^3*e*ln(
x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-b*n/d^3*e*ln(x)*ln(e*x^2+d)+1/4*I*b*
Pi*csgn(I*c*x^n)^3*e/d^2/(e*x^2+d)+I*b*Pi*csgn(I*c*x^n)^3/d^3*e*ln(x)-1/4*I
*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/x^2-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2*e/d^2/(e*x^2+d)-1/2*b*ln(x^n)*e/d^2/(e*x^2+d)+b*ln(x^n)*e/d^3*ln(e*x^
2+d)-2*b*ln(x^n)/d^3*e*ln(x)-1/2*b*ln(c)*e/d^2/(e*x^2+d)+b*ln(c)/d^3*e*ln(e
*x^2+d)-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e*ln(x)-1/2*a*e/d^2/(e*x^2+d)+
a*e/d^3*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2/(e*x^2+d)+1/
2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e*ln(e*x^2+d)-2*a/d^3*e*ln(x)-1/2*I*
b*Pi*csgn(I*c*x^n)^3/d^3*e*ln(e*x^2+d)-1/2*a/d^2/x^2+b*n/d^3*e*dilog((-e*x+
(-e*d)^(1/2))/(-e*d)^(1/2))+b*n/d^3*e*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2)
)-1/4*b*n/d^3*e*ln(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/x^2-1/
2*b*ln(x^n)/d^2/x^2-2*b*ln(c)/d^3*e*ln(x)+b*n/d^3*e*ln(x)^2+1/2*b*n/d^3*e*l
n(x)-1/2*b*ln(c)/d^2/x^2+1/4*I*b*Pi*csgn(I*c*x^n)^3/d^2/x^2+1/4*I*b*Pi*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/(e*x^2+d)-1/2*I*b*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)/d^3*e*ln(e*x^2+d)+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)/d^3*e*ln(x)-1/4*b*n/d^2/x^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] -1/2*a*((2*x^2*e + d)/(d^2*x^4*e + d^3*x^2) - 2*e*log(x^2*e + d)/d^3 + 4*e*
log(x)/d^3) + b*integrate((log(c) + log(x^n))/(x^7*e^2 + 2*d*x^5*e + d^2*x^
3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^7*e^2 + 2*d*x^5*e + d^2*x^3), x)
```

Sympy [A]
time = 227.41, size = 364, normalized size = 2.89

$$\frac{ae^{2}\left(\begin{cases} \frac{x^{2}}{2d^{2}} & \text{for}\: e = 0 \\ -\frac{1}{2de+2e^{2}x^{2}} & \text{otherwise} \end{cases}\right)}{d^{2}} - \frac{a}{2d^{2}x^{2}} - \frac{2ae\log{\left(x \right)}}{d^{3}} + \frac{ae\log{\left(d+ex^{2} \right)}}{d^{3}} - \frac{be^{2}n\left(\begin{cases} \frac{x^{2}}{2d^{2}} & \text{for}\: e = 0 \\ -\frac{\log{\left(x \right)}}{de} + \frac{\log{\left(\frac{d}{e}+x^{2} \right)}}{2de} & \text{otherwise} \end{cases}\right)}{2d^{2}} + \frac{be^{2}\left(\begin{cases} \frac{x^{2}}{d^{2}} & \text{for}\: e = 0 \\ -\frac{1}{de+e^{2}x^{2}} & \text{otherwise} \end{cases}\right)\log{\left(cx^{n} \right)}}{2d^{2}} - \frac{bn}{4d^{2}x^{2}} - \frac{b\log{\left(cx^{n} \right)}}{2d^{2}x^{2}} - \frac{be^{2}n\left(\begin{cases} \frac{x^{2}}{2d} & \text{for}\: e = 0 \\ \frac{\begin{cases} -\frac{\operatorname{Li}_{2}\left(\frac{ex^{2}e^{i\pi}}{d}\right)}{2} & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1 \\ \log{\left(d \right)}\log{\left(x \right)} - \frac{\operatorname{Li}_{2}\left(\frac{ex^{2}e^{i\pi}}{d}\right)}{2} & \text{for}\: \left|x\right| < 1 \\ -\log{\left(d \right)}\log{\left(\frac{1}{x} \right)} - \frac{\operatorname{Li}_{2}\left(\frac{ex^{2}e^{i\pi}}{d}\right)}{2} & \text{for}\: \frac{1}{\left|x\right|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\ 0, 0 & \end{matrix}\middle| x\right)\log{\left(d \right)} + G_{2,2}^{0,2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix}\middle| x\right)\log{\left(d \right)} - \frac{\operatorname{Li}_{2}\left(\frac{ex^{2}e^{i\pi}}{d}\right)}{2} & \text{otherwise} \end{cases}}{e} & \text{otherwise} \end{cases}\right)}{d^{3}} + \frac{be^{2}\left(\begin{cases} \frac{x^{2}}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(d+ex^{2} \right)}}{e} & \text{otherwise} \end{cases}\right)\log{\left(cx^{n} \right)}}{d^{3}} + \frac{ben\log{\left(x^{2} \right)}^{2}}{4d^{3}} - \frac{be\log{\left(x^{2} \right)}\log{\left(cx^{n} \right)}}{d^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**2,x)
```

```
[Out] a*e**2*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-1/(2*d*e + 2*e**2*x**2), True
))/d**2 - a/(2*d**2*x**2) - 2*a*e*log(x)/d**3 + a*e*log(d + e*x**2)/d**3 -
b*e**2*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x*
*2)/(2*d*e), True))/(2*d**2) + b*e**2*Piecewise((x**2/d**2, Eq(e, 0)), (-1/
(d*e + e**2*x**2), True))*log(c*x**n)/(2*d**2) - b*n/(4*d**2*x**2) - b*log(
c*x**n)/(2*d**2*x**2) - b*e**2*n*Piecewise((x**2/(2*d), Eq(e, 0)), (Piecewi
se((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1))
, (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-l
og(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-m
eijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (
0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True))/e, True)
)/d**3 + b*e**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))*lo
g(c*x**n)/d**3 + b*e*n*log(x**2)**2/(4*d**3) - b*e*log(x**2)*log(c*x**n)/d*
*3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^2*x^3), x)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\,{\left(e\,x^2+d\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^2),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^2), x)
```

3.226 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=191

$$\frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}\,n\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log\left(cx^n\right)}{e^2}+\frac{dx(a+b\log\left(cx^n\right))}{2e^2\left(d+ex^2\right)}-\frac{3\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right)}{2e^{5/2}}$$

```
[Out] a*x/e^2-b*n*x/e^2+b*x*ln(c*x^n)/e^2+1/2*d*x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)-1
/2*b*n*arctan(x*e^(1/2)/d^(1/2))*d^(1/2)/e^(5/2)-3/2*arctan(x*e^(1/2)/d^(1/
2))*(a+b*ln(c*x^n))*d^(1/2)/e^(5/2)+3/4*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2
))*d^(1/2)/e^(5/2)-3/4*I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))*d^(1/2)/e^(5/2)
```

Rubi [A]
time = 0.21, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 10, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {294, 327, 211, 2393, 2332, 2360, 2361, 12, 4940, 2438}

$$\frac{3ib\sqrt{d}\,n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{3ib\sqrt{d}\,n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{3\sqrt{d}\,\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{2e^{5/2}}+\frac{dx(a+b\log\left(cx^n\right))}{2e^2\left(d+ex^2\right)}+\frac{ax}{e^2}-\frac{b\sqrt{d}\,n\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log\left(cx^n\right)}{e^2}-\frac{bnx}{e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] (a*x)/e^2 - (b*n*x)/e^2 - (b*Sqrt[d]*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*e^(5
/2)) + (b*x*Log[c*x^n])/e^2 + (d*x*(a + b*Log[c*x^n]))/(2*e^2*(d + e*x^2))
- (3*Sqrt[d]*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(5/2)) +
(((3*I)/4)*b*Sqrt[d]*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/e^(5/2) - (((3
*I)/4)*b*Sqrt[d]*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/e^(5/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
```

```
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
```

```
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \left(\frac{a+b\log(cx^n)}{e^2}+\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)^2}-\frac{2d(a+b\log(cx^n))}{e^2(d+ex^2)}\right)dx$$

$$= \frac{\int (a+b\log(cx^n))\,dx}{e^2}-\frac{(2d)\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{e^2}+\frac{d^2\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx}{e^2}$$

$$= \frac{ax}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{2\sqrt{d}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}+\frac{b\int \log(cx}{e^2}$$

$$= \frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}\,n\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{3\sqrt{}}{}$$

$$= \frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}\,n\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{3\sqrt{}}{}$$

$$= \frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}\,n\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{3\sqrt{}}{}$$

$$= \frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}\,n\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{3\sqrt{}}{}$$

Mathematica [A]
time = 0.38, size = 296, normalized size = 1.55

$$\frac{4a\sqrt{e}\,x-4b\sqrt{e}\,nx+4b\sqrt{e}\,x\log(cx^n)-\frac{d(a+b\log(cx^n))}{\sqrt{-d}-\sqrt{e}\,x}+\frac{d(a+b\log(cx^n))}{\sqrt{-d}+\sqrt{e}\,x}+\frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{\sqrt{-d}}+b\sqrt{-d}\,n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)-3\sqrt{-d}\,(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)+3\sqrt{-d}\,(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)+3b\sqrt{-d}\,n\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)-3b\sqrt{-d}\,n\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{4e^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] (4*a*Sqrt[e]*x - 4*b*Sqrt[e]*n*x + 4*b*Sqrt[e]*x*Log[c*x^n] - (d*(a + b*Log
[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x) + (d*(a + b*Log[c*x^n]))/(Sqrt[-d] + Sqrt[
e]*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/Sqrt[-d] + b*Sqrt[-d]*
n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]) - 3*Sqrt[-d]*(a + b*Log[c*x^n])*Log[
```

```
1 + (Sqrt[e]*x)/Sqrt[-d]] + 3*Sqrt[-d]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e
]*x)/(-d)^(3/2)] + 3*b*Sqrt[-d]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] - 3*b*Sq
rt[-d]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(4*e^(5/2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 913, normalized size = 4.78

method	result
risch	$\frac{ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2 x}{2e^2}+\frac{bn\,d^2\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{4e^2(e\,x^2+d)\sqrt{-ed}}-\frac{bn\,d^2\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{4e^2(e\,x^2+d)\sqrt{-ed}}+\frac{3bd\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{2e^2\sqrt{ed}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*I*b*Pi*csgn(I*c*x^n)^3*x/e^2+1/4*b*n*d^2/e^2*ln(x)/(e*x^2+d)/(-e*d)^(1
/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n*d^2/e^2*ln(x)/(e*x^2+d)/(-
e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+3/2*b/e^2*d/(e*d)^(1/2)*arct
an(x*e/(e*d)^(1/2))*n*ln(x)-b*n/e^2*d/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1
/2))/(-e*d)^(1/2))+b*n/e^2*d/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d
)^(1/2))+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*x/e^2+b*ln(c)*x/e^2-1/2*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x/e^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2*x/e^2-1/4*I*b*Pi*csgn(I*c*x^n)^3/e^2*d*x/(e*x^2+d)+3/4*I*b*Pi*csgn(
I*c*x^n)^3/e^2*d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*a/e^2*d*x/(e*x^2+d
)-3/2*a/e^2*d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/4*b*n*d/e*ln(x)/(e*x^2+
d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-1/4*b*n*d/e*ln(x)/
(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2+b*ln(x^n)*x/
e^2-3/2*b/e^2*d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)-1/2*b*n/e^2*d/(
e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-3/4*b*n*d/e^2/(-e*d)^(1/2)*dilog((-e*x+(
-e*d)^(1/2))/(-e*d)^(1/2))+3/4*b*n*d/e^2/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/
2))/(-e*d)^(1/2))+1/2*b*ln(c)/e^2*d*x/(e*x^2+d)-3/2*b*ln(c)/e^2*d/(e*d)^(1/
2)*arctan(x*e/(e*d)^(1/2))+1/2*b/e^2*d*x/(e*x^2+d)*ln(x^n)+3/4*I*b*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-3/
4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2)
)-3/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*d/(e*d)^(1/2)*arctan(x*e/(e*d)
^(1/2))+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2*d*x/(e*x^2+d)-b*n*x/e^2+
a*x/e^2+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2*d*x/(e*x^2+d)-1/4*I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2*d*x/(e*x^2+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] -1/2*(3*sqrt(d)*arctan(x*e^(1/2)/sqrt(d))*e^(-5/2) - 2*x*e^(-2) - d*x/(x^2*
e^3 + d*e^2))*a + b*integrate((x^4*log(c) + x^4*log(x^n))/(x^4*e^2 + 2*d*x^
2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^4*log(c*x^n) + a*x^4)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^4(a + b\log{(cx^n)})}{(d + ex^2)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

```
[Out] Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^4/(x^2*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^4\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

```
[Out] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.227 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=164

$$\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{3/2}}-\frac{x(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}\,e^{3/2}}-\frac{ibn\text{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4\sqrt{d}\,e^{3/2}}+\frac{ibn\text{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4\sqrt{d}\,e^{3/2}}$$

```
[Out] -1/2*x*(a+b*ln(c*x^n))/e/(e*x^2+d)+1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/e^(3/2
)/d^(1/2)+1/2*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/e^(3/2)/d^(1/2)-1/4
*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/e^(3/2)/d^(1/2)+1/4*I*b*n*polylog(2,
I*x*e^(1/2)/d^(1/2))/e^(3/2)/d^(1/2)
```

Rubi [A]
time = 0.20, antiderivative size = 164, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {294, 211, 2393, 2360, 2361, 12, 4940, 2438}

$$-\frac{ibn\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4\sqrt{d}\,e^{3/2}}+\frac{ibn\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4\sqrt{d}\,e^{3/2}}+\frac{\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}\,e^{3/2}}-\frac{x(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] (b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*Sqrt[d]*e^(3/2)) - (x*(a + b*Log[c*x^n
]))/(2*e*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2
*Sqrt[d]*e^(3/2)) - ((I/4)*b*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[
d]*e^(3/2)) + ((I/4)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*e^(3/2
))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
```

```
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \left(-\frac{d(a+b\log(cx^n))}{e(d+ex^2)^2} + \frac{a+b\log(cx^n)}{e(d+ex^2)}\right)dx$$

$$= \frac{\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{e} - \frac{d\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx}{e}$$

$$= -\frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,e^{3/2}} - \frac{\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{2e} + (bn)$$

$$= \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}\,e^{3/2}} - (bn$$

$$= \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}\,e^{3/2}} - (ibn$$

$$= \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}\,e^{3/2}} - ibn$$

$$= \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}\,e^{3/2}} - ibn$$

Mathematica [A]
time = 0.32, size = 258, normalized size = 1.57

$$\frac{\frac{a+b\log(cx^n)}{\sqrt{-d}-\sqrt{e}\,x} - \frac{a+b\log(cx^n)}{\sqrt{-d}+\sqrt{e}\,x} + \frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{3/2}} + \frac{bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{\sqrt{-d}} + \frac{d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}} + \frac{(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{\sqrt{-d}} + \frac{bn\text{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{\sqrt{-d}} + \frac{bdn\text{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}}}{4e^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

```
[Out] ((a + b*Log[c*x^n])/(Sqrt[-d] - Sqrt[e]*x) - (a + b*Log[c*x^n])/(Sqrt[-d] +
 Sqrt[e]*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(3/2) + (b*
n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/Sqrt[-d] + (d*(a + b*Log[c*x^n])*Lo
g[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) + ((a + b*Log[c*x^n])*Log[1 + (d*Sq
rt[e]*x)/(-d)^(3/2)])/Sqrt[-d] + (b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/Sqr
t[-d] + (b*d*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2))/(4*e^(3/2)
)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 752, normalized size = 4.59

method	result
risch	$-\frac{bx\ln(x^n)}{2e(e\,x^2+d)}-\frac{b\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{2e\sqrt{ed}}+\frac{b\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{2e\sqrt{ed}}+\frac{bn\arctan\left(\frac{xe}{\sqrt{ed}}\right)}{2e\sqrt{ed}}-\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{4(e\,x^2+d)\sqrt{-ed}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b/e*x/(e*x^2+d)*ln(x^n)-1/2*b/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*
ln(x)+1/2*b/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)+1/2*b*n/e/(e*d)^(
1/2)*arctan(x*e/(e*d)^(1/2))-1/4*b*n*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+
(-e*d)^(1/2))/(-e*d)^(1/2))*x^2+1/4*b*n*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*
x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*
ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-e*d)^(1/
2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*b*n/e/(-e*d)^(1/2)*dilog((-e*x+(
-e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n/e/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/
(-e*d)^(1/2))+1/2*b*n/e/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1
/2))-1/2*b*n/e/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*I
*b*Pi*csgn(I*c*x^n)^3/e*x/(e*x^2+d)-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/
e*x/(e*x^2+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/
2))-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e*x/(e*x^2+d)+1/4*I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/4*I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/4*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)/e*x/(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/2*b*ln(c)/e*x/(e*x^2
+d)+1/2*b*ln(c)/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/2*a/e*x/(e*x^2+d)+1
/2*a/e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*(arctan(x*e^(1/2)/sqrt(d))*e^(-3/2)/sqrt(d) - x/(x^2*e^2 + d*e))*a + b*
integrate((x^2*log(c) + x^2*log(x^n))/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log{(cx^n)})}{(d + ex^2)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^2*e + d)^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.228 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=164

$$-\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}\sqrt{e}}-\frac{ibn\text{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{3/2}\sqrt{e}}+\frac{ibn\text{Li}_2\left(\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{3/2}\sqrt{e}}$$

```
[Out] 1/2*x*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/d^(3/2)
/e^(1/2)+1/2*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)/e^(1/2)-1/4*
I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(1/2)+1/4*I*b*n*polylog(2,I
*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(1/2)
```

Rubi [A]
time = 0.07, antiderivative size = 164, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2360, 211, 2361, 12, 4940, 2438}

$$-\frac{ibn\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{3/2}\sqrt{e}}+\frac{ibn\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{3/2}\sqrt{e}}+\frac{\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^2)^2,x]
```

```
[Out] -1/2*(b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(d^(3/2)*Sqrt[e]) + (x*(a + b*Log[c*
x^n]))/(2*d*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))
/(2*d^(3/2)*Sqrt[e]) - ((I/4)*b*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(d^
(3/2)*Sqrt[e]) + ((I/4)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(d^(3/2)*Sqr
t[e])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
```

```
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^2}\,dx = \frac{x(a+b\log\left(cx^n\right))}{2d\left(d+ex^2\right)} + \frac{\int \frac{a+b\log\left(cx^n\right)}{d+ex^2}\,dx}{2d} - \frac{(bn)\int \frac{1}{d+ex^2}\,dx}{2d}$$

$$= -\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}} + \frac{x(a+b\log\left(cx^n\right))}{2d\left(d+ex^2\right)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{2d^{3/2}\sqrt{e}} - \frac{(bn)\int}{}$$

$$= -\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}} + \frac{x(a+b\log\left(cx^n\right))}{2d\left(d+ex^2\right)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{2d^{3/2}\sqrt{e}} - \frac{(bn)\int}{}$$

$$= -\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}} + \frac{x(a+b\log\left(cx^n\right))}{2d\left(d+ex^2\right)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{2d^{3/2}\sqrt{e}} - \frac{(ibn)}{}$$

$$= -\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}} + \frac{x(a+b\log\left(cx^n\right))}{2d\left(d+ex^2\right)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{2d^{3/2}\sqrt{e}} - \frac{ibn\mathrm{Li}_2}{4}$$

Mathematica [A]
time = 0.34, size = 289, normalized size = 1.76

$$\frac{1}{4}\left(\frac{a+b\log\left(cx^n\right)}{d\left(\sqrt{-d}\,\sqrt{e}+ex\right)} + \frac{a+b\log\left(cx^n\right)}{(-d)^{3/2}\sqrt{e}+dex} + \frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{5/2}\sqrt{e}} + \frac{bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{3/2}\sqrt{e}} + \frac{(a+b\log\left(cx^n\right))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}\sqrt{e}} + \frac{d(a+b\log\left(cx^n\right))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}} + \frac{bdn\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}} + \frac{bn\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}\sqrt{e}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^2,x]
```

```
[Out] ((a + b*Log[c*x^n])/(d*(Sqrt[-d]*Sqrt[e] + e*x)) + (a + b*Log[c*x^n])/((-d)
^(3/2)*Sqrt[e] + d*e*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/((-d
)^(5/2)*Sqrt[e]) + (b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/((-d)^(3/2)*S
qrt[e]) + ((a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(3/2)*Sq
rt[e]) + (d*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(5/
2)*Sqrt[e]) + (b*d*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e])
 + (b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(3/2)*Sqrt[e]))/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 685, normalized size = 4.18

method	result
risch	$\frac{bx\ln(x^n)}{2d(e\,x^2+d)} - \frac{b\arctan\left(\frac{xe}{\sqrt{ed}}\right)n\ln(x)}{2d\sqrt{ed}} + \frac{b\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{2d\sqrt{ed}} - \frac{bn\arctan\left(\frac{xe}{\sqrt{ed}}\right)}{2d\sqrt{ed}} + \frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right.}{4d(e\,x^2+d)\sqrt{-ed}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*x/d/(e*x^2+d)*ln(x^n)-1/2*b/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*l
n(x)+1/2*b/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)-1/2*b*n/d/(e*d)^(1
/2)*arctan(x*e/(e*d)^(1/2))+1/4*b*n*ln(x)/d/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x
+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2*e-1/4*b*n*ln(x)/d/(e*x^2+d)/(-e*d)^(1/2)*l
n((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2*e+1/4*b*n*ln(x)/(e*x^2+d)/(-e*d)^(1/
2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n*ln(x)/(e*x^2+d)/(-e*d)^(1/2
)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*b*n/(-e*d)^(1/2)/d*dilog((-e*x+(-
e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n/(-e*d)^(1/2)/d*dilog((e*x+(-e*d)^(1/2))/(
-e*d)^(1/2))+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(e*d)^(1/2)*arctan(x*
e/(e*d)^(1/2))-1/4*I*b*Pi*csgn(I*c*x^n)^3*x/d/(e*x^2+d)+1/4*I*b*Pi*csgn(I*c
)*csgn(I*c*x^n)^2*x/d/(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)*x/d/(e*x^2+d)+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*x/d/(e*x^2+d)-1/4*
I*b*Pi*csgn(I*c*x^n)^3/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/4*I*b*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/4*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*
b*ln(c)*x/d/(e*x^2+d)+1/2*b*ln(c)/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2
*a*x/d/(e*x^2+d)+1/2*a/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*a*(arctan(x*e^(1/2)/sqrt(d))*e^(-1/2)/d^(3/2) + x/(d*x^2*e + d^2)) + b*
integrate((log(c) + log(x^n))/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log\left(cx^{n}\right)}{\left(d + ex^{2}\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^2*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{{\left(e\,x^2+d\right)}^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^2)^2,x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^2)^2, x)
```

3.229 $\int \frac{a+b\log(cx^n)}{x^2\left(d+ex^2\right)^2}\,dx$

Optimal. Leaf size=183

$$-\frac{3bn}{2d^2x}+\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}-\frac{3a-bn+3b\log\left(cx^n\right)}{2d^2x}-\frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(3a-bn+3b\log\left(cx^n\right)\right)}{2d^{5/2}}+\frac{3ib\sqrt{e}\,n\mathrm{Li}_2}{4d}$$

```
[Out] -3/2*b*n/d^2/x+1/2*(a+b*ln(c*x^n))/d/x/(e*x^2+d)+1/2*(-3*a+b*n-3*b*ln(c*x^n
))/d^2/x-1/2*arctan(x*e^(1/2)/d^(1/2))*(3*a-b*n+3*b*ln(c*x^n))*e^(1/2)/d^(5
/2)+3/4*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(5/2)-3/4*I*b*n*pol
ylog(2,I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(5/2)
```

Rubi [A]
time = 0.17, antiderivative size = 183, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2385, 2380, 2341, 211, 2361, 12, 4940, 2438}

$$\frac{3ib\sqrt{e}\,n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{5/2}}-\frac{3ib\sqrt{e}\,n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{5/2}}-\frac{\sqrt{e}\,\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(3a+3b\log\left(cx^n\right)-bn\right)}{2d^{5/2}}-\frac{3a+3b\log\left(cx^n\right)-bn}{2d^2x}+\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}-\frac{3bn}{2d^2x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^2),x]
```

```
[Out] (-3*b*n)/(2*d^2*x) + (a + b*Log[c*x^n])/(2*d*x*(d + e*x^2)) - (3*a - b*n +
3*b*Log[c*x^n])/(2*d^2*x) - (Sqrt[e]*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(3*a - b*n
 + 3*b*Log[c*x^n]))/(2*d^(5/2)) + (((3*I)/4)*b*Sqrt[e]*n*PolyLog[2, ((-I)*S
qrt[e]*x)/Sqrt[d]])/d^(5/2) - (((3*I)/4)*b*Sqrt[e]*n*PolyLog[2, (I*Sqrt[e]*
x)/Sqrt[d]])/d^(5/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^2}\,dx = \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{\int \frac{-3a+bn-3b\log(cx^n)}{x^2(d+ex^2)}\,dx}{2d}$$

$$= \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{\int \left(\frac{-3a+bn-3b\log(cx^n)}{dx^2} - \frac{e(-3a+bn-3b\log(cx^n))}{d(d+ex^2)}\right)dx}{2d}$$

$$= \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{\int \frac{-3a+bn-3b\log(cx^n)}{x^2}\,dx}{2d^2} + \frac{e\int \frac{-3a+bn-3b\log(cx^n)}{d+ex^2}\,dx}{2d^2}$$

$$= -\frac{3bn}{2d^2x} + \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{3a-bn+3b\log\left(cx^n\right)}{2d^2x} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(3a-bn+}{2d^{5/2}}$$

$$= -\frac{3bn}{2d^2x} + \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{3a-bn+3b\log\left(cx^n\right)}{2d^2x} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(3a-bn+}{2d^{5/2}}$$

$$= -\frac{3bn}{2d^2x} + \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{3a-bn+3b\log\left(cx^n\right)}{2d^2x} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(3a-bn+}{2d^{5/2}}$$

$$= -\frac{3bn}{2d^2x} + \frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)} - \frac{3a-bn+3b\log\left(cx^n\right)}{2d^2x} - \frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(3a-bn+}{2d^{5/2}}$$

Mathematica [A]
time = 0.49, size = 328, normalized size = 1.79

$$\frac{1}{4}\left(-\frac{4bn}{d^2x}-\frac{4(a+b\log(cx^n))}{d^2x}+\frac{\sqrt{e}\,(a+b\log(cx^n))}{d^2\left(\sqrt{-d}-\sqrt{e}\,x\right)}-\frac{\sqrt{e}\,(a+b\log(cx^n))}{d^2\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{b\sqrt{e}\,n\left(-\log(x)+\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{5/2}}+\frac{b\sqrt{e}\,n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{5/2}}+\frac{3\sqrt{e}\,(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{5/2}}-\frac{3\sqrt{e}\,(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}-\frac{3b\sqrt{e}\,n\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{5/2}}+\frac{3b\sqrt{e}\,n\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^2),x]
```

```
[Out] ((-4*b*n)/(d^2*x) - (4*(a + b*Log[c*x^n]))/(d^2*x) + (Sqrt[e]*(a + b*Log[c*
x^n]))/(d^2*(Sqrt[-d] - Sqrt[e]*x)) - (Sqrt[e]*(a + b*Log[c*x^n]))/(d^2*(Sq
rt[-d] + Sqrt[e]*x)) + (b*Sqrt[e]*n*(-Log[x] + Log[Sqrt[-d] - Sqrt[e]*x]))/
(-d)^(5/2) + (b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(5/2)
+ (3*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) -
 (3*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2
) - (3*b*Sqrt[e]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (3*b*Sqrt
[e]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2))/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 933, normalized size = 5.10

method	result
risch	$-\frac{bex\ln(x^n)}{2d^2(e\,x^2+d)}-\frac{3be\arctan\left(\frac{xe}{\sqrt{ed}}\right)\ln(x^n)}{2d^2\sqrt{ed}}-\frac{a}{d^2x}-\frac{b\ln(x^n)}{d^2x}-\frac{3ae\arctan\left(\frac{xe}{\sqrt{ed}}\right)}{2d^2\sqrt{ed}}-\frac{aex}{2d^2(e\,x^2+d)}-\frac{3bne\,\mathrm{dilog}\left(\frac{-ex}{}\right.}{4d^2\sqrt{-}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*e/d^2*x/(e*x^2+d)*ln(x^n)+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^2/x-3/2*b*e/d
^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)-a/d^2/x+1/2*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)/d^2/x-b*ln(x^n)/d^2/x-3/2*a*e/d^2/(e*d)^(1/2)*ar
ctan(x*e/(e*d)^(1/2))-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/x-1/2*a*e/d^
2*x/(e*x^2+d)-1/4*b*n*e^2/d^2*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^
(1/2))/(-e*d)^(1/2))*x^2+3/2*b*e/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*
ln(x)-1/2*b*n*e/d^2/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))
+1/2*b*n*e/d^2/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*I
*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/x+1/4*b*n*e^2/d^2*ln(x)/(e*x^2+d)/(-e
*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-b*ln(c)/d^2/x+3/4*I*b*Pi*
csgn(I*c*x^n)^3*e/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/4*I*b*Pi*csgn(I
*c*x^n)^3*e/d^2*x/(e*x^2+d)-1/2*b*ln(c)*e/d^2*x/(e*x^2+d)+1/2*b*n*e/d^2/(e*
d)^(1/2)*arctan(x*e/(e*d)^(1/2))-3/4*b*n*e/d^2/(-e*d)^(1/2)*dilog((-e*x+(-e
*d)^(1/2))/(-e*d)^(1/2))+3/4*b*n*e/d^2/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2)
)/(-e*d)^(1/2))-1/4*b*n*e/d*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1
/2))/(-e*d)^(1/2))+1/4*b*n*e/d*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^
(1/2))/(-e*d)^(1/2))-3/2*b*ln(c)*e/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+
1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2*x/(e*x^2+d)+3/4*I*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/
2))-3/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)
^(1/2))-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2*x/(e*x^2+d)-1/4*I*b*Pi
*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2*x/(e*x^2+d)-b*n/d^2/x-3/4*I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2*e/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F]

time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] -1/2*a*((3*x^2*e + 2*d)/(d^2*x^3*e + d^3*x) + 3*arctan(x*e^(1/2)/sqrt(d))*e
^(1/2)/d^(5/2)) + b*integrate((log(c) + log(x^n))/(x^6*e^2 + 2*d*x^4*e + d^
2*x^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)/(x^6*e^2 + 2*d*x^4*e + d^2*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log{(cx^n)}}{x^2 \left(d + ex^2\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**2,x)
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^2*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(e\,x^2+d\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^2),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^2), x)
```

3.230 $\int \frac{a+b\log(cx^n)}{x^4\left(d+ex^2\right)^2}\,dx$

Optimal. Leaf size=224

$$-\frac{5bn}{18d^2x^3}+\frac{5ben}{2d^3x}+\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}-\frac{5a-bn+5b\log\left(cx^n\right)}{6d^2x^3}+\frac{e(5a-bn+5b\log\left(cx^n\right))}{2d^3x}+\frac{e^{3/2}\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(5a\cdots}{2d^{7\cdots}}$$

```
[Out] -5/18*b*n/d^2/x^3+5/2*b*e*n/d^3/x+1/2*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)+1/6*(
-5*a+b*n-5*b*ln(c*x^n))/d^2/x^3+1/2*e*(5*a-b*n+5*b*ln(c*x^n))/d^3/x+1/2*e^(
3/2)*arctan(x*e^(1/2)/d^(1/2))*(5*a-b*n+5*b*ln(c*x^n))/d^(7/2)-5/4*I*b*e^(3
/2)*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(7/2)+5/4*I*b*e^(3/2)*n*polylog(2,I
*x*e^(1/2)/d^(1/2))/d^(7/2)
```

Rubi [A]
time = 0.25, antiderivative size = 224, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2385, 2380, 2341, 211, 2361, 12, 4940, 2438}

$$-\frac{5ibe^{3/2}n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{7/2}}+\frac{5ibe^{3/2}n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{4d^{7/2}}+\frac{e^{3/2}\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(5a+5b\log\left(cx^n\right)-bn)}{2d^{7/2}}+\frac{e(5a+5b\log\left(cx^n\right)-bn)}{2d^3x}-\frac{5a+5b\log\left(cx^n\right)-bn}{6d^2x^3}+\frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)}+\frac{5ben}{2d^3x}-\frac{5bn}{18d^2x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^2),x]
```

```
[Out] (-5*b*n)/(18*d^2*x^3) + (5*b*e*n)/(2*d^3*x) + (a + b*Log[c*x^n])/(2*d*x^3*(
d + e*x^2)) - (5*a - b*n + 5*b*Log[c*x^n])/(6*d^2*x^3) + (e*(5*a - b*n + 5*
b*Log[c*x^n]))/(2*d^3*x) + (e^(3/2)*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(5*a - b*n
+ 5*b*Log[c*x^n]))/(2*d^(7/2)) - (((5*I)/4)*b*e^(3/2)*n*PolyLog[2, ((-I)*Sq
rt[e]*x)/Sqrt[d]])/d^(7/2) + (((5*I)/4)*b*e^(3/2)*n*PolyLog[2, (I*Sqrt[e]*x
)/Sqrt[d]])/d^(7/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^2}\,dx = \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{\int \frac{-5a+bn-5b\log(cx^n)}{x^4(d+ex^2)}\,dx}{2d}$$

$$= \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{\int \left(\frac{-5a+bn-5b\log(cx^n)}{dx^4} - \frac{e(-5a+bn-5b\log(cx^n))}{d^2x^2} + \frac{e^2(-5a+bn-5b\log(cx^n))}{d^2(d+ex^2)}\right) dx}{2d}$$

$$= \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{\int \frac{-5a+bn-5b\log(cx^n)}{x^4}\,dx}{2d^2} + \frac{e\int \frac{-5a+bn-5b\log(cx^n)}{x^2}\,dx}{2d^3} - \frac{e^2\int \frac{-5a+bn-5b\log(cx^n)}{d+ex^2}}{2d^3}$$

$$= -\frac{5bn}{18d^2x^3} + \frac{5ben}{2d^3x} + \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{5a-bn+5b\log\left(cx^n\right)}{6d^2x^3} + \frac{e(5a-bn+5b\log\left(cx^n\right)}{2d^3x}$$

$$= -\frac{5bn}{18d^2x^3} + \frac{5ben}{2d^3x} + \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{5a-bn+5b\log\left(cx^n\right)}{6d^2x^3} + \frac{e(5a-bn+5b\log\left(cx^n\right)}{2d^3x}$$

$$= -\frac{5bn}{18d^2x^3} + \frac{5ben}{2d^3x} + \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{5a-bn+5b\log\left(cx^n\right)}{6d^2x^3} + \frac{e(5a-bn+5b\log\left(cx^n\right)}{2d^3x}$$

$$= -\frac{5bn}{18d^2x^3} + \frac{5ben}{2d^3x} + \frac{a+b\log\left(cx^n\right)}{2dx^3\left(d+ex^2\right)} - \frac{5a-bn+5b\log\left(cx^n\right)}{6d^2x^3} + \frac{e(5a-bn+5b\log\left(cx^n\right)}{2d^3x}$$

Mathematica [A]
time = 0.46, size = 361, normalized size = 1.61

$$\frac{1}{36}\left(-\frac{4bn}{d^2x^3} + \frac{72ben}{d^3x} - \frac{12(a+b\log(cx^n))}{d^2x^3} + \frac{72e(a+b\log(cx^n))}{d^3x} - \frac{9e^{3/2}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{9e^{3/2}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}+\sqrt{e}\,x\right)} - \frac{9be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{7/2}} + \frac{9be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{7/2}} + \frac{45e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{7/2}} - \frac{45e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{7/2}} - \frac{45be^{3/2}n\,\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{7/2}} + \frac{45be^{3/2}n\,\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^2),x]
```

```
[Out] ((-4*b*n)/(d^2*x^3) + (72*b*e*n)/(d^3*x) - (12*(a + b*Log[c*x^n]))/(d^2*x^3
) + (72*e*(a + b*Log[c*x^n]))/(d^3*x) - (9*e^(3/2)*(a + b*Log[c*x^n]))/(d^3
*(Sqrt[-d] - Sqrt[e]*x)) + (9*e^(3/2)*(a + b*Log[c*x^n]))/(d^3*(Sqrt[-d] +
Sqrt[e]*x)) - (9*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(7/
2) + (9*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(7/2) + (45*
e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) - (45*
e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2) -
(45*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) + (45*b*e^(3/2
)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2))/36
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.14, size = 1133, normalized size = 5.06

method	result	size
risch	Expression too large to display	1133

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/x^3+5/2*b*ln(c)*e^2/d^3/(e*d)^(1/
2)*arctan(x*e/(e*d)^(1/2))+1/6*I*b*Pi*csgn(I*c*x^n)^3/d^2/x^3+2*a/d^3*e/x-5
/2*b*e^2/d^3/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)+b*n*e^2/d^3/(-e*d)
^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-b*n*e^2/d^3/(-e*d)^(1/2)*
ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*a*e^2/d^3*x/(e*x^2+d)+5/2*a*e
^2/d^3/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+2*b*ln(c)/d^3*e/x-1/3*a/d^2/x^3-
1/3*b/d^2/x^3*ln(x^n)-I*b*Pi*csgn(I*c*x^n)^3/d^3*e/x+1/4*b*n*e^3/d^3*ln(x)/
(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-1/3*b*ln(c)
/d^2/x^3+1/2*b*e^2/d^3*x/(e*x^2+d)*ln(x^n)+5/2*b*e^2/d^3/(e*d)^(1/2)*arctan
(x*e/(e*d)^(1/2))*ln(x^n)-1/4*b*n*e^3/d^3*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((
e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-1/2*b*n*e^2/d^3/(e*d)^(1/2)*arctan(x*e/
(e*d)^(1/2))+5/4*b*n*e^2/d^3/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^
(1/2))-5/4*b*n*e^2/d^3/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-
1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/x^3+I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2/d^3*e/x+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e/x-1/4*b*n*e^2/d^2*ln(
x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*b*n*e^2/d
^2*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*
ln(c)*e^2/d^3*x/(e*x^2+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3*x/(e*x^2+d)-5/
4*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/6*I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/x^3-1/4*I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*e^2/d^3*x/(e*x^2+d)-5/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*e^2/d^3/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+2*b*ln(x^n)/d^3*e/
x+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3*x/(e*x^2+d)-1/9*b*n/d^2/x^3-
I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e/x+5/4*I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2*e^2/d^3/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+2*b*e*n/d^3/x+1/4*
I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3*x/(e*x^2+d)+5/4*I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2*e^2/d^3/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/6*a*((15*x^4*e^2 + 10*d*x^2*e - 2*d^2)/(d^3*x^5*e + d^4*x^3) + 15*arctan(
x*e^(1/2)/sqrt(d))*e^(3/2)/d^(7/2)) + b*integrate((log(c) + log(x^n))/(x^8*
e^2 + 2*d*x^6*e + d^2*x^4), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^8*e^2 + 2*d*x^6*e + d^2*x^4), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log{(cx^n)}}{x^4\,(d + ex^2)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^2*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a + b\,\ln\left(c\,x^n\right)}{x^4\,\left(e\,x^2 + d\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^2),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^2), x)
```

3.231 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal. Leaf size=152

$$\frac{bdn}{8e^3(d+ex^2)}+\frac{bn\log(x)}{4e^3}-\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2}-\frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)}+\frac{3bn\log(d+ex^2)}{8e^3}+\frac{(a+b\log(cx^n))\log}{2e^3}$$

```
[Out] 1/8*b*d*n/e^3/(e*x^2+d)+1/4*b*n*ln(x)/e^3-1/4*d^2*(a+b*ln(c*x^n))/e^3/(e*x^
2+d)^2-x^2*(a+b*ln(c*x^n))/e^2/(e*x^2+d)+3/8*b*n*ln(e*x^2+d)/e^3+1/2*(a+b*l
n(c*x^n))*ln(1+e*x^2/d)/e^3+1/4*b*n*polylog(2,-e*x^2/d)/e^3
```

Rubi [A]
time = 0.21, antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {272, 45, 2393, 2376, 46, 2373, 266, 2375, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}-\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2}+\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^3}-\frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)}+\frac{bdn}{8e^3(d+ex^2)}+\frac{3bn\log(d+ex^2)}{8e^3}+\frac{bn\log(x)}{4e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] (b*d*n)/(8*e^3*(d + e*x^2)) + (b*n*Log[x])/(4*e^3) - (d^2*(a + b*Log[c*x^n]
))/(4*e^3*(d + e*x^2)^2) - (x^2*(a + b*Log[c*x^n]))/(e^2*(d + e*x^2)) + (3*
b*n*Log[d + e*x^2])/(8*e^3) + ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e^
3) + (b*n*PolyLog[2, -((e*x^2)/d)])/(4*e^3)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \left(\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)^3} - \frac{2dx(a+b\log(cx^n))}{e^2(d+ex^2)^2} + \frac{x(a+b\log(cx^n))}{e^2(d+ex^2)}\right)dx$$

$$= \frac{\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx}{e^2} - \frac{(2d)\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx}{e^2} + \frac{d^2\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx}{e^2}$$

$$= -\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2} - \frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^3} - $$

$$= -\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2} - \frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{bn\log(d+ex^2)}{2e^3} + \frac{(a+b\log(cx^n)}{2}$$

$$= -\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2} - \frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{bn\log(d+ex^2)}{2e^3} + \frac{(a+b\log(cx^n)}{2}$$

$$= \frac{bdn}{8e^3(d+ex^2)} + \frac{bn\log(x)}{4e^3} - \frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2} - \frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{3bn\log}{}$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.36, size = 498, normalized size = 3.28

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] (-2*d^2*(a - b*n*Log[x] + b*Log[c*x^n]) + 8*d*(d + e*x^2)*(a - b*n*Log[x] +
 b*Log[c*x^n]) + 4*(d + e*x^2)^2*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*
x^2] + b*n*(d^2 + d*e*x^2 - 4*d*e*x^2*Log[x] - 6*e^2*x^4*Log[x] + 3*d^2*Log
[I*Sqrt[d] - Sqrt[e]*x] + 6*d*e*x^2*Log[I*Sqrt[d] - Sqrt[e]*x] + 3*e^2*x^4*
Log[I*Sqrt[d] - Sqrt[e]*x] + 3*d^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 6*d*e*x^2*L
og[I*Sqrt[d] + Sqrt[e]*x] + 3*e^2*x^4*Log[I*Sqrt[d] + Sqrt[e]*x] + 4*d^2*Lo
g[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 8*d*e*x^2*Log[x]*Log[1 - (I*Sqrt[e]*x
)/Sqrt[d]] + 4*e^2*x^4*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 4*d^2*Log[x]
*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 8*d*e*x^2*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sq
rt[d]] + 4*e^2*x^4*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 4*(d + e*x^2)^2*
PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 4*(d + e*x^2)^2*PolyLog[2, (I*Sqrt[e
]*x)/Sqrt[d]]))/(8*e^3*(d + e*x^2)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 727, normalized size = 4.78

method	result
risch	$-\frac{ib\pi \mathrm{csgn}(ic\,x^n)^3 \ln(e\,x^2+d)}{4e^3}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^3}+\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2e^3}+\frac{b\ln(c)\ln(e\,x^2+d)}{2e^3}+\frac{a\ln(e\,x^2+}{2e^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*n/e^3*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/e^3*ln(x)*ln
((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/e^3*dilog((-e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))+1/2*b*n/e^3*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*ln(c)/e
^3*ln(e*x^2+d)+1/2*a/e^3*ln(e*x^2+d)-1/2*I*b*Pi*csgn(I*c*x^n)^3*d/e^3/(e*x^
2+d)+1/8*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^3/(e*x^2+d)^2+b*ln(x^n)*d/e^3/(e*x^2+
d)+1/2*b*ln(x^n)/e^3*ln(e*x^2+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^3*l
n(e*x^2+d)-1/2*b*n/e^3*ln(x)*ln(e*x^2+d)-1/4*a*d^2/e^3/(e*x^2+d)^2+a*d/e^3/
(e*x^2+d)-1/4*b*ln(c)*d^2/e^3/(e*x^2+d)^2+b*ln(c)*d/e^3/(e*x^2+d)-1/4*b*ln(
x^n)*d^2/e^3/(e*x^2+d)^2+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^3*ln(e*x^
2+d)-1/4*I*b*Pi*csgn(I*c*x^n)^3/e^3*ln(e*x^2+d)+1/2*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2*d/e^3/(e*x^2+d)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/
e^3*ln(e*x^2+d)-1/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^3/(e*x^2+d)^2+1/
2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^3/(e*x^2+d)-1/8*I*b*Pi*csgn(I*x^n)*c
sgn(I*c*x^n)^2*d^2/e^3/(e*x^2+d)^2+1/8*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)*d^2/e^3/(e*x^2+d)^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d
/e^3/(e*x^2+d)-3/4*b*n*ln(x)/e^3+3/8*b*n*ln(e*x^2+d)/e^3+1/8*b*d*n/e^3/(e*x
^2+d)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] 1/4*(2*e^(-3)*log(x^2*e + d) + (4*d*x^2*e + 3*d^2)/(x^4*e^5 + 2*d*x^2*e^4 +
 d^2*e^3))*a + b*integrate((x^5*log(c) + x^5*log(x^n))/(x^6*e^3 + 3*d*x^4*e
^2 + 3*d^2*x^2*e + d^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*x^5*log(c*x^n) + a*x^5)/(x^6*e^3 + 3*d*x^4*e^2 + 3*d^2*x^2*e +
d^3), x)
```

Sympy [A]
time = 72.70, size = 403, normalized size = 2.65

$$\frac{ad^2\left(\begin{cases}\frac{x^2}{d^3} & \text{for}\ e=0\\ -\frac{1}{2e(d+ex^2)^2} & \text{otherwise}\end{cases}\right)}{2e^2}-\frac{ad\left(\begin{cases}\frac{x^2}{d^2} & \text{for}\ e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{a\left(\begin{cases}\frac{x^2}{d} & \text{for}\ e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e^2}-\frac{bd^2n\left(\begin{cases}\frac{x^2}{2d^3} & \text{for}\ e=0\\ -\frac{1}{4d^2e+4de^2x^2}-\frac{\log(x)}{2d^2e}+\frac{\log\left(\frac{d}{e}+x^2\right)}{4d^2e} & \text{otherwise}\end{cases}\right)}{2e^2}+\frac{bd^2\left(\begin{cases}\frac{x^2}{d^3} & \text{for}\ e=0\\ -\frac{1}{2e(d+ex^2)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2}+\frac{bdn\left(\begin{cases}\frac{x^2}{2d^2} & \text{for}\ e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x^2\right)}{2de} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{bd\left(\begin{cases}\frac{x^2}{d^2} & \text{for}\ e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}-\frac{bn\left(\begin{cases}\frac{x^2}{2d} & \text{for}\ e=0\\ \frac{\begin{cases}-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for}\ |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{2e^2}+\frac{b\left(\begin{cases}\frac{x^2}{d} & \text{for}\ e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

```
[Out] a*d**2*Piecewise((x**2/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x**2)**2), True))/(
2*e**2) - a*d*Piecewise((x**2/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True)
)/e**2 + a*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e**2
) - b*d**2*n*Piecewise((x**2/(2*d**3), Eq(e, 0)), (-1/(4*d**2*e + 4*d*e**2*
x**2) - log(x)/(2*d**2*e) + log(d/e + x**2)/(4*d**2*e), True))/(2*e**2) + b
*d**2*Piecewise((x**2/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x**2)**2), True))*lo
g(c*x**n)/(2*e**2) + b*d*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/(d
*e) + log(d/e + x**2)/(2*d*e), True))/e**2 - b*d*Piecewise((x**2/d**2, Eq(e
, 0)), (-1/(d*e + e**2*x**2), True))*log(c*x**n)/e**2 - b*n*Piecewise((x**2
/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Ab
s(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I
*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*p
i)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + m
eijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(
I*pi)/d)/2, True))/e, True))/(2*e**2) + b*Piecewise((x**2/d, Eq(e, 0)), (lo
g(d + e*x**2)/e, True))*log(c*x**n)/(2*e**2)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^5/(x^2*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

3.232 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal. Leaf size=68

$$-\frac{bn}{8e^2\left(d+ex^2\right)}+\frac{x^4(a+b\log\left(cx^n\right))}{4d\left(d+ex^2\right)^2}-\frac{bn\log\left(d+ex^2\right)}{8de^2}$$

```
[Out] -1/8*b*n/e^2/(e*x^2+d)+1/4*x^4*(a+b*ln(c*x^n))/d/(e*x^2+d)^2-1/8*b*n*ln(e*x
^2+d)/d/e^2
```

Rubi [A]
time = 0.06, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2373, 272, 45}

$$\frac{x^4(a+b\log\left(cx^n\right))}{4d\left(d+ex^2\right)^2}-\frac{bn}{8e^2\left(d+ex^2\right)}-\frac{bn\log\left(d+ex^2\right)}{8de^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] -1/8*(b*n)/(e^2*(d + e*x^2)) + (x^4*(a + b*Log[c*x^n]))/(4*d*(d + e*x^2)^2)
 - (b*n*Log[d + e*x^2])/(8*d*e^2)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx &= \frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2} - \frac{(bn)\int \frac{x^3}{(d+ex^2)^2}\,dx}{4d}\\
&= \frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2} - \frac{(bn)\mathrm{Subst}\left(\int \frac{x}{(d+ex)^2}\,dx, x, x^2\right)}{8d}\\
&= \frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2} - \frac{(bn)\mathrm{Subst}\left(\int \left(-\frac{d}{e(d+ex)^2}+\frac{1}{e(d+ex)}\right)\,dx, x, x^2\right)}{8d}\\
&= -\frac{bn}{8e^2(d+ex^2)} + \frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2} - \frac{bn\log(d+ex^2)}{8de^2}
\end{aligned}
$$

Mathematica [A]
time = 0.08, size = 129, normalized size = 1.90

$$
-\frac{2ad^2+bd^2n+4adex^2+bdenx^2-2bn(d+ex^2)^2\log(x)+2bd(d+2ex^2)\log(cx^n)+bd^2n\log(d+ex^2)+2bdenx^2\log(d+ex^2)+be^2nx^4\log(d+ex^2)}{8de^2(d+ex^2)^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] -1/8*(2*a*d^2 + b*d^2*n + 4*a*d*e*x^2 + b*d*e*n*x^2 - 2*b*n*(d + e*x^2)^2*L
og[x] + 2*b*d*(d + 2*e*x^2)*Log[c*x^n] + b*d^2*n*Log[d + e*x^2] + 2*b*d*e*n
*x^2*Log[d + e*x^2] + b*e^2*n*x^4*Log[d + e*x^2])/(d*e^2*(d + e*x^2)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 369, normalized size = 5.43

method	result
risch	$-\frac{b(2e x^2+d)\ln(x^n)}{4(e x^2+d)^2e^2} - \frac{-2i\pi bde x^2\mathrm{csgn}(ic x^n)^3+i\pi b d^2\mathrm{csgn}(ic)\mathrm{csgn}(ic x^n)^2-2i\pi bde x^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic x^n)+2i\pi bde x^2\mathrm{csgn}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(2*e*x^2+d)/(e*x^2+d)^2/e^2*ln(x^n)-1/8*(-2*I*Pi*b*d*e*x^2*csgn(I*c*
x^n)^3+I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d*e*x^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-2*ln(x)*b*
e^2*n*x^4+ln(e*x^2+d)*b*e^2*n*x^4-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d^2*csgn(I*c*x^n)^3+2*I
*Pi*b*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*ln(x)*b*d*e*n*x^2+2*ln(e*x^2+d)
```

```
*b*d*e*n*x^2+4*ln(c)*b*d*e*x^2+b*d*e*n*x^2-2*ln(x)*b*d^2*n+ln(e*x^2+d)*b*d^
2*n+4*x^2*a*d*e+2*d^2*b*ln(c)+b*d^2*n+2*a*d^2)/e^2/d/(e*x^2+d)^2
```

Maxima [A]
time = 0.28, size = 121, normalized size = 1.78

$$-\frac{1}{8}\,bn\left(\frac{e^{(-2)}\log\left(x^2e+d\right)}{d}-\frac{e^{(-2)}\log\left(x^2\right)}{d}+\frac{1}{x^2e^3+de^2}\right)-\frac{\left(2\,x^2e+d\right)b\log\left(cx^n\right)}{4\left(x^4e^4+2\,dx^2e^3+d^2e^2\right)}-\frac{\left(2\,x^2e+d\right)a}{4\left(x^4e^4+2\,dx^2e^3+d^2e^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] -1/8*b*n*(e^(-2)*log(x^2*e + d)/d - e^(-2)*log(x^2)/d + 1/(x^2*e^3 + d*e^2)
) - 1/4*(2*x^2*e + d)*b*log(c*x^n)/(x^4*e^4 + 2*d*x^2*e^3 + d^2*e^2) - 1/4*
(2*x^2*e + d)*a/(x^4*e^4 + 2*d*x^2*e^3 + d^2*e^2)
```

Fricas [A]
time = 0.35, size = 124, normalized size = 1.82

$$\frac{2\,bnx^4e^2\log\left(x\right)-bd^2n-\left(bdn+4\,ad\right)x^2e-2\,ad^2-\left(bnx^4e^2+2\,bdnx^2e+bd^2n\right)\log\left(x^2e+d\right)-2\left(2\,bdx^2e+bd^2\right)\log\left(c\right)}{8\left(dx^4e^4+2\,d^2x^2e^3+d^3e^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] 1/8*(2*b*n*x^4*e^2*log(x) - b*d^2*n - (b*d*n + 4*a*d)*x^2*e - 2*a*d^2 - (b*
n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*log(x^2*e + d) - 2*(2*b*d*x^2*e + b*d^
2)*log(c))/(d*x^4*e^4 + 2*d^2*x^2*e^3 + d^3*e^2)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 612 vs. $2(58) = 116$.
time = 201.61, size = 612, normalized size = 9.00

$$\begin{cases}\tilde{\infty}\left(-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log\left(cx^n\right)}{2x^2}\right) & \text{for}\: d=0\wedge e=0\\ \frac{\frac{ax^4}{4}-\frac{bnx^4}{16}+\frac{bx^4\log\left(cx^n\right)}{4}}{d^3} & \text{for}\: e=0\\ \frac{-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log\left(cx^n\right)}{2x^2}}{e^3} & \text{for}\: d=0\\ -\frac{2ad^2}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{4adex^2}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{bd^2n\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{bd^2n\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{bd^2n}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{2bdenx^2\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{2bdenx^2\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{bdenx^2}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{be^2nx^4\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4}-\frac{be^2nx^4\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4}+\frac{2be^2x^4\log\left(cx^n\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

```
[Out] Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d,
 0) & Eq(e, 0)), ((a*x**4/4 - b*n*x**4/16 + b*x**4*log(c*x**n)/4)/d**3, Eq(
e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**3, Eq(d,
0)), (-2*a*d**2/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - 4*a*d*e
*x**2/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - b*d**2*n*log(x -
sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - b*d**2*n*lo
g(x + sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - b*d**
```

```
2*n/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - 2*b*d*e*n*x**2*log(
x - sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - 2*b*d*e
*n*x**2*log(x + sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**
4) - b*d*e*n*x**2/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - b*e**
2*n*x**4*log(x - sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x*
*4) - b*e**2*n*x**4*log(x + sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 +
8*d*e**4*x**4) + 2*b*e**2*x**4*log(c*x**n)/(8*d**3*e**2 + 16*d**2*e**3*x**2
 + 8*d*e**4*x**4), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 140 vs. 2(63) = 126.
time = 4.44, size = 140, normalized size = 2.06

$$-\frac{bnx^4e^2\log\left(x^2e+d\right)-2\,bnx^4e^2\log\left(x\right)+2\,bdnx^2e\log\left(x^2e+d\right)+bdnx^2e+4\,bdx^2e\log\left(c\right)+4\,adx^2e+bd^2n\log\left(x^2e+d\right)+bd^2n+2\,bd^2\log\left(c\right)+2\,ad^2}{8\,\left(dx^4e^4+2\,d^2x^2e^3+d^3e^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] -1/8*(b*n*x^4*e^2*log(x^2*e + d) - 2*b*n*x^4*e^2*log(x) + 2*b*d*n*x^2*e*log
(x^2*e + d) + b*d*n*x^2*e + 4*b*d*x^2*e*log(c) + 4*a*d*x^2*e + b*d^2*n*log(
x^2*e + d) + b*d^2*n + 2*b*d^2*log(c) + 2*a*d^2)/(d*x^4*e^4 + 2*d^2*x^2*e^3
 + d^3*e^2)
```

Mupad [**B**]
time = 3.74, size = 129, normalized size = 1.90

$$\frac{b\,n\,\ln\left(x\right)}{4\,d\,e^2}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,x^2}{2\,e}+\frac{b\,d}{4\,e^2}\right)}{d^2+2\,d\,e\,x^2+e^2\,x^4}-\frac{b\,n\,\ln\left(e\,x^2+d\right)}{8\,d\,e^2}-\frac{\left(2\,a\,e+\frac{b\,e\,n}{2}\right)\,x^2+a\,d+\frac{b\,d\,n}{2}}{4\,d^2\,e^2+8\,d\,e^3\,x^2+4\,e^4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

```
[Out] (b*n*log(x))/(4*d*e^2) - (log(c*x^n)*((b*x^2)/(2*e) + (b*d)/(4*e^2)))/(d^2
+ e^2*x^4 + 2*d*e*x^2) - (b*n*log(d + e*x^2))/(8*d*e^2) - (a*d + x^2*(2*a*e
 + (b*e*n)/2) + (b*d*n)/2)/(4*d^2*e^2 + 4*e^4*x^4 + 8*d*e^3*x^2)
```

3.233 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal. Leaf size=82

$$\frac{bn}{8de\left(d+ex^2\right)}+\frac{bn\log(x)}{4d^2e}-\frac{a+b\log\left(cx^n\right)}{4e\left(d+ex^2\right)^2}-\frac{bn\log\left(d+ex^2\right)}{8d^2e}$$

```
[Out] 1/8*b*n/d/e/(e*x^2+d)+1/4*b*n*ln(x)/d^2/e+1/4*(-a-b*ln(c*x^n))/e/(e*x^2+d)^
2-1/8*b*n*ln(e*x^2+d)/d^2/e
```

Rubi [A]
time = 0.05, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2376, 272, 46}

$$-\frac{a+b\log\left(cx^n\right)}{4e\left(d+ex^2\right)^2}-\frac{bn\log\left(d+ex^2\right)}{8d^2e}+\frac{bn\log(x)}{4d^2e}+\frac{bn}{8de\left(d+ex^2\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] (b*n)/(8*d*e*(d + e*x^2)) + (b*n*Log[x])/(4*d^2*e) - (a + b*Log[c*x^n])/(4*
e*(d + e*x^2)^2) - (b*n*Log[d + e*x^2])/(8*d^2*e)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx &= -\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}+\frac{(bn)\int \frac{1}{x(d+ex^2)^2}\,dx}{4e}\\
&= -\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}+\frac{(bn)\mathrm{Subst}\left(\int \frac{1}{x(d+ex)^2}\,dx,x,x^2\right)}{8e}\\
&= -\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}+\frac{(bn)\mathrm{Subst}\left(\int \left(\frac{1}{d^2x}-\frac{e}{d(d+ex)^2}-\frac{e}{d^2(d+ex)}\right)\,dx,x,x^2\right)}{8e}\\
&= \frac{bn}{8de(d+ex^2)}+\frac{bn\log(x)}{4d^2e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}-\frac{bn\log(d+ex^2)}{8d^2e}
\end{aligned}
$$

Mathematica [A]
time = 0.04, size = 111, normalized size = 1.35

$$
\frac{bn}{8de(d+ex^2)}+\frac{bn\log(x)}{4d^2e}-\frac{bn\log(x)}{4e(d+ex^2)^2}+\frac{-a-b(-n\log(x)+\log(cx^n))}{4e(d+ex^2)^2}-\frac{bn\log(d+ex^2)}{8d^2e}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] (b*n)/(8*d*e*(d + e*x^2)) + (b*n*Log[x])/(4*d^2*e) - (b*n*Log[x])/(4*e*(d +
 e*x^2)^2) + (-a - b*(-(n*Log[x]) + Log[c*x^n]))/(4*e*(d + e*x^2)^2) - (b*n
*Log[d + e*x^2])/(8*d^2*e)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 243, normalized size = 2.96

method	result
risch	$-\frac{b\ln(x^n)}{4e(e\,x^2+d)^2}-\frac{-2\ln(x)b\,e^2n\,x^4+\ln(e\,x^2+d)\,b\,e^2n\,x^4-i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi b\,d^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi b\,d^2\mathrm{csg}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b/e/(e*x^2+d)^2*ln(x^n)-1/8*(-2*ln(x)*b*e^2*n*x^4+ln(e*x^2+d)*b*e^2*n*
x^4-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d^2*csgn(I*c)*csg
n(I*c*x^n)^2+I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d^2*csgn(I*c*x^n
)^3-4*ln(x)*b*d*e*n*x^2+2*ln(e*x^2+d)*b*d*e*n*x^2-b*d*e*n*x^2-2*ln(x)*b*d^2
*n+ln(e*x^2+d)*b*d^2*n+2*d^2*b*ln(c)-b*d^2*n+2*a*d^2)/d^2/e/(e*x^2+d)^2
```

Maxima [A]
time = 0.28, size = 108, normalized size = 1.32

$$-\frac{1}{8}\,bn\left(\frac{e^{(-1)}\log\left(x^2e+d\right)}{d^2}-\frac{e^{(-1)}\log\left(x^2\right)}{d^2}-\frac{1}{dx^2e^2+d^2e}\right)-\frac{b\log\left(cx^n\right)}{4\left(x^4e^3+2\,dx^2e^2+d^2e\right)}-\frac{a}{4\left(x^4e^3+2\,dx^2e^2+d^2e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] -1/8*b*n*(e^(-1)*log(x^2*e + d)/d^2 - e^(-1)*log(x^2)/d^2 - 1/(d*x^2*e^2 +
d^2*e)) - 1/4*b*log(c*x^n)/(x^4*e^3 + 2*d*x^2*e^2 + d^2*e) - 1/4*a/(x^4*e^3
 + 2*d*x^2*e^2 + d^2*e)
```

Fricas [A]
time = 0.36, size = 119, normalized size = 1.45

$$\frac{bdnx^2e+bd^2n-2\,bd^2\log\left(c\right)-2\,ad^2-\left(bnx^4e^2+2\,bdnx^2e+bd^2n\right)\log\left(x^2e+d\right)+2\left(bnx^4e^2+2\,bdnx^2e\right)\log\left(x\right)}{8\left(d^2x^4e^3+2\,d^3x^2e^2+d^4e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] 1/8*(b*d*n*x^2*e + b*d^2*n - 2*b*d^2*log(c) - 2*a*d^2 - (b*n*x^4*e^2 + 2*b*
d*n*x^2*e + b*d^2*n)*log(x^2*e + d) + 2*(b*n*x^4*e^2 + 2*b*d*n*x^2*e)*log(x
))/(d^2*x^4*e^3 + 2*d^3*x^2*e^2 + d^4*e)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 619 vs. $2(71) = 142$.
time = 201.82, size = 619, normalized size = 7.55

$$\begin{cases} \tilde{\infty}\left(-\frac{a}{4x^4}-\frac{bn}{16x^4}-\frac{b\log\left(cx^n\right)}{4x^4}\right) & \text{for}\ d=0\wedge e=0 \\ \frac{-\frac{a}{4x^4}-\frac{bn}{16x^4}-\frac{b\log\left(cx^n\right)}{4x^4}}{e^3} & \text{for}\ d=0 \\ \frac{\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log\left(cx^n\right)}{2}}{d^3} & \text{for}\ e=0 \\ -\frac{2ad^2}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{bd^2n\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{bd^2n\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}+\frac{bd^2n}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{2bdenx^2\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{2bdenx^2\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}+\frac{bdenx^2}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}+\frac{4bdex^2\log\left(cx^n\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{be^2nx^4\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{be^2nx^4\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}+\frac{2be^2x^4\log\left(cx^n\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

```
[Out] Piecewise((zoo*(-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4)), Eq(d
, 0) & Eq(e, 0)), ((-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4))/e
**3, Eq(d, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**3, Eq(e,
 0)), (-2*a*d**2/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4) - b*d**2
*n*log(x - sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4) -
b*d**2*n*log(x + sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x*
*4) + b*d**2*n/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4) - 2*b*d*e*
n*x**2*log(x - sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4
) - 2*b*d*e*n*x**2*log(x + sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d*
```

```
*2*e**3*x**4) + b*d*e*n*x**2/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x*
*4) + 4*b*d*e*x**2*log(c*x**n)/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*
x**4) - b*e**2*n*x**4*log(x - sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8
*d**2*e**3*x**4) - b*e**2*n*x**4*log(x + sqrt(-d/e))/(8*d**4*e + 16*d**3*e*
*2*x**2 + 8*d**2*e**3*x**4) + 2*b*e**2*x**4*log(c*x**n)/(8*d**4*e + 16*d**3
*e**2*x**2 + 8*d**2*e**3*x**4), True))
```

Giac [A]
time = 3.57, size = 136, normalized size = 1.66

$$-\frac{bnx^4e^2\log\left(x^2e+d\right)-2\,bnx^4e^2\log\left(x\right)+2\,bdnx^2e\log\left(x^2e+d\right)-4\,bdnx^2e\log\left(x\right)-bdnx^2e+bd^2n\log\left(x^2e+d\right)-bd^2n+2\,bd^2\log\left(c\right)+2\,ad^2}{8\,\left(d^2x^4e^3+2\,d^3x^2e^2+d^4e\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] -1/8*(b*n*x^4*e^2*log(x^2*e + d) - 2*b*n*x^4*e^2*log(x) + 2*b*d*n*x^2*e*log
(x^2*e + d) - 4*b*d*n*x^2*e*log(x) - b*d*n*x^2*e + b*d^2*n*log(x^2*e + d) -
 b*d^2*n + 2*b*d^2*log(c) + 2*a*d^2)/(d^2*x^4*e^3 + 2*d^3*x^2*e^2 + d^4*e)
```

Mupad [B]
time = 3.68, size = 109, normalized size = 1.33

$$\frac{\frac{b\,n}{2}-a+\frac{b\,e\,n\,x^2}{2\,d}}{4\,d^2\,e+8\,d\,e^2\,x^2+4\,e^3\,x^4}-\frac{b\,\ln\left(c\,x^n\right)}{4\,e\,\left(d^2+2\,d\,e\,x^2+e^2\,x^4\right)}-\frac{b\,n\,\ln\left(e\,x^2+d\right)}{8\,d^2\,e}+\frac{b\,n\,\ln\left(x\right)}{4\,d^2\,e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

```
[Out] ((b*n)/2 - a + (b*e*n*x^2)/(2*d))/(4*d^2*e + 4*e^3*x^4 + 8*d*e^2*x^2) - (b*
log(c*x^n))/(4*e*(d^2 + e^2*x^4 + 2*d*e*x^2)) - (b*n*log(d + e*x^2))/(8*d^2
*e) + (b*n*log(x))/(4*d^2*e)
```

3.234 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$

Optimal. Leaf size=115

$$\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}-\frac{\log\left(1+\frac{d}{ex^2}\right)(4a-3bn+4b\log(cx^n))}{8d^3}+\frac{4a-bn+4b\log(cx^n)}{8d^2(d+ex^2)}+\frac{bn\text{Li}_2\left(-\frac{d}{ex^2}\right)}{4d^3}$$

```
[Out] 1/4*(a+b*ln(c*x^n))/d/(e*x^2+d)^2-1/8*ln(1+d/e/x^2)*(4*a-3*b*n+4*b*ln(c*x^n
))/d^3+1/8*(4*a-b*n+4*b*ln(c*x^n))/d^2/(e*x^2+d)+1/4*b*n*polylog(2,-d/e/x^2
)/d^3
```

Rubi [A]
time = 0.16, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2385, 2379, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^3}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-3bn)}{8d^3}+\frac{4a+4b\log(cx^n)-bn}{8d^2(d+ex^2)}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^3),x]
```

```
[Out] (a + b*Log[c*x^n])/(4*d*(d + e*x^2)^2) - (Log[1 + d/(e*x^2)]*(4*a - 3*b*n +
 4*b*Log[c*x^n]))/(8*d^3) + (4*a - b*n + 4*b*Log[c*x^n])/(8*d^2*(d + e*x^2)
) + (b*n*PolyLog[2, -(d/(e*x^2))])/(4*d^3)
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx = \frac{a+b\log(cx^n)}{4d(d+ex^2)^2} - \frac{\int \frac{-4a+bn-4b\log(cx^n)}{x(d+ex^2)^2}\,dx}{4d}$$

$$= \frac{a+b\log(cx^n)}{4d(d+ex^2)^2} + \frac{4a-bn+4b\log(cx^n)}{8d^2(d+ex^2)} + \frac{\int \frac{-4bn-2(-4a+bn)+8b\log(cx^n)}{x(d+ex^2)}\,dx}{8d^2}$$

$$= \frac{a+b\log(cx^n)}{4d(d+ex^2)^2} - \frac{\log\left(1+\frac{d}{ex^2}\right)(4a-3bn+4b\log(cx^n))}{8d^3} + \frac{4a-bn+4b\log(cx^n)}{8d^2(d+ex^2)} +$$

$$= \frac{a+b\log(cx^n)}{4d(d+ex^2)^2} - \frac{\log\left(1+\frac{d}{ex^2}\right)(4a-3bn+4b\log(cx^n))}{8d^3} + \frac{4a-bn+4b\log(cx^n)}{8d^2(d+ex^2)} +$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.68, size = 396, normalized size = 3.44

$$\frac{\frac{4d^2(a-bn\log(x)+b\log(cx^n))}{(d+ex^2)^2}+\frac{8d(a-bn\log(x)+b\log(cx^n))}{d+ex^2}+16\log(x)(a-bn\log(x)+b\log(cx^n))-8(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)-bn\left(\frac{d}{d-i\sqrt{d}\sqrt{e}x}+\frac{d}{d+i\sqrt{d}\sqrt{e}x}+2\log(x)-\frac{d\log(x)}{(\sqrt{d}-i\sqrt{e}x)^2}-\frac{d\log(x)}{(\sqrt{d}+i\sqrt{e}x)^2}+\frac{5\sqrt{e}x\log(x)}{-i\sqrt{d}+\sqrt{e}x}+\frac{5\sqrt{e}x\log(x)}{i\sqrt{d}+\sqrt{e}x}-8\log^2(x)-6\log(i\sqrt{d}-\sqrt{e}x)-6\log(i\sqrt{d}+\sqrt{e}x)+8\log(x)\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)+8\log(x)\log\left(1+\frac{i\sqrt{e}x}{\sqrt{d}}\right)+8\text{Li}_2\left(-\frac{i\sqrt{e}x}{\sqrt{d}}\right)+8\text{Li}_2\left(\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{16d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^3),x]
```

```
[Out] ((4*d^2*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^2)^2 + (8*d*(a - b*n*Log[
x] + b*Log[c*x^n]))/(d + e*x^2) + 16*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])
 - 8*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] - b*n*(d/(d - I*Sqrt[d]
*Sqrt[e]*x) + d/(d + I*Sqrt[d]*Sqrt[e]*x) + 2*Log[x] - (d*Log[x])/(Sqrt[d]
- I*Sqrt[e]*x)^2 - (d*Log[x])/(Sqrt[d] + I*Sqrt[e]*x)^2 + (5*Sqrt[e]*x*Log[
x])/((-I)*Sqrt[d] + Sqrt[e]*x) + (5*Sqrt[e]*x*Log[x])/(I*Sqrt[d] + Sqrt[e]*
x) - 8*Log[x]^2 - 6*Log[I*Sqrt[d] - Sqrt[e]*x] - 6*Log[I*Sqrt[d] + Sqrt[e]*
x] + 8*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 8*Log[x]*Log[1 + (I*Sqrt[e]*
x)/Sqrt[d]] + 8*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 8*PolyLog[2, (I*Sqrt
[e]*x)/Sqrt[d]]))/(16*d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 841, normalized size = 7.31

method	result
risch	$\frac{bn\ln(x)\ln(e\,x^2+d)}{2d^3}-\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d^3}+\frac{a\ln(x)}{d^3}-\frac{bn\,\text{dilog}\left(\frac{-ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d^3}-\frac{bn\,\text{dilog}\left(\frac{ex+\sqrt{-ed}}{\sqrt{-ed}}\right)}{2d^3}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*n/d^3*ln(x)*ln(e*x^2+d)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*ln
(x)-1/2*b*n/d^3*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/8*I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2/d/(e*x^2+d)^2+a/d^3*ln(x)-1/2*I*b*Pi*csgn(I*c*x^n)^3/d
^3*ln(x)-1/2*b*n/d^3*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n/d^3*di
log((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/8*b*n/d^2/(e*x^2+d)+3/8*b*n/d^3*ln(e
*x^2+d)+1/2*a/d^2/(e*x^2+d)-1/2*a/d^3*ln(e*x^2+d)+1/4*a/d/(e*x^2+d)^2+1/4*I
*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/(e*x^2+d)-1/4*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2/d^3*ln(e*x^2+d)+1/4*b*ln(x^n)/d/(e*x^2+d)^2+1/2*b*ln(x^n)/d^2/(
e*x^2+d)-1/2*b*ln(x^n)/d^3*ln(e*x^2+d)+1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2/d/(e*x^2+d)^2-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*ln(e*x^2+d)+1/4*b
*ln(c)/d/(e*x^2+d)^2+1/2*b*ln(c)/d^2/(e*x^2+d)-1/2*b*ln(c)/d^3*ln(e*x^2+d)-
1/2*b*n/d^3*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/4*I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2/d^2/(e*x^2+d)-1/8*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)/d/(e*x^2+d)^2-1/8*I*b*Pi*csgn(I*c*x^n)^3/d/(e*x^2+d)^2+b*ln(x^n)/d^3*ln(x
)+b*ln(c)/d^3*ln(x)-1/2*b*n/d^3*ln(x)^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)/d^3*ln(x)-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/(e
*x^2+d)+1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*ln(e*x^2+d)-1/4*
I*b*Pi*csgn(I*c*x^n)^3/d^2/(e*x^2+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d
^3*ln(x)+1/4*I*b*Pi*csgn(I*c*x^n)^3/d^3*ln(e*x^2+d)-3/4*b*n*ln(x)/d^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] 1/4*a*((2*x^2*e + 3*d)/(d^2*x^4*e^2 + 2*d^3*x^2*e + d^4) - 2*log(x^2*e + d)
/d^3 + 4*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(x^7*e^3 + 3*d*x^5*e
^2 + 3*d^2*x^3*e + d^3*x), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^7*e^3 + 3*d*x^5*e^2 + 3*d^2*x^3*e + d^3*x),
x)
```

Sympy [A]
time = 145.08, size = 403, normalized size = 3.50

$$-\frac{ae\left(\begin{cases}\frac{x^2}{2d^3} & \text{for } e=0\\ -\frac{1}{4e(d+ex^2)^2} & \text{otherwise}\end{cases}\right)}{d}-\frac{ae\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{1}{2de+2e^2x^2} & \text{otherwise}\end{cases}\right)}{d^2}+\frac{a\log(x)}{d^3}-\frac{a\log(d+ex^2)}{2d^3}+\frac{be^2n\left(\begin{cases}-\frac{1}{2e^3x^2} & \text{for } d=0\\ -\frac{1}{4de^2+4e^3x^2}-\frac{\log(d+ex^2)}{4de^2} & \text{otherwise}\end{cases}\right)}{2d^2}-\frac{be^2\left(\begin{cases}\frac{1}{e^3x^2} & \text{for } d=0\\ -\frac{1}{2d\left(\frac{d}{x^2}+e\right)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2d^2}-\frac{ben\left(\begin{cases}-\frac{1}{2e^2x^2} & \text{for } d=0\\ -\frac{\log(d+ex^2)}{2de} & \text{otherwise}\end{cases}\right)}{d^2}+\frac{be\left(\begin{cases}\frac{1}{e^2x^2} & \text{for } d=0\\ -\frac{1}{\frac{d^2}{x^2}+de} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}+\frac{bn\left(\begin{cases}-\frac{1}{2ex^2} & \text{for } d=0\\ \frac{\begin{cases}\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{2d^2}-\frac{b\left(\begin{cases}\frac{1}{ex^2} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x^2}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**3,x)
```

```
[Out] -a*e*Piecewise((x**2/(2*d**3), Eq(e, 0)), (-1/(4*e*(d + e*x**2)**2), True))
/d - a*e*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-1/(2*d*e + 2*e**2*x**2), Tr
ue))/d**2 + a*log(x)/d**3 - a*log(d + e*x**2)/(2*d**3) + b*e**2*n*Piecewise
((-1/(2*e**3*x**2), Eq(d, 0)), (-1/(4*d*e**2 + 4*e**3*x**2) - log(d + e*x**
2)/(4*d*e**2), True))/(2*d**2) - b*e**2*Piecewise((1/(e**3*x**2), Eq(d, 0))
, (-1/(2*d*(d/x**2 + e)**2), True))*log(c*x**n)/(2*d**2) - b*e*n*Piecewise(
(-1/(2*e**2*x**2), Eq(d, 0)), (-log(d + e*x**2)/(2*d*e), True))/d**2 + b*e*
Piecewise((1/(e**2*x**2), Eq(d, 0)), (-1/(d**2/x**2 + d*e), True))*log(c*x*
*n)/d**2 + b*n*Piecewise((-1/(2*e*x**2), Eq(d, 0)), (Piecewise((polylog(2,
d*exp_polar(I*pi)/(e*x**2))/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(
x) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, Abs(x) < 1), (-log(e)*log(1/
x) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, 1/Abs(x) < 1), (-meijerg((()
, (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)
*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, True))/d, True))/(2*d**
2) - b*Piecewise((1/(e*x**2), Eq(d, 0)), (log(d/x**2 + e)/d, True))*log(c*x
**n)/(2*d**2)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^3*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(e\,x^2+d\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^2)^3),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^2)^3), x)
```

3.235 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$

Optimal. Leaf size=162

$$-\frac{3bn}{4d^3x^2}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}+\frac{6a-bn+6b\log\left(cx^n\right)}{8d^2x^2\left(d+ex^2\right)}-\frac{12a-5bn+12b\log\left(cx^n\right)}{8d^3x^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)(12a-5bn+}{8d^4}$$

```
[Out] -3/4*b*n/d^3/x^2+1/4*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)^2+1/8*(6*a-b*n+6*b*ln(
c*x^n))/d^2/x^2/(e*x^2+d)+1/8*(-12*a+5*b*n-12*b*ln(c*x^n))/d^3/x^2+1/8*e*ln
(1+d/e/x^2)*(12*a-5*b*n+12*b*ln(c*x^n))/d^4-3/4*b*e*n*polylog(2,-d/e/x^2)/d
^4
```

Rubi [A]
time = 0.24, antiderivative size = 162, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2385, 2380, 2341, 2379, 2438}

$$-\frac{3ben\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^4}+\frac{e\log\left(\frac{d}{ex^2}+1\right)\left(12a+12b\log\left(cx^n\right)-5bn\right)}{8d^4}-\frac{12a+12b\log\left(cx^n\right)-5bn}{8d^3x^2}+\frac{6a+6b\log\left(cx^n\right)-bn}{8d^2x^2\left(d+ex^2\right)}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}-\frac{3bn}{4d^3x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^3),x]
```

```
[Out] (-3*b*n)/(4*d^3*x^2) + (a + b*Log[c*x^n])/(4*d*x^2*(d + e*x^2)^2) + (6*a -
b*n + 6*b*Log[c*x^n])/(8*d^2*x^2*(d + e*x^2)) - (12*a - 5*b*n + 12*b*Log[c*
x^n])/(8*d^3*x^2) + (e*Log[1 + d/(e*x^2)]*(12*a - 5*b*n + 12*b*Log[c*x^n]))
/(8*d^4) - (3*b*e*n*PolyLog[2, -(d/(e*x^2))])/(4*d^4)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
```

```
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx = \frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2} - \frac{\int \frac{-6a+bn-6b\log(cx^n)}{x^3(d+ex^2)^2}\,dx}{4d}$$

$$= \frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2} + \frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} + \frac{\int \frac{-6bn-4(-6a+bn)+24b\log(cx^n)}{x^3(d+ex^2)}\,dx}{8d^2}$$

$$= \frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2} + \frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} + \frac{\int \left(\frac{-6bn-4(-6a+bn)+24b\log(cx^n)}{dx^3} - \frac{e(-6bn-4(-\cdots}{\cdots}\right.}{\cdots}$$

$$= \frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2} + \frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} + \frac{\int \frac{-6bn-4(-6a+bn)+24b\log(cx^n)}{x^3}\,dx}{8d^3} - \frac{e\int \frac{-6bn\cdots}{\cdots}}{\cdots}$$

$$= -\frac{3bn}{4d^3x^2} + \frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2} + \frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} - \frac{12a-5bn+12b\log(cx^n)}{8d^3x^2} - \frac{e\cdots}{\cdots}$$

$$= -\frac{3bn}{4d^3x^2} + \frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2} + \frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} - \frac{12a-5bn+12b\log(cx^n)}{8d^3x^2} - \frac{e\cdots}{\cdots}$$

Mathematica [C] Result contains complex when optimal does not.
time = 0.83, size = 507, normalized size = 3.13

$$\frac{-\frac{8d(a-bn\log(x)+b\log(cx^n))}{x^2} - \frac{4d^2e(a-bn\log(x)+b\log(cx^n))}{(d+ex^2)^2} - \frac{16de(a-bn\log(x)+b\log(cx^n))}{d+ex^2} - 48e\log(x)\left(a-bn\log(x)+b\log(cx^n)\right) + 24e(a-bn\log(x)+b\log(cx^n))\log(d+ex^2) + bn\left(\frac{9e^{3/2}x\log(x)}{-i\sqrt{d}+\sqrt{e}x} - 24e\log^2(x) - \frac{4d(1+2\log(x))}{x^2} + e\left(\frac{d}{d+i\sqrt{d}\sqrt{e}x} + \log(x) - \frac{d\log(x)}{(\sqrt{d}+i\sqrt{e}x)^2} - \log\left(i\sqrt{d}-\sqrt{e}x\right)\right) - 9e\log\left(i\sqrt{d}-\sqrt{e}x\right) + e\left(\frac{d}{d-i\sqrt{d}\sqrt{e}x} + \log(x) - \frac{d\log(x)}{(\sqrt{d}-i\sqrt{e}x)^2} - \log\left(i\sqrt{d}+\sqrt{e}x\right)\right) + \frac{-9ie^{3/2}x\log(x)+9ie\left(i\sqrt{d}+\sqrt{e}x\right)\log\left(i\sqrt{d}+\sqrt{e}x\right)}{\sqrt{d}-i\sqrt{e}x} + 24e\left(\log(x)\log\left(1+\frac{i\sqrt{e}x}{\sqrt{d}}\right) + \text{Li}_2\left(-\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right) + 24e\left(\log(x)\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right) + \text{Li}_2\left(\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)\right)}{16d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^3),x]
```

```
[Out] ((-8*d*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - (4*d^2*e*(a - b*n*Log[x] + b*
Log[c*x^n]))/(d + e*x^2)^2 - (16*d*e*(a - b*n*Log[x] + b*Log[c*x^n]))/(d +
e*x^2) - 48*e*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 24*e*(a - b*n*Log[x]
 + b*Log[c*x^n])*Log[d + e*x^2] + b*n*((9*e^(3/2)*x*Log[x])/((-I)*Sqrt[d] +
 Sqrt[e]*x) - 24*e*Log[x]^2 - (4*d*(1 + 2*Log[x]))/x^2 + e*(d/(d + I*Sqrt[d
]*Sqrt[e]*x) + Log[x] - (d*Log[x])/(Sqrt[d] + I*Sqrt[e]*x)^2 - Log[I*Sqrt[d
] - Sqrt[e]*x]) - 9*e*Log[I*Sqrt[d] - Sqrt[e]*x] + e*(d/(d - I*Sqrt[d]*Sqrt
[e]*x) + Log[x] - (d*Log[x])/(Sqrt[d] - I*Sqrt[e]*x)^2 - Log[I*Sqrt[d] + Sq
rt[e]*x]) + ((-9*I)*e^(3/2)*x*Log[x] + (9*I)*e*(I*Sqrt[d] + Sqrt[e]*x)*Log[
I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d] - I*Sqrt[e]*x) + 24*e*(Log[x]*Log[1 + (I*S
qrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) + 24*e*(Log[x]*L
og[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(16*d^
4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 1030, normalized size = 6.36

method	result	size
risch	Expression too large to display	1030

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I*b*Pi*csgn(I*c*x^n)^3*e/d^3/(e*x^2+d)-b*ln(c)*e/d^3/(e*x^2+d)+3/2*b*ln
(c)/d^4*e*ln(e*x^2+d)-1/4*a*e/d^2/(e*x^2+d)^2-a*e/d^3/(e*x^2+d)+3/2*a*e/d^4
*ln(e*x^2+d)-3*a/d^4*e*ln(x)-1/4*b*ln(x^n)*e/d^2/(e*x^2+d)^2-3/4*I*b*Pi*csg
n(I*c*x^n)^3/d^4*e*ln(e*x^2+d)-1/2*b*ln(x^n)/d^3/x^2+3/2*b*n/d^4*e*dilog((-
e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+3/2*b*n/d^4*e*dilog((e*x+(-e*d)^(1/2))/(-e*
d)^(1/2))+1/8*b*n*e/d^3/(e*x^2+d)-5/8*b*n/d^4*e*ln(e*x^2+d)+3/2*b*n/d^4*e*l
n(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/2*b*n/d^4*e*ln(x)*ln(e*x^2+d)+3/
2*b*n/d^4*e*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3*b*ln(c)/d^4*e*ln(x
)-1/2*a/d^3/x^2-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3/x^2-1/4*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2/d^3/x^2+3/2*b*n/d^4*e*ln(x)^2-3/4*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)/d^4*e*ln(e*x^2+d)-1/2*b*ln(c)/d^3/x^2+1/4*I*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3/x^2+5/4*b*e*n*ln(x)/d^4+3/2*I*b*Pi
*csgn(I*c*x^n)^3/d^4*e*ln(x)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^3/(
e*x^2+d)+3/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4*e*ln(e*x^2+d)+3/4*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e*ln(e*x^2+d)-1/8*I*b*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2*e/d^2/(e*x^2+d)^2+1/4*I*b*Pi*csgn(I*c*x^n)^3/d^3/x^2-1/8*I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2*e/d^2/(e*x^2+d)^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^
n)^2*e/d^3/(e*x^2+d)-3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4*e*ln(x)-3/2
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e*ln(x)-3*b*ln(x^n)/d^4*e*ln(x)+1/8*I
*b*Pi*csgn(I*c*x^n)^3*e/d^2/(e*x^2+d)^2-1/4*b*ln(c)*e/d^2/(e*x^2+d)^2+3/2*I
*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*e*ln(x)+1/8*I*b*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)*e/d^2/(e*x^2+d)^2-b*ln(x^n)*e/d^3/(e*x^2+d)+3/2*b
```

```
*ln(x^n)*e/d^4*ln(e*x^2+d)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e
/d^3/(e*x^2+d)-1/4*b*n/d^3/x^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] -1/4*a*((6*x^4*e^2 + 9*d*x^2*e + 2*d^2)/(d^3*x^6*e^2 + 2*d^4*x^4*e + d^5*x^
2) - 6*e*log(x^2*e + d)/d^4 + 12*e*log(x)/d^4) + b*integrate((log(c) + log(
x^n))/(x^9*e^3 + 3*d*x^7*e^2 + 3*d^2*x^5*e + d^3*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^9*e^3 + 3*d*x^7*e^2 + 3*d^2*x^5*e + d^3*x^3)
, x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**3,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^3*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\,{\left(e\,x^2+d\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^3),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^3), x)
```

3.236 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal. Leaf size=211

$$-\frac{bnx}{8e^2\left(d+ex^2\right)}+\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{5/2}}+\frac{dx(a+b\log\left(cx^n\right))}{4e^2\left(d+ex^2\right)^2}-\frac{5x(a+b\log\left(cx^n\right))}{8e^2\left(d+ex^2\right)}+\frac{3\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(c\cdots\right.}{8\sqrt{d}\,e^{5/2}}$$

```
[Out] -1/8*b*n*x/e^2/(e*x^2+d)+1/4*d*x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^2-5/8*x*(a+b
*ln(c*x^n))/e^2/(e*x^2+d)+1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/e^(5/2)/d^(1/2)
+3/8*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)/d^(1/2)-3/16*I*b*n*p
olylog(2,-I*x*e^(1/2)/d^(1/2))/e^(5/2)/d^(1/2)+3/16*I*b*n*polylog(2,I*x*e^(
1/2)/d^(1/2))/e^(5/2)/d^(1/2)
```

Rubi [A]
time = 0.31, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 24, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {294, 211, 2393, 2360, 2361, 12, 4940, 2438, 205}

$$-\frac{3ibn\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16\sqrt{d}\,e^{5/2}}+\frac{3ibn\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16\sqrt{d}\,e^{5/2}}+\frac{3\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log\left(cx^n\right))}{8\sqrt{d}\,e^{5/2}}-\frac{5x(a+b\log\left(cx^n\right))}{8e^2\left(d+ex^2\right)}+\frac{dx(a+b\log\left(cx^n\right))}{4e^2\left(d+ex^2\right)^2}+\frac{bn\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{5/2}}-\frac{bnx}{8e^2\left(d+ex^2\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] -1/8*(b*n*x)/(e^2*(d + e*x^2)) + (b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*Sqrt[
d]*e^(5/2)) + (d*x*(a + b*Log[c*x^n]))/(4*e^2*(d + e*x^2)^2) - (5*x*(a + b*
Log[c*x^n]))/(8*e^2*(d + e*x^2)) + (3*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Lo
g[c*x^n]))/(8*Sqrt[d]*e^(5/2)) - (((3*I)/16)*b*n*PolyLog[2, ((-I)*Sqrt[e]*x
)/Sqrt[d]])/(Sqrt[d]*e^(5/2)) + (((3*I)/16)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sq
rt[d]])/(Sqrt[d]*e^(5/2))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^n)^(p +
 1)/(a*n*(p + 1))), x] + Dist[(n*(p + 1) + 1)/(a*n*(p + 1)), Int[(a + b*x^n
)^(p + 1), x], x] /; FreeQ[{a, b}, x] && IGtQ[n, 0] && LtQ[p, -1] && (Integ
erQ[2*p] || (n == 2 && IntegerQ[4*p]) || (n == 2 && IntegerQ[3*p]) || Denom
inator[p + 1/n] < Denominator[p])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx &= \int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)^3} - \frac{2d(a+b\log(cx^n))}{e^2(d+ex^2)^2} + \frac{a+b\log(cx^n)}{e^2(d+ex^2)}\right) dx \\
&= \frac{\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{e^2} - \frac{(2d)\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx}{e^2} + \frac{d^2\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx}{e^2} \\
&= \frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2} - \frac{x(a+b\log(cx^n))}{e^2(d+ex^2)} + \frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,e^{5/2}} - \int \\
&= -\frac{bnx}{8e^2(d+ex^2)} + \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,e^{5/2}} + \frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2} - \frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)} \\
&= -\frac{bnx}{8e^2(d+ex^2)} + \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{5/2}} + \frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2} - \frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)} \\
&= -\frac{bnx}{8e^2(d+ex^2)} + \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{5/2}} + \frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2} - \frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)} \\
&= -\frac{bnx}{8e^2(d+ex^2)} + \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{5/2}} + \frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2} - \frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)} \\
&= -\frac{bnx}{8e^2(d+ex^2)} + \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2\sqrt{d}\,e^{5/2}} + \frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2} - \frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)}
\end{aligned}
$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 495 vs. 2(211) = 422.
time = 0.86, size = 495, normalized size = 2.35

$$
\frac{-\frac{\sqrt{-d}\,(a+b\log(cx^n))}{\left(\sqrt{-d}-\sqrt{e}\,x\right)^2} + \frac{5(a+b\log(cx^n))}{\sqrt{-d}-\sqrt{e}\,x} + \frac{\sqrt{-d}\,(a+b\log(cx^n))}{\left(\sqrt{-d}+\sqrt{e}\,x\right)^2} - \frac{5(a+b\log(cx^n))}{\sqrt{-d}+\sqrt{e}\,x} - \frac{5bn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{\sqrt{-d}} + \frac{5bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{\sqrt{-d}} - \frac{bn\left(d+\left(d-\sqrt{-d}\,\sqrt{e}\,x\right)\log(x)+\left(-d+\sqrt{-d}\,\sqrt{e}\,x\right)\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{d\left(\sqrt{-d}+\sqrt{e}\,x\right)} - \frac{3(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{\sqrt{-d}} + \frac{bn\left(d+\left(d+\sqrt{-d}\,\sqrt{e}\,x\right)\log(x)-\left(d+\sqrt{-d}\,\sqrt{e}\,x\right)\log\left((-d)^{3/2}+d\sqrt{e}\,x\right)\right)}{d\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{3(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{\sqrt{-d}} + \frac{3bn\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{\sqrt{-d}} - \frac{3bn\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{\sqrt{-d}}}{16e^{5/2}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] (-((Sqrt[-d]*(a + b*Log[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x)^2) + (5*(a + b*Log[
c*x^n]))/(Sqrt[-d] - Sqrt[e]*x) + (Sqrt[-d]*(a + b*Log[c*x^n]))/(Sqrt[-d] +
```

```
Sqrt[e]*x)^2 - (5*(a + b*Log[c*x^n]))/(Sqrt[-d] + Sqrt[e]*x) - (5*b*n*(Log
[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/Sqrt[-d] + (5*b*n*(Log[x] - Log[Sqrt[-d]
+ Sqrt[e]*x]))/Sqrt[-d] - (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] + (-d +
 Sqrt[-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d*(Sqrt[-d] + Sqrt[e]*x))
 - (3*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/Sqrt[-d] + (b*n*(d
+ (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*Log[(-d)^(3/2)
 + d*Sqrt[e]*x]))/(d*(Sqrt[-d] - Sqrt[e]*x)) + (3*(a + b*Log[c*x^n])*Log[1
+ (d*Sqrt[e]*x)/(-d)^(3/2)])/Sqrt[-d] + (3*b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[
-d]])/Sqrt[-d] - (3*b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/Sqrt[-d])/(16
*e^(5/2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 1311, normalized size = 6.21

method	result	size
risch	Expression too large to display	1311

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 5/16*I*b*Pi*csgn(I*c*x^n)^3/(e*x^2+d)^2/e*x^3-3/16*I*b*Pi*csgn(I*c*x^n)^3/e
^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-3/8*b*n*d/e*ln(x)/(e*x^2+d)^2/(-e*d)
^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-b*n/e^2*ln(x)*x/(e*x^2+d)-5/
8*a/(e*x^2+d)^2/e*x^3+3/8*a/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-3/8*a/(
e*x^2+d)^2*d/e^2*x-3/16*b*n*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(
1/2))/(-e*d)^(1/2))*x^4+b*n*d/e^2*ln(x)/(e*x^2+d)^2*x+3/8*b*n*d/e*ln(x)/(e*
x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2+3/16*I*b*Pi*
csgn(I*c*x^n)^3/(e*x^2+d)^2*d/e^2*x-5/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/(
e*x^2+d)^2/e*x^3+3/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e^2/(e*d)^(1/2)*ar
ctan(x*e/(e*d)^(1/2))-5/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/(e*x^2+d)^2/e
*x^3+3/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)
^(1/2))+3/16*b*n*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*
d)^(1/2))*x^4-3/8*b/(e*x^2+d)^2*d/e^2*x*ln(x^n)-3/8*b*ln(c)/(e*x^2+d)^2*d/e
^2*x+1/2*b*n/e^2/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/
2*b*n/e^2/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/8*b/e^2/
(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)+b*n/e*ln(x)/(e*x^2+d)^2*x^3-1/2
*b*n/e*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^
2+1/2*b*n/e*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2)
)*x^2-1/2*b*n*d/e^2*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))+1/2*b*n*d/e^2*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))
/(-e*d)^(1/2))+3/16*b*n*d^2/e^2*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e
*d)^(1/2))/(-e*d)^(1/2))-3/16*b*n*d^2/e^2*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln
((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+3/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)/(e*x^2+d)^2*d/e^2*x+1/2*b*n/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+
3/16*b*n/e^2/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/16*b*n/
```

```
e^2/(-e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+5/16*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)/(e*x^2+d)^2/e*x^3-5/8*b/(e*x^2+d)^2/e*x^3*ln(x
^n)+3/8*b*ln(c)/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-5/8*b*ln(c)/(e*x^2+
d)^2/e*x^3+3/8*b/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)-3/16*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2/(e*x^2+d)^2*d/e^2*x-1/8*b*n*x/e^2/(e*x^2+d)-3/1
6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/(e*x^2+d)^2*d/e^2*x-3/16*I*b*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)/e^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*x^4*log(c*x^n) + a*x^4)/(x^6*e^3 + 3*d*x^4*e^2 + 3*d^2*x^2*e +
d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^4(a+b\log{(cx^n)})}{(d+ex^2)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

```
[Out] Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^4/(x^2*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^4\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

```
[Out] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

3.237 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

Optimal. Leaf size=187

$$\frac{bnx}{8de\left(d+ex^2\right)}-\frac{x(a+b\log\left(cx^n\right))}{4e\left(d+ex^2\right)^2}+\frac{x(a+b\log\left(cx^n\right))}{8de\left(d+ex^2\right)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{8d^{3/2}e^{3/2}}-\frac{ibn\text{Li}_2\left(-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}}+$$

```
[Out] 1/8*b*n*x/d/e/(e*x^2+d)-1/4*x*(a+b*ln(c*x^n))/e/(e*x^2+d)^2+1/8*x*(a+b*ln(c
*x^n))/d/e/(e*x^2+d)+1/8*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)/
e^(3/2)-1/16*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(3/2)+1/16*I*b
*n*polylog(2,I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(3/2)
```

Rubi [A]
time = 0.26, antiderivative size = 187, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$,
Rules used = {294, 205, 211, 2393, 2360, 2361, 12, 4940, 2438}

$$-\frac{ibn\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}}+\frac{ibn\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}}+\frac{\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{8d^{3/2}e^{3/2}}+\frac{x(a+b\log\left(cx^n\right))}{8de\left(d+ex^2\right)}-\frac{x(a+b\log\left(cx^n\right))}{4e\left(d+ex^2\right)^2}+\frac{bnx}{8de\left(d+ex^2\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] (b*n*x)/(8*d*e*(d + e*x^2)) - (x*(a + b*Log[c*x^n]))/(4*e*(d + e*x^2)^2) +
(x*(a + b*Log[c*x^n]))/(8*d*e*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(
a + b*Log[c*x^n]))/(8*d^(3/2)*e^(3/2)) - ((I/16)*b*n*PolyLog[2, ((-I)*Sqrt[
e]*x)/Sqrt[d]])/(d^(3/2)*e^(3/2)) + ((I/16)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sq
rt[d]])/(d^(3/2)*e^(3/2))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^n)^(p +
 1)/(a*n*(p + 1))), x] + Dist[(n*(p + 1) + 1)/(a*n*(p + 1)), Int[(a + b*x^n
)^(p + 1), x], x] /; FreeQ[{a, b}, x] && IGtQ[n, 0] && LtQ[p, -1] && (Integ
erQ[2*p] || (n == 2 && IntegerQ[4*p]) || (n == 2 && IntegerQ[3*p]) || Denom
inator[p + 1/n] < Denominator[p])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \left(-\frac{d(a+b\log(cx^n))}{e\,(d+ex^2)^3}+\frac{a+b\log(cx^n)}{e\,(d+ex^2)^2}\right)dx$$

$$=\frac{\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx}{e}$$

$$=-\frac{x(a+b\log(cx^n))}{4e\,(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{2de\,(d+ex^2)}-\frac{3\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx}{4e}+\frac{\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{2de}+$$

$$=\frac{bnx}{8de\,(d+ex^2)}-\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{3/2}e^{3/2}}-\frac{x(a+b\log(cx^n))}{4e\,(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{8de\,(d+ex^2)}+$$

$$=\frac{bnx}{8de\,(d+ex^2)}-\frac{x(a+b\log(cx^n))}{4e\,(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{8de\,(d+ex^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b}{8d^{3/2}e^{3/2}}$$

$$=\frac{bnx}{8de\,(d+ex^2)}-\frac{x(a+b\log(cx^n))}{4e\,(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{8de\,(d+ex^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b}{8d^{3/2}e^{3/2}}$$

$$=\frac{bnx}{8de\,(d+ex^2)}-\frac{x(a+b\log(cx^n))}{4e\,(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{8de\,(d+ex^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b}{8d^{3/2}e^{3/2}}$$

$$=\frac{bnx}{8de\,(d+ex^2)}-\frac{x(a+b\log(cx^n))}{4e\,(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{8de\,(d+ex^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b}{8d^{3/2}e^{3/2}}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 497 vs. $2(187) = 374$.

time = 0.65, size = 497, normalized size = 2.66

$$\frac{\frac{d(a+b\log(cx^n))}{(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)^2}+\frac{a+b\log(cx^n)}{\sqrt{-d}\left(\sqrt{-d}+\sqrt{e}\,x\right)^2}-\frac{a+b\log(cx^n)}{\sqrt{-d}\,d-d\sqrt{e}\,x}+\frac{a+b\log(cx^n)}{\sqrt{-d}\,d+d\sqrt{e}\,x}+\frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{5/2}}+\frac{bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{3/2}}+\frac{bn\left(d+\left(d-\sqrt{-d}\sqrt{e}\,x\right)\log(x)+\left(-d+\sqrt{-d}\sqrt{e}\,x\right)\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{d^2\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}}-\frac{bn\left(d+\left(d+\sqrt{-d}\sqrt{e}\,x\right)\log(x)-\left(d+\sqrt{-d}\sqrt{e}\,x\right)\log\left((-d)^{3/2}+d\sqrt{e}\,x\right)\right)}{d^2\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{d(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}+\frac{bdn\,\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{5/2}}+\frac{bn\,\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}}}{16e^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

```
[Out] ((d*(a + b*Log[c*x^n]))/((-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)^2) + (a + b*Log[
c*x^n])/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)^2) - (a + b*Log[c*x^n])/(Sqrt[-d]*
d - d*Sqrt[e]*x) + (a + b*Log[c*x^n])/(Sqrt[-d]*d + d*Sqrt[e]*x) + (b*d*n*(
Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(5/2) + (b*n*(Log[x] - Log[Sqrt[-
```

```
d] + Sqrt[e]*x]))/(-d)^(3/2) + (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] +
(-d + Sqrt[-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d^2*(Sqrt[-d] + Sqrt
[e]*x)) + ((a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (
b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*Log[(-d
)^(3/2) + d*Sqrt[e]*x]))/(d^2*(Sqrt[-d] - Sqrt[e]*x)) + (d*(a + b*Log[c*x^n
])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2) + (b*d*n*PolyLog[2, (Sqrt[
e]*x)/Sqrt[-d]])/(-d)^(5/2) + (b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-
d)^(3/2))/(16*e^(3/2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.16, size = 1247, normalized size = 6.67

method	result	size
risch	Expression too large to display	1247

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/(e*x^2+d)^2/d*x^3-1/16*I*b*Pi*csgn(
I*c*x^n)^3/(e*x^2+d)^2/d*x^3+1/8*a/e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+
1/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1
/2))+1/8*b/e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)-1/8*b*ln(c)/(e*x
^2+d)^2/e*x+1/8*b*ln(c)/(e*x^2+d)^2/d*x^3-1/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2/(e*x^2+d)^2/e*x+1/8*a/(e*x^2+d)^2/d*x^3-1/8*a/(e*x^2+d)^2/e*x+1/16*b
*n/d/e/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/16*b*n/d/e/(-
e*d)^(1/2)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/2*b*n/d*ln(x)/(e*x^2+d)
^2*x^3-1/2*b*n/e*ln(x)/(e*x^2+d)^2*x+1/8*b/(e*x^2+d)^2/d*x^3*ln(x^n)-1/16*I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/(e*x^2+d)^2/e*x+1/16*I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2/(e*x^2+d)^2/d*x^3-1/16*I*b*Pi*csgn(I*c*x^n)^3/e/d/(e*d)^(1/2)*ar
ctan(x*e/(e*d)^(1/2))-3/16*b*n/d*e*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+
(-e*d)^(1/2))/(-e*d)^(1/2))*x^4+3/16*b*n/d*e*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)
*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4+1/8*b*ln(c)/e/d/(e*d)^(1/2)*arctan
(x*e/(e*d)^(1/2))+1/16*I*b*Pi*csgn(I*c*x^n)^3/(e*x^2+d)^2/e*x+1/4*b*n/e*ln(
x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n/e*ln
(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/2*b*n/e*ln
(x)*x/d/(e*x^2+d)-1/8*b/e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)-3/8
*b*n*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^
2+3/8*b*n*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2)
)*x^2-3/16*b*n*d/e*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-
e*d)^(1/2))+3/16*b*n*d/e*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2
))/(-e*d)^(1/2))+1/4*b*n*ln(x)/d/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/
2))/(-e*d)^(1/2))*x^2-1/4*b*n*ln(x)/d/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)
^(1/2))/(-e*d)^(1/2))*x^2+1/8*b*n*x/d/e/(e*x^2+d)-1/8*b/(e*x^2+d)^2/e*x*ln(
x^n)-1/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e/d/(e*d)^(1/2)*arctan
(x*e/(e*d)^(1/2))-1/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/(e*x^2+d)
```

```
^2/d*x^3+1/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/(e*x^2+d)^2/e*x+1/
16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e/d/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x^6*e^3 + 3*d*x^4*e^2 + 3*d^2*x^2*e +
d^3), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log{(cx^n)})}{(d + ex^2)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^2*e + d)^3, x)
```

<u>Mupad</u> [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

3.238 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$

Optimal. Leaf size=210

$$-\frac{bnx}{8d^2(d+ex^2)}-\frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}+\frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)}+\frac{3\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx$$

```
[Out] -1/8*b*n*x/d^2/(e*x^2+d)+1/4*x*(a+b*ln(c*x^n))/d/(e*x^2+d)^2+3/8*x*(a+b*ln(
c*x^n))/d^2/(e*x^2+d)-1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/d^(5/2)/e^(1/2)+3/8
*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)/e^(1/2)-3/16*I*b*n*polyl
og(2,-I*x*e^(1/2)/d^(1/2))/d^(5/2)/e^(1/2)+3/16*I*b*n*polylog(2,I*x*e^(1/2)
/d^(1/2))/d^(5/2)/e^(1/2)
```

Rubi [A]
time = 0.10, antiderivative size = 210, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.350$, Rules used = {2360, 211, 2361, 12, 4940, 2438, 205}

$$-\frac{3ibn\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{5/2}\sqrt{e}}+\frac{3ibn\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{5/2}\sqrt{e}}+\frac{3\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8d^{5/2}\sqrt{e}}+\frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}}-\frac{bnx}{8d^2(d+ex^2)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^2)^3,x]
```

```
[Out] -1/8*(b*n*x)/(d^2*(d + e*x^2)) - (b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*d^(5/
2)*Sqrt[e]) + (x*(a + b*Log[c*x^n]))/(4*d*(d + e*x^2)^2) + (3*x*(a + b*Log[
c*x^n]))/(8*d^2*(d + e*x^2)) + (3*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*
x^n]))/(8*d^(5/2)*Sqrt[e]) - (((3*I)/16)*b*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sq
rt[d]])/(d^(5/2)*Sqrt[e]) + (((3*I)/16)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d
]])/(d^(5/2)*Sqrt[e])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^n)^(p +
 1)/(a*n*(p + 1))), x] + Dist[(n*(p + 1) + 1)/(a*n*(p + 1)), Int[(a + b*x^n
)^(p + 1), x], x] /; FreeQ[{a, b}, x] && IGtQ[n, 0] && LtQ[p, -1] && (Integ
erQ[2*p] || (n == 2 && IntegerQ[4*p]) || (n == 2 && IntegerQ[3*p]) || Denom
inator[p + 1/n] < Denominator[p])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx = \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx}{4d} - \frac{(bn)\int \frac{1}{(d+ex^2)^2}\,dx}{4d}$$

$$= -\frac{bnx}{8d^2(d+ex^2)} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx}{8d^2} - (bn$$

$$= -\frac{bnx}{8d^2(d+ex^2)} - \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\,\mathrm{t}}{}$$

$$= -\frac{bnx}{8d^2(d+ex^2)} - \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\,\mathrm{t}}{}$$

$$= -\frac{bnx}{8d^2(d+ex^2)} - \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\,\mathrm{t}}{}$$

$$= -\frac{bnx}{8d^2(d+ex^2)} - \frac{bn\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\,\mathrm{t}}{}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 544 vs. $2(210) = 420$.

time = 0.60, size = 544, normalized size = 2.59

$$\frac{1}{16}\left(\frac{d(a+b\log(cx^n))}{(-d)^{5/2}\sqrt{e}\left(\sqrt{-d}-\sqrt{e}\,x\right)^2} + \frac{a+b\log(cx^n)}{(-d)^{3/2}\sqrt{e}\left(\sqrt{-d}+\sqrt{e}\,x\right)^2} + \frac{3(a+b\log(cx^n))}{(-d)^{5/2}\sqrt{e}+d^2ex} + \frac{3(a+b\log(cx^n))}{(-d)^{3/2}d\sqrt{e}+d^2ex} + \frac{3bn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{5/2}\sqrt{e}} - \frac{3bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{5/2}\sqrt{e}} - \frac{bn\left(d+\left(d-\sqrt{-d}\sqrt{e}\,x\right)\log(x)+\left(-d+\sqrt{-d}\sqrt{e}\,x\right)\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{d^3\left(\sqrt{-d}\sqrt{e}+ex\right)} - \frac{3(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}} - \frac{bn\left(d+\left(d+\sqrt{-d}\sqrt{e}\,x\right)\log(x)-\left(d+\sqrt{-d}\sqrt{e}\,x\right)\log\left((-d)^{3/2}+d\sqrt{e}\,x\right)\right)}{(-d)^{7/2}\sqrt{e}+d^3ex} + \frac{3(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}} + \frac{3bn\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}} - \frac{3bn\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^3,x]
```

```
[Out] ((d*(a + b*Log[c*x^n]))/((-d)^(5/2)*Sqrt[e]*(Sqrt[-d] - Sqrt[e]*x)^2) + (a
+ b*Log[c*x^n])/((-d)^(3/2)*Sqrt[e]*(Sqrt[-d] + Sqrt[e]*x)^2) + (3*(a + b*L
og[c*x^n]))/((-d)^(5/2)*Sqrt[e] + d^2*e*x) + (3*(a + b*Log[c*x^n]))/((-d)^(
3/2)*d*Sqrt[e] + d^2*e*x) + (3*b*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/((
-d)^(5/2)*Sqrt[e]) - (3*b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/((-d)^(5/
2)*Sqrt[e]) - (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] + (-d + Sqrt[-d]*Sq
rt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d^3*(Sqrt[-d]*Sqrt[e] + e*x)) - (3*(a
 + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e]) - (b*n
*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*Log[(-d)^(
3/2) + d*Sqrt[e]*x]))/((-d)^(7/2)*Sqrt[e] + d^3*e*x) + (3*(a + b*Log[c*x^n]
)*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(5/2)*Sqrt[e]) + (3*b*n*PolyLog[
```

```
2, (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e]) - (3*b*n*PolyLog[2, (d*Sqrt[
e]*x)/(-d)^(3/2)])/((-d)^(5/2)*Sqrt[e]))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 1047, normalized size = 4.99

method	result	size
risch	Expression too large to display	1047

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*a*x/d/(e*x^2+d)^2+3/8*a/d^2*x/(e*x^2+d)+3/8*a/d^2/(e*d)^(1/2)*arctan(x*
e/(e*d)^(1/2))+3/8*b*n*ln(x)/d/(e*x^2+d)^2*x-3/8*b/d^2*x/(e*x^2+d)*n*ln(x)-
3/8*b/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)+3/16*b*n*ln(x)/(e*x^2
+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/16*b*n*ln(x)/(e*x
^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/16*I*b*Pi*csgn(I
*c*x^n)^3/d^2*x/(e*x^2+d)-1/8*I*b*Pi*csgn(I*c*x^n)^3*x/d/(e*x^2+d)^2+3/8*b/
d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)+3/8*b/d^2*x/(e*x^2+d)*ln(x^
n)-3/8*b*n*ln(x)/d/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1
/2))*x^2*e+1/4*b*x/d/(e*x^2+d)^2*ln(x^n)+3/8*b*n*ln(x)/d^2/(e*x^2+d)^2*x^3*
e-3/16*I*b*Pi*csgn(I*c*x^n)^3/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/2*b
*n/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+3/16*b*n/d^2/(-e*d)^(1/2)*dilog(
(-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/16*b*n/d^2/(-e*d)^(1/2)*dilog((e*x+(-e*
d)^(1/2))/(-e*d)^(1/2))-3/16*b*n*ln(x)/d^2/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x
+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4*e^2+3/8*b*n*ln(x)/d/(e*x^2+d)^2/(-e*d)^(1/
2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2*e+3/16*b*n*ln(x)/d^2/(e*x^2+d)^
2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4*e^2+3/16*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2/d^2*x/(e*x^2+d)+1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2*x/d/(e*x^2+d)^2+3/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/(e*d)^(1/2)*
arctan(x*e/(e*d)^(1/2))+1/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*x/d/(e*x^2+d)^
2+3/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^
(1/2))+1/4*b*ln(c)*x/d/(e*x^2+d)^2+3/8*b*ln(c)/d^2*x/(e*x^2+d)+3/8*b*ln(c)/
d^2/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+3/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)
^2/d^2*x/(e*x^2+d)-1/8*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x/d/(e*x^
2+d)^2-1/8*b*n*x/d^2/(e*x^2+d)-3/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)/d^2*x/(e*x^2+d)-3/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/(e*
d)^(1/2)*arctan(x*e/(e*d)^(1/2))
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^6*e^3 + 3*d*x^4*e^2 + 3*d^2*x^2*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{\left(d + ex^{2}\right)^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^2*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a + b\,\ln\left(c\,x^{n}\right)}{\left(e\,x^{2} + d\right)^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^2)^3,x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^2)^3, x)
```

3.239 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$

Optimal. Leaf size=219

$$-\frac{15bn}{8d^3x}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}+\frac{5a-bn+5b\log\left(cx^n\right)}{8d^2x\left(d+ex^2\right)}-\frac{15a-8bn+15b\log\left(cx^n\right)}{8d^3x}-\frac{\sqrt{e}\,\tan^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(15a-8b}{8d^{7/2}}$$

```
[Out] -15/8*b*n/d^3/x+1/4*(a+b*ln(c*x^n))/d/x/(e*x^2+d)^2+1/8*(5*a-b*n+5*b*ln(c*x
^n))/d^2/x/(e*x^2+d)+1/8*(-15*a+8*b*n-15*b*ln(c*x^n))/d^3/x-1/8*arctan(x*e^
(1/2)/d^(1/2))*(15*a-8*b*n+15*b*ln(c*x^n))*e^(1/2)/d^(7/2)+15/16*I*b*n*poly
log(2,-I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(7/2)-15/16*I*b*n*polylog(2,I*x*e^(1/
2)/d^(1/2))*e^(1/2)/d^(7/2)
```

Rubi [A]

time = 0.23, antiderivative size = 219, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2385, 2380, 2341, 211, 2361, 12, 4940, 2438}

$$\frac{15ib\sqrt{e}\,n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{7/2}}-\frac{15ib\sqrt{e}\,n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{7/2}}-\frac{\sqrt{e}\,\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(15a+15b\log\left(cx^n\right)-8bn\right)}{8d^{7/2}}-\frac{15a+15b\log\left(cx^n\right)-8bn}{8d^3x}+\frac{5a+5b\log\left(cx^n\right)-bn}{8d^2x\left(d+ex^2\right)}+\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}-\frac{15bn}{8d^3x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^3),x]
```

```
[Out] (-15*b*n)/(8*d^3*x) + (a + b*Log[c*x^n])/(4*d*x*(d + e*x^2)^2) + (5*a - b*n
 + 5*b*Log[c*x^n])/(8*d^2*x*(d + e*x^2)) - (15*a - 8*b*n + 15*b*Log[c*x^n])
/(8*d^3*x) - (Sqrt[e]*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(15*a - 8*b*n + 15*b*Log[
c*x^n]))/(8*d^(7/2)) + (((15*I)/16)*b*Sqrt[e]*n*PolyLog[2, ((-I)*Sqrt[e]*x)
/Sqrt[d]])/d^(7/2) - (((15*I)/16)*b*Sqrt[e]*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt
[d]])/d^(7/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} - \frac{\int \frac{-5a+bn-5b\log(cx^n)}{x^2(d+ex^2)^2}\,dx}{4d}$$

$$= \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} + \frac{\int \frac{-5bn-3(-5a+bn)+15b\log(cx^n)}{x^2(d+ex^2)}\,dx}{8d^2}$$

$$= \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} + \frac{\int \left(\frac{-5bn-3(-5a+bn)+15b\log(cx^n)}{dx^2} - \frac{e(-5bn-3(-}{} \right.}{8d^2}$$

$$= \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} + \frac{\int \frac{-5bn-3(-5a+bn)+15b\log(cx^n)}{x^2}\,dx}{8d^3} - \frac{e\int \frac{-5bn}{}}{}$$

$$= -\frac{15bn}{8d^3x} + \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} - \frac{15a-8bn+15b\log(cx^n)}{8d^3x} - $$

$$= -\frac{15bn}{8d^3x} + \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} - \frac{15a-8bn+15b\log(cx^n)}{8d^3x} - $$

$$= -\frac{15bn}{8d^3x} + \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} - \frac{15a-8bn+15b\log(cx^n)}{8d^3x} - $$

$$= -\frac{15bn}{8d^3x} + \frac{a+b\log(cx^n)}{4dx(d+ex^2)^2} + \frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)} - \frac{15a-8bn+15b\log(cx^n)}{8d^3x} - $$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 552 vs. 2(219) = 438.
time = 1.01, size = 552, normalized size = 2.52

$$\frac{1}{16}\left(-\frac{16bn}{d^3x} - \frac{16(a+b\log(cx^n))}{d^3x} + \frac{d\sqrt{e}\,(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)^2} + \frac{7\sqrt{e}\,(a+b\log(cx^n))}{d^3\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{\sqrt{e}\,(a+b\log(cx^n))}{(-d)^{5/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)^2} - \frac{7\sqrt{e}\,(a+b\log(cx^n))}{d^3\left(\sqrt{-d}+\sqrt{e}\,x\right)} + \frac{7b\sqrt{e}\,n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{7/2}} - \frac{7b\sqrt{e}\,n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{7/2}} + \frac{bd\sqrt{e}\,n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}+\sqrt{e}\,x\right)} - \frac{\log(x)}{d} + \frac{\log\left(\sqrt{-d}+\sqrt{e}\,x\right)}{d}\right)}{(-d)^{7/2}} - \frac{15\sqrt{e}\,(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{7/2}} + \frac{b\sqrt{e}\,n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}-\sqrt{e}\,x\right)} - \frac{\log(x)}{d} + \frac{\log\left((-d)^{3/2}+d\sqrt{e}\,x\right)}{d}\right)}{(-d)^{5/2}} + \frac{15\sqrt{e}\,(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{7/2}} + \frac{15b\sqrt{e}\,n\,\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{7/2}} - \frac{15b\sqrt{e}\,n\,\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^3),x]
```

```
[Out] ((-16*b*n)/(d^3*x) - (16*(a + b*Log[c*x^n]))/(d^3*x) + (d*Sqrt[e]*(a + b*Lo
g[c*x^n]))/((-d)^(7/2)*(Sqrt[-d] - Sqrt[e]*x)^2) + (7*Sqrt[e]*(a + b*Log[c*
x^n]))/(d^3*(Sqrt[-d] - Sqrt[e]*x)) + (Sqrt[e]*(a + b*Log[c*x^n]))/((-d)^(5
/2)*(Sqrt[-d] + Sqrt[e]*x)^2) - (7*Sqrt[e]*(a + b*Log[c*x^n]))/(d^3*(Sqrt[-
d] + Sqrt[e]*x)) + (7*b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d
```

```
)^(7/2) - (7*b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(7/2) +
 (b*d*Sqrt[e]*n*(1/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)) - Log[x]/d + Log[Sqrt[
-d] + Sqrt[e]*x]/d))/(-d)^(7/2) - (15*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (S
qrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) + (b*Sqrt[e]*n*(1/(Sqrt[-d]*(Sqrt[-d] - Sqr
t[e]*x)) - Log[x]/d + Log[(-d)^(3/2) + d*Sqrt[e]*x]/d))/(-d)^(5/2) + (15*Sq
rt[e]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2) + (1
5*b*Sqrt[e]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) - (15*b*Sqrt[e]*
n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 1518, normalized size = 6.93

method	result	size
risch	Expression too large to display	1518

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -15/8*b/d^3*e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)+7/16*I*b*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e^2/(e*x^2+d)^2*x^3+b*n/d^3*e/(e*d)^(1/2
)*arctan(x*e/(e*d)^(1/2))-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3/x-1/2*
b*n*e/d^3*ln(x)*x/(e*x^2+d)-1/2*b*n/d^3*e/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d
)^(1/2))/(-e*d)^(1/2))+1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)^2*x^3+15/8*b/d^3*e/(
e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*n*ln(x)+1/2*b*n/d^3*e/(-e*d)^(1/2)*ln(x)
*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-9/8*b*ln(c)/d^2*e/(e*x^2+d)^2*x-15/8*b
*ln(c)/d^3*e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-7/8*b*ln(c)/d^3*e^2/(e*x^2
+d)^2*x^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3/x+15/16*I*b*Pi
*csgn(I*c*x^n)^3/d^3*e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*b*n*e/d^2*ln
(x)/(e*x^2+d)^2*x-7/8*a/d^3*e^2/(e*x^2+d)^2*x^3-9/8*a/d^2*e/(e*x^2+d)^2*x-1
5/8*a/d^3*e/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+1/2*I*b*Pi*csgn(I*c*x^n)^3/
d^3/x-7/8*b/d^3*e^2/(e*x^2+d)^2*x^3*ln(x^n)-a/d^3/x-15/16*b*n*e/d^3/(-e*d)^
(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-9/8*b/d^2*e/(e*x^2+d)^2*x*ln(
x^n)+1/4*b*n*e/d^2*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d
)^(1/2))-b*ln(c)/d^3/x+7/16*I*b*Pi*csgn(I*c*x^n)^3/d^3*e^2/(e*x^2+d)^2*x^3+
9/16*I*b*Pi*csgn(I*c*x^n)^3/d^2*e/(e*x^2+d)^2*x+15/16*b*n*e/d^3/(-e*d)^(1/2
)*dilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/4*b*n*e/d^2*ln(x)/(e*x^2+d)/(-e*
d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/16*b*n*e/d*ln(x)/(e*x^2+d)^
2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+3/16*b*n*e/d*ln(x)/(e*x
^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+1/8*b*n*e/d^3*x/(e
*x^2+d)-b*ln(x^n)/d^3/x-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3/x-7/16*I*b
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*e^2/(e*x^2+d)^2*x^3-9/16*I*b*Pi*csgn(I*
x^n)*csgn(I*c*x^n)^2/d^2*e/(e*x^2+d)^2*x+3/16*b*n*e^3/d^3*ln(x)/(e*x^2+d)^2
/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4-3/8*b*n*e^2/d^2*ln(x)
/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2-1/4*b*n*
e^2/d^3*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x
```

```
^2+1/4*b*n*e^2/d^3*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d
)^(1/2))*x^2+15/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*e/(e*d)^(
1/2)*arctan(x*e/(e*d)^(1/2))-7/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e^2/
(e*x^2+d)^2*x^3-15/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*e/(e*d)^(1/2)*
arctan(x*e/(e*d)^(1/2))-15/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*e/(e*d)^
(1/2)*arctan(x*e/(e*d)^(1/2))+9/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)/d^2*e/(e*x^2+d)^2*x-b*n/d^3/x-9/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*
e/(e*x^2+d)^2*x+3/8*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*
d)^(1/2))/(-e*d)^(1/2))*x^2-3/16*b*n*e^3/d^3*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)
*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="maxima")
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)/(x^8*e^3 + 3*d*x^6*e^2 + 3*d^2*x^4*e + d^3*x^2)
, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{x^{2}\left(d + ex^{2}\right)^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**3,x)
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**3), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^3*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(e\,x^2+d\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^3),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^3), x)
```

3.240 $\int \frac{a+b\log(cx^n)}{x^4\left(d+ex^2\right)^3}\,dx$

Optimal. Leaf size=260

$$-\frac{35bn}{72d^3x^3}+\frac{35ben}{8d^4x}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}+\frac{7a-bn+7b\log\left(cx^n\right)}{8d^2x^3\left(d+ex^2\right)}-\frac{35a-12bn+35b\log\left(cx^n\right)}{24d^3x^3}+\frac{e(35a-12bn+3}{8d^4x}$$

```
[Out] -35/72*b*n/d^3/x^3+35/8*b*e*n/d^4/x+1/4*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)^2+1
/8*(7*a-b*n+7*b*ln(c*x^n))/d^2/x^3/(e*x^2+d)+1/24*(-35*a+12*b*n-35*b*ln(c*x
^n))/d^3/x^3+1/8*e*(35*a-12*b*n+35*b*ln(c*x^n))/d^4/x+1/8*e^(3/2)*arctan(x*
e^(1/2)/d^(1/2))*(35*a-12*b*n+35*b*ln(c*x^n))/d^(9/2)-35/16*I*b*e^(3/2)*n*p
olylog(2,-I*x*e^(1/2)/d^(1/2))/d^(9/2)+35/16*I*b*e^(3/2)*n*polylog(2,I*x*e^
(1/2)/d^(1/2))/d^(9/2)
```

Rubi [A]
time = 0.32, antiderivative size = 260, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2385, 2380, 2341, 211, 2361, 12, 4940, 2438}

$$-\frac{35ibe^{3/2}n\text{PolyLog}\left(2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{9/2}}+\frac{35ibe^{3/2}n\text{PolyLog}\left(2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right)}{16d^{9/2}}+\frac{e^{3/2}\text{ArcTan}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\left(35a+35b\log\left(cx^n\right)-12bn\right)}{8d^{9/2}}+\frac{e(35a+35b\log\left(cx^n\right)-12bn)}{8d^4x}-\frac{35a+35b\log\left(cx^n\right)-12bn}{24d^3x^3}+\frac{7a+7b\log\left(cx^n\right)-bn}{8d^2x^3\left(d+ex^2\right)}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}+\frac{35ben}{8d^4x}-\frac{35bn}{72d^3x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^3),x]
```

```
[Out] (-35*b*n)/(72*d^3*x^3) + (35*b*e*n)/(8*d^4*x) + (a + b*Log[c*x^n])/(4*d*x^3
*(d + e*x^2)^2) + (7*a - b*n + 7*b*Log[c*x^n])/(8*d^2*x^3*(d + e*x^2)) - (3
5*a - 12*b*n + 35*b*Log[c*x^n])/(24*d^3*x^3) + (e*(35*a - 12*b*n + 35*b*Log
[c*x^n]))/(8*d^4*x) + (e^(3/2)*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(35*a - 12*b*n +
 35*b*Log[c*x^n]))/(8*d^(9/2)) - (((35*I)/16)*b*e^(3/2)*n*PolyLog[2, ((-I)*
Sqrt[e]*x)/Sqrt[d]])/d^(9/2) + (((35*I)/16)*b*e^(3/2)*n*PolyLog[2, (I*Sqrt[
e]*x)/Sqrt[d]])/d^(9/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2380

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Dist[1/d, Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
Dist[e/d, Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; FreeQ
[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

Rule 2385

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Dist[1/(2*d*(q + 1)), Int[(f*x)^m*(d
+ e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} - \frac{\int \frac{-7a+bn-7b\log(cx^n)}{x^4(d+ex^2)^2}\,dx}{4d}$$

$$= \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} + \frac{\int \frac{-7bn-5(-7a+bn)+35b\log(cx^n)}{x^4(d+ex^2)}\,dx}{8d^2}$$

$$= \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} + \frac{\int \left(\frac{-7bn-5(-7a+bn)+35b\log(cx^n)}{dx^4} - \frac{e(-7bn-5(\cdots}{\cdots}\right.}{\cdots}$$

$$= \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} + \frac{\int \frac{-7bn-5(-7a+bn)+35b\log(cx^n)}{x^4}\,dx}{8d^3} - \frac{e\int \frac{-7b\cdots}{\cdots}}{\cdots}$$

$$= -\frac{35bn}{72d^3x^3} + \frac{35ben}{8d^4x} + \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} - \frac{35a-12bn+35b\cdots}{24d^3x^3}$$

$$= -\frac{35bn}{72d^3x^3} + \frac{35ben}{8d^4x} + \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} - \frac{35a-12bn+35b\cdots}{24d^3x^3}$$

$$= -\frac{35bn}{72d^3x^3} + \frac{35ben}{8d^4x} + \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} - \frac{35a-12bn+35b\cdots}{24d^3x^3}$$

$$= -\frac{35bn}{72d^3x^3} + \frac{35ben}{8d^4x} + \frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2} + \frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} - \frac{35a-12bn+35b\cdots}{24d^3x^3}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 584 vs. 2(260) = 520.
time = 1.09, size = 584, normalized size = 2.25

$$\frac{1}{144}\left(-\frac{16bn}{d^3x^3} + \frac{432ben}{d^4x} - \frac{48(a+b\log(cx^n))}{d^3x^3} + \frac{432e(a+b\log(cx^n))}{d^4x} - \frac{9e^{3/2}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)^2} - \frac{99e^{3/2}(a+b\log(cx^n))}{d^4\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{9e^{3/2}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)^2} + \frac{99e^{3/2}(a+b\log(cx^n))}{d^4\left(\sqrt{-d}+\sqrt{e}\,x\right)} + \frac{99be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}\,x\right)\right)}{(-d)^{9/2}} - \frac{99be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}\,x\right)\right)}{(-d)^{9/2}} - \frac{9be^{3/2}n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}+\sqrt{e}\,x\right)} - \frac{\log(x)}{d} + \frac{\log\left(\sqrt{-d}+\sqrt{e}\,x\right)}{d}\right)}{(-d)^{7/2}} - \frac{315e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{9/2}} + \frac{9be^{3/2}n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}-\sqrt{e}\,x\right)} - \frac{\log(x)}{d} + \frac{\log\left((-d)^{3/2}+d\sqrt{e}\,x\right)}{d}\right)}{(-d)^{7/2}} + \frac{315e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{9/2}} + \frac{315be^{3/2}n\,\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{9/2}} - \frac{315be^{3/2}n\,\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{9/2}}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^3),x]
```

```
[Out] ((-16*b*n)/(d^3*x^3) + (432*b*e*n)/(d^4*x) - (48*(a + b*Log[c*x^n]))/(d^3*x
^3) + (432*e*(a + b*Log[c*x^n]))/(d^4*x) - (9*e^(3/2)*(a + b*Log[c*x^n]))/(
(-d)^(7/2)*(Sqrt[-d] - Sqrt[e]*x)^2) - (99*e^(3/2)*(a + b*Log[c*x^n]))/(d^4
*(Sqrt[-d] - Sqrt[e]*x)) + (9*e^(3/2)*(a + b*Log[c*x^n]))/((-d)^(7/2)*(Sqrt
[-d] + Sqrt[e]*x)^2) + (99*e^(3/2)*(a + b*Log[c*x^n]))/(d^4*(Sqrt[-d] + Sqr
```

```
t[e]*x)) + (99*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(9/2)
 - (99*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(9/2) - (9*b*
e^(3/2)*n*(1/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)) - Log[x]/d + Log[Sqrt[-d] +
Sqrt[e]*x]/d))/(-d)^(7/2) - (315*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e
]*x)/Sqrt[-d]])/(-d)^(9/2) + (9*b*e^(3/2)*n*(1/(Sqrt[-d]*(Sqrt[-d] - Sqrt[e
]*x)) - Log[x]/d + Log[(-d)^(3/2) + d*Sqrt[e]*x]/d))/(-d)^(7/2) + (315*e^(3
/2)*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(9/2) + (315
*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(9/2) - (315*b*e^(3/2)*
n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(9/2))/144
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 1729, normalized size = 6.65

method	result	size
risch	Expression too large to display	1729

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/9*b*n/d^3/x^3-3/2*I*b*Pi*csgn(I*c*x^n)^3/d^4*e/x-3/16*b*n*e^4/d^4*ln(x)/
(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4-11/16*I*b*
Pi*csgn(I*c*x^n)^3*e^3/d^4/(e*x^2+d)^2*x^3-35/16*b*n*e^2/d^4/(-e*d)^(1/2)*d
ilog((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/2*b*n*e^2/d^4/(e*d)^(1/2)*arctan(x*
e/(e*d)^(1/2))+35/16*b*n*e^2/d^4/(-e*d)^(1/2)*dilog((-e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))-1/8*b*n*e^2/d^4*x/(e*x^2+d)+11/8*a*e^3/d^4/(e*x^2+d)^2*x^3+13/8*
a*e^2/d^3/(e*x^2+d)^2*x+35/8*a*e^2/d^4/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-
13/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3/(e*x^2+d)^2*x-35/1
6*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^4/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+3/2*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^4*e/x-1/3*b*ln(c)/d^3/x^3-13/16*I*b*Pi*csg
n(I*c*x^n)^3*e^2/d^3/(e*x^2+d)^2*x-1/3*a/d^3/x^3+11/8*b*e^3/d^4/(e*x^2+d)^2
*x^3*ln(x^n)+11/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^3/d^4/(e*x^2+d)^2*x^3
+3*a/d^4*e/x+11/8*b*ln(c)*e^3/d^4/(e*x^2+d)^2*x^3+13/8*b*ln(c)*e^2/d^3/(e*x
^2+d)^2*x+35/8*b*ln(c)*e^2/d^4/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))+3*b*ln(c
)/d^4*e/x-b*n*e^3/d^4*ln(x)/(e*x^2+d)^2*x^3-b*n*e^2/d^3*ln(x)/(e*x^2+d)^2*x
+3/2*b*n*e^2/d^4/(-e*d)^(1/2)*ln(x)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-3/
2*b*n*e^2/d^4/(-e*d)^(1/2)*ln(x)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+b*n*e^
2/d^4*ln(x)*x/(e*x^2+d)-35/8*b*e^2/d^4/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*
n*ln(x)-1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3/x^3+1/6*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)/d^3/x^3+1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)/(-e*d)^(1/
2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))+13/8*b*e^2/d^3/(e*x^2+d)^2*x*ln(x^n
)+35/8*b*e^2/d^4/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))*ln(x^n)+3/16*b*n*e^4/d
^4*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^4+
3/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^4*e/x+1/6*I*b*Pi*csgn(I*c*x^n)^3/d
^3/x^3-1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(
-e*d)^(1/2))+3/16*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d
```

```
)^(1/2))/(-e*d)^(1/2))-3/16*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((
e*x+(-e*d)^(1/2))/(-e*d)^(1/2))-1/3*b/d^3/x^3*ln(x^n)-3/8*b*n*e^3/d^3*ln(x)
/(e*x^2+d)^2/(-e*d)^(1/2)*ln((e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^2+1/2*b*n*e
^3/d^4*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e*d)^(1/2))*x^
2+3/8*b*n*e^3/d^3*ln(x)/(e*x^2+d)^2/(-e*d)^(1/2)*ln((-e*x+(-e*d)^(1/2))/(-e
*d)^(1/2))*x^2-1/2*b*n*e^3/d^4*ln(x)/(e*x^2+d)/(-e*d)^(1/2)*ln((e*x+(-e*d)^
(1/2))/(-e*d)^(1/2))*x^2+3*b*e*n/d^4/x+13/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2*e^2/d^3/(e*x^2+d)^2*x+35/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^4
/(e*d)^(1/2)*arctan(x*e/(e*d)^(1/2))-1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
/d^3/x^3-3/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^4*e/x-35/16*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^4/(e*d)^(1/2)*arctan(x*e/(e*d)^
(1/2))-11/16*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^3/d^4/(e*x^2+d)^2
*x^3+3*b*ln(x^n)/d^4*e/x+35/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^4/(e*
d)^(1/2)*arctan(x*e/(e*d)^(1/2))+11/16*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e
^3/d^4/(e*x^2+d)^2*x^3+13/16*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^2/d^3/(e*x^
2+d)^2*x
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^10*e^3 + 3*d*x^8*e^2 + 3*d^2*x^6*e + d^3*x^4
), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**3,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^3*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,{\left(e\,x^2+d\right)}^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^3),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^3), x)
```

3.241 $\int \frac{x\log(cx^2)}{1-cx^2}\,dx$

Optimal. Leaf size=17

$$\frac{\mathrm{Li}_2(1-cx^2)}{2c}$$

```
[Out] 1/2*polylog(2,-c*x^2+1)/c
```

Rubi [A]
time = 0.03, antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2374, 2352}

$$\frac{\text{PolyLog}(2,1-cx^2)}{2c}$$

Antiderivative was successfully verified.

```
[In] Int[(x*Log[c*x^2])/(1 - c*x^2),x]
```

```
[Out] PolyLog[2, 1 - c*x^2]/(2*c)
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2374

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[f^m/n, Subst[Int[(d + e*x)^q*(a +
b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Rubi steps

$$\begin{aligned}\int \frac{x\log\left(cx^2\right)}{1-cx^2}\,dx &= \frac{1}{2}\text{Subst}\left(\int \frac{\log(cx)}{1-cx}\,dx, x, x^2\right)\\ &= \frac{\mathrm{Li}_2(1-cx^2)}{2c}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 17, normalized size = 1.00

$$\frac{\mathrm{Li}_2(1-cx^2)}{2c}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*Log[c*x^2])/(1 - c*x^2),x]
```

```
[Out] PolyLog[2, 1 - c*x^2]/(2*c)
```

Maple [A]
time = 0.11, size = 12, normalized size = 0.71

method	result	size
derivativedivides	$\frac{\operatorname{dilog}(c x^2)}{2c}$	12
default	$\frac{\operatorname{dilog}(c x^2)}{2c}$	12
risch	$\frac{\operatorname{dilog}(c x^2)}{2c}$	12

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(c*x^2)/(-c*x^2+1),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2/c*dilog(c*x^2)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 76 vs. $2(14) = 28$.
time = 0.26, size = 76, normalized size = 4.47

$$-\frac{\log(cx^2-1)\log(cx^2)}{2c}+\frac{\log(cx^2-1)\log(x)}{c}+\frac{\log(cx^2-1)\log(cx^2)-2\log(cx^2-1)\log(x)+\operatorname{Li}_2(-cx^2+1)}{2c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="maxima")
```

```
[Out] -1/2*log(c*x^2 - 1)*log(c*x^2)/c + log(c*x^2 - 1)*log(x)/c + 1/2*(log(c*x^2
 - 1)*log(c*x^2) - 2*log(c*x^2 - 1)*log(x) + dilog(-c*x^2 + 1))/c
```

Fricas [A]
time = 0.34, size = 14, normalized size = 0.82

$$\frac{\operatorname{Li}_2(-cx^2+1)}{2c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="fricas")
```

```
[Out] 1/2*dilog(-c*x^2 + 1)/c
```

Sympy [C] Result contains complex when optimal does not.
time = 4.64, size = 94, normalized size = 5.53

$$\frac{\begin{cases} -\frac{\operatorname{Li}_2(cx^2)}{2} & \text{for } \frac{1}{|x|} < 1 \wedge |x| < 1 \\ i\pi \log(x) - \frac{\operatorname{Li}_2(cx^2)}{2} & \text{for } |x| < 1 \\ -i\pi \log\left(\frac{1}{x}\right) - \frac{\operatorname{Li}_2(cx^2)}{2} & \text{for } \frac{1}{|x|} < 1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix} \middle| x\right) + i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix} \middle| x\right) - \frac{\operatorname{Li}_2(cx^2)}{2} & \text{otherwise} \end{cases}}{c} - \frac{\log(cx^2)\log(cx^2-1)}{2c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(c*x**2)/(-c*x**2+1),x)
```

```
[Out] Piecewise((-polylog(2, c*x**2)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*log
(x) - polylog(2, c*x**2)/2, Abs(x) < 1), (-I*pi*log(1/x) - polylog(2, c*x**
2)/2, 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*pi*m
eijerg(((1, 1), ()), ((), (0, 0)), x) - polylog(2, c*x**2)/2, True))/c - lo
g(c*x**2)*log(c*x**2 - 1)/(2*c)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="giac")
```

```
[Out] integrate(-x*log(c*x^2)/(c*x^2 - 1), x)
```

Mupad [B]
time = 3.38, size = 11, normalized size = 0.65

$$\frac{\operatorname{Li}_2(c\,x^2)}{2\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(x*log(c*x^2))/(c*x^2 - 1),x)
```

```
[Out] dilog(c*x^2)/(2*c)
```

3.242 $\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx$

Optimal. Leaf size=16

$$\frac{1}{2}\mathrm{Li}_2\left(1-\frac{x^2}{c}\right)$$

```
[Out] 1/2*polylog(2,1-x^2/c)
```

Rubi [A]
time = 0.03, antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {2374, 2352}

$$\frac{1}{2}\mathrm{PolyLog}\left(2,1-\frac{x^2}{c}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(x*Log[x^2/c])/(c - x^2),x]
```

```
[Out] PolyLog[2, 1 - x^2/c]/2
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2374

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[f^m/n, Subst[Int[(d + e*x)^q*(a +
b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Rubi steps

$$\begin{aligned}\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx &= \frac{1}{2}\mathrm{Subst}\left(\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx,x,x^2\right)\\ &= \frac{1}{2}\mathrm{Li}_2\left(1-\frac{x^2}{c}\right)\end{aligned}$$

Mathematica [**A**]
time = 0.00, size = 17, normalized size = 1.06

$$\frac{1}{2}\text{Li}_2\left(\frac{c-x^2}{c}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*Log[x^2/c])/(c - x^2),x]
```

```
[Out] PolyLog[2, (c - x^2)/c]/2
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.10, size = 53, normalized size = 3.31

method	result	size
default	$\frac{\left(\sum_{\_\alpha=\text{RootOf}\left(\_Z^2-c\right)}\left(-\ln(x-\_\alpha)\ln\left(\frac{x^2}{c}\right)+2\,\text{dilog}\left(\frac{x}{\_\alpha}\right)+2\ln(x-\_\alpha)\ln\left(\frac{x}{\_\alpha}\right)\right)\right)}{2}$	53
risch	$\frac{\left(\sum_{\_\alpha=\text{RootOf}\left(\_Z^2-c\right)}\left(-\ln(x-\_\alpha)\ln\left(\frac{x^2}{c}\right)+2\,\text{dilog}\left(\frac{x}{\_\alpha}\right)+2\ln(x-\_\alpha)\ln\left(\frac{x}{\_\alpha}\right)\right)\right)}{2}$	53

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(x^2/c)/(-x^2+c),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*sum(-ln(x-_alpha)*ln(x^2/c)+2*dilog(x/_alpha)+2*ln(x-_alpha)*ln(x/_alph
a),_alpha=RootOf(_Z^2-c))
```

Maxima [**B**] Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(13) = 26$.
time = 0.29, size = 58, normalized size = 3.62

$$-\frac{1}{2}\log\left(x^2-c\right)\log\left(\frac{x^2}{c}\right)+\frac{1}{2}\log\left(x^2-c\right)\log\left(\frac{x^2-c}{c}+1\right)+\frac{1}{2}\text{Li}_2\left(-\frac{x^2-c}{c}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="maxima")
```

```
[Out] -1/2*log(x^2 - c)*log(x^2/c) + 1/2*log(x^2 - c)*log((x^2 - c)/c + 1) + 1/2*
dilog(-(x^2 - c)/c)
```

Fricas [**A**]
time = 0.37, size = 13, normalized size = 0.81

$$\frac{1}{2}\text{Li}_2\left(-\frac{x^2}{c}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="fricas")
[Out] 1/2*dilog(-x^2/c + 1)
```

Sympy [A]
time = 3.21, size = 117, normalized size = 7.31

$$\begin{cases} -\frac{\operatorname{Li}_{2}\left(\frac{x^{2}}{c}\right)}{2} & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1 \\ \log{\left(c \right)} \log{\left(x \right)} + i \pi \log{\left(x \right)} - \frac{\operatorname{Li}_{2}\left(\frac{x^{2}}{c}\right)}{2} & \text{for}\: \left|x\right| < 1 \\ - \log{\left(c \right)} \log{\left(\frac{1}{x} \right)} - i \pi \log{\left(\frac{1}{x} \right)} - \frac{\operatorname{Li}_{2}\left(\frac{x^{2}}{c}\right)}{2} & \text{for}\: \frac{1}{\left|x\right|} < 1 \\ - {G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right)} \log{\left(c \right)} - i \pi {G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right)} + {G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)} \log{\left(c \right)} + i \pi {G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)} - \frac{\operatorname{Li}_{2}\left(\frac{x^{2}}{c}\right)}{2} & \text{otherwise} \end{cases} - \frac{\log{\left(\frac{x^{2}}{c} \right)} \log{\left(- c + x^{2} \right)}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(x**2/c)/(-x**2+c),x)
[Out] Piecewise((-polylog(2, x**2/c)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(c)*l
og(x) + I*pi*log(x) - polylog(2, x**2/c)/2, Abs(x) < 1), (-log(c)*log(1/x)
- I*pi*log(1/x) - polylog(2, x**2/c)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1
)), ((0, 0), ()), x)*log(c) - I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) +
 meijerg(((1, 1), ()), ((), (0, 0)), x)*log(c) + I*pi*meijerg(((1, 1), ()),
 ((), (0, 0)), x) - polylog(2, x**2/c)/2, True)) - log(x**2/c)*log(-c + x**
2)/2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="giac")
[Out] integrate(-x*log(x^2/c)/(x^2 - c), x)
```

Mupad [B]
time = 3.34, size = 10, normalized size = 0.62

$$\frac{\mathrm{Li}_2\left(\frac{x^2}{c}\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*log(x^2/c))/(c - x^2),x)
[Out] dilog(x^2/c)/2
```

3.243 $\int \frac{\log(x)}{1-x^2} \, dx$

Optimal. Leaf size=22

$$\tanh^{-1}(x)\log(x) + \frac{\text{Li}_2(-x)}{2} - \frac{\text{Li}_2(x)}{2}$$

```
[Out] arctanh(x)*ln(x)+1/2*polylog(2,-x)-1/2*polylog(2,x)
```

Rubi [A]
time = 0.02, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {212, 2361, 6031}

$$\frac{1}{2}\text{PolyLog}(2,-x) - \frac{1}{2}\text{PolyLog}(2,x) + \log(x)\tanh^{-1}(x)$$

Antiderivative was successfully verified.

```
[In] Int[Log[x]/(1 - x^2),x]
```

```
[Out] ArcTanh[x]*Log[x] + PolyLog[2, -x]/2 - PolyLog[2, x]/2
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 6031

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\begin{aligned} \int \frac{\log(x)}{1-x^2} \, dx &= \tanh^{-1}(x)\log(x) - \int \frac{\tanh^{-1}(x)}{x} \, dx \\ &= \tanh^{-1}(x)\log(x) + \frac{\text{Li}_2(-x)}{2} - \frac{\text{Li}_2(x)}{2} \end{aligned}$$

Mathematica [A]
time = 0.01, size = 31, normalized size = 1.41

$$\frac{1}{2}\log(x)\log(1+x)+\frac{\text{Li}_2(1-x)}{2}+\frac{\text{Li}_2(-x)}{2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[x]/(1 - x^2),x]
```

```
[Out] (Log[x]*Log[1 + x])/2 + PolyLog[2, 1 - x]/2 + PolyLog[2, -x]/2
```

Maple [A]
time = 0.10, size = 20, normalized size = 0.91

method	result	size
default	$\frac{\text{dilog}(x+1)}{2}+\frac{\ln(x)\ln(x+1)}{2}+\frac{\text{dilog}(x)}{2}$	20
risch	$\frac{\text{dilog}(x+1)}{2}+\frac{\ln(x)\ln(x+1)}{2}+\frac{\text{dilog}(x)}{2}$	20
meijerg	$\left(\frac{\ln(x)\Phi(x^2,1,\frac{1}{2})}{2}-\frac{\Phi(x^2,2,\frac{1}{2})}{4}\right)x$	22

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(x)/(-x^2+1),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*dilog(x+1)+1/2*ln(x)*ln(x+1)+1/2*dilog(x)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 48 vs. $2(16) = 32$.
time = 0.27, size = 48, normalized size = 2.18

$$-\frac{1}{2}\log(-x)\log(x+1)+\frac{1}{2}(\log(x+1)-\log(x-1))\log(x)+\frac{1}{2}\log(x-1)\log(x)-\frac{1}{2}\text{Li}_2(x+1)+\frac{1}{2}\text{Li}_2(-x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x)/(-x^2+1),x, algorithm="maxima")
```

```
[Out] -1/2*log(-x)*log(x + 1) + 1/2*(log(x + 1) - log(x - 1))*log(x) + 1/2*log(x
- 1)*log(x) - 1/2*dilog(x + 1) + 1/2*dilog(-x + 1)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x)/(-x^2+1),x, algorithm="fricas")
```

```
[Out] integral(-log(x)/(x^2 - 1), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\int \frac{\log(x)}{x^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(x)/(-x**2+1),x)
[Out] -Integral(log(x)/(x**2 - 1), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x)/(-x^2+1),x, algorithm="giac")
[Out] integrate(-log(x)/(x^2 - 1), x)
```

Mupad [B]
time = 0.04, size = 18, normalized size = 0.82

$$\mathrm{atanh}(x)\,\ln(x)+\frac{\mathrm{polylog}(2,-x)}{2}-\frac{\mathrm{polylog}(2,x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-log(x)/(x^2 - 1),x)
[Out] atanh(x)*log(x) + polylog(2, -x)/2 - polylog(2, x)/2
```

3.244 $\int \frac{\log(x)}{1+x^2}\,dx$

Optimal. Leaf size=32

$$\tan^{-1}(x)\log(x)-\frac{1}{2}i\text{Li}_2(-ix)+\frac{1}{2}i\text{Li}_2(ix)$$

```
[Out] arctan(x)*ln(x)-1/2*I*polylog(2,-I*x)+1/2*I*polylog(2,I*x)
```

Rubi [A]
time = 0.02, antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.400, Rules used = {209, 2361, 4940, 2438}

$$-\frac{1}{2}i\text{PolyLog}(2,-ix)+\frac{1}{2}i\text{PolyLog}(2,ix)+\text{ArcTan}(x)\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[Log[x]/(1 + x^2),x]
```

```
[Out] ArcTan[x]*Log[x] - (I/2)*PolyLog[2, (-I)*x] + (I/2)*PolyLog[2, I*x]
```

Rule 209

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[b, 2]))*A
rcTan[Rt[b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (GtQ[a
, 0] || GtQ[b, 0])
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 4940

```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Dist[I*(b/2), Int[Log[1 - I*c*x]/x, x], x] - Dist[I*(b/2), Int[Log[1 +
I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{\log(x)}{1+x^2}\,dx = \tan^{-1}(x)\log(x) - \int \frac{\tan^{-1}(x)}{x}\,dx$$
$$= \tan^{-1}(x)\log(x) - \frac{1}{2}i\int \frac{\log(1-ix)}{x}\,dx + \frac{1}{2}i\int \frac{\log(1+ix)}{x}\,dx$$
$$= \tan^{-1}(x)\log(x) - \frac{1}{2}i\mathrm{Li}_2(-ix) + \frac{1}{2}i\mathrm{Li}_2(ix)$$

Mathematica [**B**] Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 65 vs. $2(32) = 64$.
time = 0.01, size = 65, normalized size = 2.03

$$-\frac{1}{2}i\log(-i(i-x))\log(x) + \frac{1}{2}i\log(x)\log(-i(i+x)) - \frac{1}{2}i\mathrm{Li}_2(-ix) + \frac{1}{2}i\mathrm{Li}_2(ix)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[x]/(1 + x^2),x]
```

```
[Out] (-1/2*I)*Log[(-I)*(I - x)]*Log[x] + (I/2)*Log[x]*Log[(-I)*(I + x)] - (I/2)*
PolyLog[2, (-I)*x] + (I/2)*PolyLog[2, I*x]
```

Maple [**A**]
time = 0.09, size = 46, normalized size = 1.44

method	result	size
meijerg	$\left(\frac{\ln(x)\Phi\left(-x^2,1,\frac{1}{2}\right)}{2} - \frac{\Phi\left(-x^2,2,\frac{1}{2}\right)}{4}\right)x$	26
default	$-\frac{i\ln(x)\ln(ix+1)}{2} + \frac{i\ln(x)\ln(-ix+1)}{2} - \frac{i\,\mathrm{dilog}(ix+1)}{2} + \frac{i\,\mathrm{dilog}(-ix+1)}{2}$	46
risch	$-\frac{i\ln(x)\ln(ix+1)}{2} + \frac{i\ln(x)\ln(-ix+1)}{2} - \frac{i\,\mathrm{dilog}(ix+1)}{2} + \frac{i\,\mathrm{dilog}(-ix+1)}{2}$	46

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(x)/(x^2+1),x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*I*ln(x)*ln(1+I*x)+1/2*I*ln(x)*ln(1-I*x)-1/2*I*dilog(1+I*x)+1/2*I*dilog
(1-I*x)
```

Maxima [**A**]
time = 0.52, size = 26, normalized size = 0.81

$$\frac{1}{4}\pi\log\left(x^2+1\right) + \frac{1}{2}i\,\mathrm{Li}_2(i\,x+1) - \frac{1}{2}i\,\mathrm{Li}_2(-i\,x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x)/(x^2+1),x, algorithm="maxima")
```

```
[Out] 1/4*pi*log(x^2 + 1) + 1/2*I*dilog(I*x + 1) - 1/2*I*dilog(-I*x + 1)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x)/(x^2+1),x, algorithm="fricas")
```

```
[Out] integral(log(x)/(x^2 + 1), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\log(x)}{x^2+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(x)/(x**2+1),x)
```

```
[Out] Integral(log(x)/(x**2 + 1), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(x)/(x^2+1),x, algorithm="giac")
```

```
[Out] integrate(log(x)/(x^2 + 1), x)
```

Mupad [B]
time = 3.33, size = 24, normalized size = 0.75

$$\mathrm{atan}(x)\,\ln(x) - \frac{\mathrm{polylog}(2,-x\,1\mathrm{i})\,1\mathrm{i}}{2} + \frac{\mathrm{polylog}(2,x\,1\mathrm{i})\,1\mathrm{i}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(x)/(x^2 + 1),x)
```

```
[Out] atan(x)*log(x) - (polylog(2, -x*1i)*1i)/2 + (polylog(2, x*1i)*1i)/2
```

3.245 $\int \frac{a+b\log(cx)}{1-ex^2}\,dx$

Optimal. Leaf size=62

$$\frac{\tanh^{-1}\left(\sqrt{e}\,x\right)\left(a+b\log(cx)\right)}{\sqrt{e}}+\frac{b\text{Li}_2\left(-\sqrt{e}\,x\right)}{2\sqrt{e}}-\frac{b\text{Li}_2\left(\sqrt{e}\,x\right)}{2\sqrt{e}}$$

```
[Out] arctanh(x*e^(1/2))*(a+b*ln(c*x))/e^(1/2)+1/2*b*polylog(2,-x*e^(1/2))/e^(1/2
)-1/2*b*polylog(2,x*e^(1/2))/e^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 62, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 4, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {212, 2361, 12, 6031}

$$\frac{b\text{PolyLog}\left(2,-\sqrt{e}\,x\right)}{2\sqrt{e}}-\frac{b\text{PolyLog}\left(2,\sqrt{e}\,x\right)}{2\sqrt{e}}+\frac{\tanh^{-1}\left(\sqrt{e}\,x\right)\left(a+b\log(cx)\right)}{\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x])/(1 - e*x^2),x]
```

```
[Out] (ArcTanh[Sqrt[e]*x]*(a + b*Log[c*x]))/Sqrt[e] + (b*PolyLog[2, -(Sqrt[e]*x)]
)/(2*Sqrt[e]) - (b*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 6031

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\log(cx)}{1-ex^2}\,dx &= \frac{\tanh^{-1}\left(\sqrt{e}\,x\right)(a+b\log(cx))}{\sqrt{e}}-b\int \frac{\tanh^{-1}\left(\sqrt{e}\,x\right)}{\sqrt{e}\,x}\,dx \\
&= \frac{\tanh^{-1}\left(\sqrt{e}\,x\right)(a+b\log(cx))}{\sqrt{e}}-\frac{b\int \frac{\tanh^{-1}\left(\sqrt{e}\,x\right)}{x}\,dx}{\sqrt{e}} \\
&= \frac{\tanh^{-1}\left(\sqrt{e}\,x\right)(a+b\log(cx))}{\sqrt{e}}+\frac{b\mathrm{Li}_2\left(-\sqrt{e}\,x\right)}{2\sqrt{e}}-\frac{b\mathrm{Li}_2\left(\sqrt{e}\,x\right)}{2\sqrt{e}}
\end{aligned}
$$

Mathematica [A]
time = 0.02, size = 68, normalized size = 1.10

$$
\frac{-\left((a+b\log(cx))\left(\log\left(1-\sqrt{e}\,x\right)-\log\left(1+\sqrt{e}\,x\right)\right)\right)+b\mathrm{Li}_2\left(-\sqrt{e}\,x\right)-b\mathrm{Li}_2\left(\sqrt{e}\,x\right)}{2\sqrt{e}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])/(1 - e*x^2),x]
```

```
[Out] (-((a + b*Log[c*x])*(Log[1 - Sqrt[e]*x] - Log[1 + Sqrt[e]*x])) + b*PolyLog[
2, -(Sqrt[e]*x)] - b*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

Maple [B] Leaf count of result is larger than twice the leaf count of optimal. 111 vs. 2(46) = 92.
time = 0.12, size = 112, normalized size = 1.81

method	result
meijerg	$\frac{a\,\mathrm{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}+\frac{b\ln(c)\,\mathrm{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}+\left(\frac{b\ln(x)\Phi\left(e\,x^2,1,\frac{1}{2}\right)}{2}-\frac{b\Phi\left(e\,x^2,2,\frac{1}{2}\right)}{4}\right)x$
risch	$\frac{a\,\mathrm{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}-\frac{b\ln(cx)\ln\left(-\frac{\sqrt{e}\,cx-c}{c}\right)}{2\sqrt{e}}+\frac{b\ln(cx)\ln\left(\frac{\sqrt{e}\,cx+c}{c}\right)}{2\sqrt{e}}-\frac{b\,\mathrm{dilog}\left(-\frac{\sqrt{e}\,cx-c}{c}\right)}{2\sqrt{e}}+\frac{b\,\mathrm{dilog}\left(\right.}{2}$
derivativedivides	$\frac{\frac{ca\,\mathrm{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}-\frac{cb\ln(cx)\ln\left(-\frac{\sqrt{e}\,cx-c}{c}\right)}{2\sqrt{e}}+\frac{cb\ln(cx)\ln\left(\frac{\sqrt{e}\,cx+c}{c}\right)}{2\sqrt{e}}-\frac{cb\,\mathrm{dilog}\left(-\frac{\sqrt{e}\,cx-c}{c}\right)}{2\sqrt{e}}+\frac{cb\,\mathrm{dilog}\left(\frac{\sqrt{e}\,cx+c}{c}\right.}{2\sqrt{e}}}{c}$
default	$\frac{\frac{ca\,\mathrm{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}-\frac{cb\ln(cx)\ln\left(-\frac{\sqrt{e}\,cx-c}{c}\right)}{2\sqrt{e}}+\frac{cb\ln(cx)\ln\left(\frac{\sqrt{e}\,cx+c}{c}\right)}{2\sqrt{e}}-\frac{cb\,\mathrm{dilog}\left(-\frac{\sqrt{e}\,cx-c}{c}\right)}{2\sqrt{e}}+\frac{cb\,\mathrm{dilog}\left(\frac{\sqrt{e}\,cx+c}{c}\right.}{2\sqrt{e}}}{c}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))/(-e*x^2+1),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c*(c*a/e^(1/2)*arctanh(x*e^(1/2))-1/2*c*b/e^(1/2)*ln(c*x)*ln(-(e^(1/2)*c*
x-c)/c)+1/2*c*b/e^(1/2)*ln(c*x)*ln((e^(1/2)*c*x+c)/c)-1/2*c*b/e^(1/2)*dilog
(-(e^(1/2)*c*x-c)/c)+1/2*c*b/e^(1/2)*dilog((e^(1/2)*c*x+c)/c))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="maxima")
```

```
[Out] -integrate((b*log(c*x) + a)/(x^2*e - 1), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="fricas")
```

```
[Out] integral(-(b*log(c*x) + a)/(x^2*e - 1), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\int \frac{a}{ex^2-1}\,dx-\int \frac{b\log{(cx)}}{ex^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))/(-e*x**2+1),x)
```

```
[Out] -Integral(a/(e*x**2 - 1), x) - Integral(b*log(c*x)/(e*x**2 - 1), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="giac")
```

```
[Out] integrate(-(b*log(c*x) + a)/(x^2*e - 1), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int -\frac{a+b\,\ln\left(c\,x\right)}{e\,x^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(a + b*log(c*x))/(e*x^2 - 1),x)
[Out] int(-(a + b*log(c*x))/(e*x^2 - 1), x)
```

3.246 $\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx$

Optimal. Leaf size=66

$$\frac{\tanh^{-1}\left(\sqrt{e}\,x\right)\left(a+b\log\left(cx^n\right)\right)}{\sqrt{e}}+\frac{bn\text{Li}_2\left(-\sqrt{e}\,x\right)}{2\sqrt{e}}-\frac{bn\text{Li}_2\left(\sqrt{e}\,x\right)}{2\sqrt{e}}$$

```
[Out] arctanh(x*e^(1/2))*(a+b*ln(c*x^n))/e^(1/2)+1/2*b*n*polylog(2,-x*e^(1/2))/e^
(1/2)-1/2*b*n*polylog(2,x*e^(1/2))/e^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 66, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {212, 2361, 12, 6031}

$$\frac{bn\text{PolyLog}\left(2,-\sqrt{e}\,x\right)}{2\sqrt{e}}-\frac{bn\text{PolyLog}\left(2,\sqrt{e}\,x\right)}{2\sqrt{e}}+\frac{\tanh^{-1}\left(\sqrt{e}\,x\right)\left(a+b\log\left(cx^n\right)\right)}{\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(1 - e*x^2),x]
```

```
[Out] (ArcTanh[Sqrt[e]*x]*(a + b*Log[c*x^n]))/Sqrt[e] + (b*n*PolyLog[2, -(Sqrt[e]
*x)])/(2*Sqrt[e]) - (b*n*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 2361

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Di
st[b*n, Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

Rule 6031

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx = \frac{\tanh^{-1}(\sqrt{e}\,x)(a+b\log(cx^n))}{\sqrt{e}} - (bn)\int \frac{\tanh^{-1}(\sqrt{e}\,x)}{\sqrt{e}\,x}\,dx$$

$$= \frac{\tanh^{-1}(\sqrt{e}\,x)(a+b\log(cx^n))}{\sqrt{e}} - \frac{(bn)\int \frac{\tanh^{-1}(\sqrt{e}\,x)}{x}\,dx}{\sqrt{e}}$$

$$= \frac{\tanh^{-1}(\sqrt{e}\,x)(a+b\log(cx^n))}{\sqrt{e}} + \frac{bn\text{Li}_2(-\sqrt{e}\,x)}{2\sqrt{e}} - \frac{bn\text{Li}_2(\sqrt{e}\,x)}{2\sqrt{e}}$$

Mathematica [A]
time = 0.02, size = 72, normalized size = 1.09

$$\frac{-((a+b\log(cx^n))(\log(1-\sqrt{e}\,x)-\log(1+\sqrt{e}\,x)))+bn\text{Li}_2(-\sqrt{e}\,x)-bn\text{Li}_2(\sqrt{e}\,x)}{2\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(1 - e*x^2),x]
```

```
[Out] (-((a + b*Log[c*x^n])*(Log[1 - Sqrt[e]*x] - Log[1 + Sqrt[e]*x])) + b*n*Poly
Log[2, -(Sqrt[e]*x)] - b*n*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.13, size = 55, normalized size = 0.83

method	result
meijerg	$\frac{a\,\text{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}+\frac{b\ln(c)\,\text{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}+\left(\frac{bn\ln(x)\Phi\left(e\,x^2,1,\frac{1}{2}\right)}{2}-\frac{bn\Phi\left(e\,x^2,2,\frac{1}{2}\right)}{4}\right)x$
risch	$-\frac{\left(\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)}{2}-\frac{ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2}{2}-\frac{ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2}{2}+\frac{ib\pi\text{csgn}(ic\,x^n)^3}{2}-b\ln(c)-a\right)\text{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(-e*x^2+1),x,method=_RETURNVERBOSE)
```

```
[Out] a/e^(1/2)*arctanh(x*e^(1/2))+b*ln(c)/e^(1/2)*arctanh(x*e^(1/2))+(1/2*b*n*ln
(x)*LerchPhi(e*x^2,1,1/2)-1/4*b*n*LerchPhi(e*x^2,2,1/2))*x
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="maxima")
```

```
[Out] -1/2*a*e^(-1/2)*log((x*e - e^(1/2))/(x*e + e^(1/2))) - b*integrate((log(c)
+ log(x^n))/(x^2*e - 1), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="fricas")
```

```
[Out] integral(-(b*log(c*x^n) + a)/(x^2*e - 1), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\int \frac{a}{ex^2-1}\,dx - \int \frac{b\log{(cx^n)}}{ex^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(-e*x**2+1),x)
```

```
[Out] -Integral(a/(e*x**2 - 1), x) - Integral(b*log(c*x**n)/(e*x**2 - 1), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="giac")
```

```
[Out] integrate(-(b*log(c*x^n) + a)/(x^2*e - 1), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int -\frac{a+b\,\ln\left(c\,x^n\right)}{e\,x^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(a + b*log(c*x^n))/(e*x^2 - 1),x)
```

```
[Out] int(-(a + b*log(c*x^n))/(e*x^2 - 1), x)
```

3.247 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=509

$$\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{bn(a+b\log(cx^n))\log\left(1-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{(a+b\log(c}{4}$$

```
[Out] 1/2*b*n*(a+b*ln(c*x^n))*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/4*(
a+b*ln(c*x^n))^2*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b*n*(a+b
*ln(c*x^n))*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/4*(a+b*ln(c*x^n
))^2*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b^2*n^2*polylog(2,-x
*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/2*b*n*(a+b*ln(c*x^n))*polylog(2,-
x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/2*b^2*n^2*polylog(2,x*e^(1/2)/(-
d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b*n*(a+b*ln(c*x^n))*polylog(2,x*e^(1/2)/(-
d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b^2*n^2*polylog(3,-x*e^(1/2)/(-d)^(1/2))/(
-d)^(3/2)/e^(1/2)+1/2*b^2*n^2*polylog(3,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^
(1/2)+1/4*x*(a+b*ln(c*x^n))^2/(-d)^(3/2)/((-d)^(1/2)-x*e^(1/2))+1/4*x*(a+b*
ln(c*x^n))^2/(-d)^(3/2)/((-d)^(1/2)+x*e^(1/2))
```

Rubi [A]
time = 0.44, antiderivative size = 509, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$, Rules used = {2367, 2355, 2354, 2438, 2421, 6724}

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{bn\,\text{PolyLog}\left(2,\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\text{PolyLog}\left(2,-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\text{PolyLog}\left(2,\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\text{PolyLog}\left(3,-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\text{PolyLog}\left(3,\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{bn\log\left(1-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{bn\log\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}-\frac{\log\left(1-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{\log\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d + e*x^2)^2,x]
```

```
[Out] (x*(a + b*Log[c*x^n])^2)/(4*(-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)) + (x*(a + b*
Log[c*x^n])^2)/(4*(-d)^(3/2)*(Sqrt[-d] + Sqrt[e]*x)) + (b*n*(a + b*Log[c*x^
n])*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - ((a + b*Log[c*x
^n])^2*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (b*n*(a + b*
Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) + ((a + b
*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (b^2
*n^2*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) + (b*n*(a
+ b*Log[c*x^n])*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e])
 + (b^2*n^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - (b*n
*(a + b*Log[c*x^n])*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]
) - (b^2*n^2*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) +
(b^2*n^2*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e])
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \int \left(-\frac{e(a+b\log(cx^n))^2}{4d\left(\sqrt{-d}\,\sqrt{e}-ex\right)^2} - \frac{e(a+b\log(cx^n))^2}{4d\left(\sqrt{-d}\,\sqrt{e}+ex\right)^2} - \frac{e(a+b\log(cx^n))^2}{2d\left(-de-e^2x^2\right)}\right) dx$$

$$= -\frac{e\int \frac{(a+b\log(cx^n))^2}{\left(\sqrt{-d}\,\sqrt{e}-ex\right)^2}\,dx}{4d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{\left(\sqrt{-d}\,\sqrt{e}+ex\right)^2}\,dx}{4d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{-de-e^2x^2}\,dx}{2d}$$

$$= \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)} - \frac{e\int \left(-\frac{\sqrt{-d}\,(a+b\log(cx}{2de\left(\sqrt{-d}-\sqrt{e}\right.}\right.}{}$$

$$= \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)} + \frac{bn(a+b\log(cx^n))\log}{2(-d)^{3/2}\sqrt{}}$$

$$= \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)} + \frac{bn(a+b\log(cx^n))\log}{2(-d)^{3/2}\sqrt{}}$$

$$= \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)} + \frac{bn(a+b\log(cx^n))\log}{2(-d)^{3/2}\sqrt{}}$$

$$= \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)} + \frac{bn(a+b\log(cx^n))\log}{2(-d)^{3/2}\sqrt{}}$$

Mathematica [A]
time = 0.49, size = 432, normalized size = 0.85

$$\frac{-\frac{(a+b\log(cx^n))^2}{d\left(\sqrt{-d}-\sqrt{e}\,x\right)} + \frac{(a+b\log(cx^n))^2}{d\left(\sqrt{-d}+\sqrt{e}\,x\right)} - \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}} + \frac{(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}} + \frac{d(a+b\log(cx^n))^2\log\left(1+\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{5/2}} + \frac{2b^2n^2\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}} - \frac{2bn(a+b\log(cx^n))\mathrm{Li}_2\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}} - \frac{2b^2n^2\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}} + \frac{2bn(a+b\log(cx^n))\mathrm{Li}_2\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}} + \frac{2b^2n^2\mathrm{Li}_3\left(\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{(-d)^{3/2}} - \frac{2b^2n^2\mathrm{Li}_3\left(\frac{d\sqrt{e}\,x}{(-d)^{3/2}}\right)}{(-d)^{3/2}}}{4\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d + e*x^2)^2,x]
```

```
[Out] (-((a + b*Log[c*x^n])^2/(d*(Sqrt[-d] - Sqrt[e]*x))) + (a + b*Log[c*x^n])^2/
(d*(Sqrt[-d] + Sqrt[e]*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/
Sqrt[-d]])/(-d)^(3/2) + ((a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]]
)/(-d)^(3/2) + (2*b*n*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])
```

```
/(-d)^(3/2) + (d*(a + b*Log[c*x^n])^2*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-
d)^(5/2) + (2*b^2*n^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (2*b*n
*(a + b*Log[c*x^n])*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (2*b^2*n
^2*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2) + (2*b*n*(a + b*Log[c*x
^n])*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2) + (2*b^2*n^2*PolyLog[
3, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (2*b^2*n^2*PolyLog[3, (d*Sqrt[e]*x)/
(-d)^(3/2)])/(-d)^(3/2))/(4*Sqrt[e])
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\,x^{n}\right)\right)^{2}}{\left(e\,x^{2}+d\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(e*x^2+d)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))^2/(e*x^2+d)^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*a^2*(arctan(x*e^(1/2)/sqrt(d))*e^(-1/2)/d^(3/2) + x/(d*x^2*e + d^2)) +
integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a
*b)*log(x^n))/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^4*e^2 + 2*d*x^2*e +
 d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\log\left(cx^{n}\right)\right)^{2}}{\left(d+ex^{2}\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(e*x**2+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(d + e*x**2)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/(x^2*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{\left(e\,x^2+d\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d + e*x^2)^2,x)
```

```
[Out] int((a + b*log(c*x^n))^2/(d + e*x^2)^2, x)
```

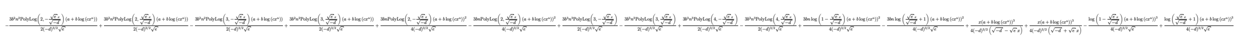
3.248 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=711

$$\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{3bn(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt{e}\,x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}-\frac{(a+b\log \ldots}{\ldots}$$

```
[Out] 3/4*b*n*(a+b*ln(c*x^n))^2*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/4
*(a+b*ln(c*x^n))^3*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/4*b*n*(a
+b*ln(c*x^n))^2*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/4*(a+b*ln(c
*x^n))^3*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^2*n^2*(a+b*ln(
c*x^n))*polylog(2,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/4*b*n*(a+b*ln
(c*x^n))^2*polylog(2,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^2*n^2*
(a+b*ln(c*x^n))*polylog(2,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/4*b*n*
(a+b*ln(c*x^n))^2*polylog(2,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^
3*n^3*polylog(3,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^2*n^2*(a+b*
ln(c*x^n))*polylog(3,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^3*n^3*
polylog(3,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^2*n^2*(a+b*ln(c*x^
n))*polylog(3,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^3*n^3*polylog(
4,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^3*n^3*polylog(4,x*e^(1/2)
/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/4*x*(a+b*ln(c*x^n))^3/(-d)^(3/2)/((-d)^(1
/2)-x*e^(1/2))+1/4*x*(a+b*ln(c*x^n))^3/(-d)^(3/2)/((-d)^(1/2)+x*e^(1/2))
```

Rubi [A]
time = 0.60, antiderivative size = 711, normalized size of antiderivative = 1.00, number of steps used = 20, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$, Rules used = {2367, 2355, 2354, 2421, 6724, 2430}



Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/(d + e*x^2)^2,x]
```

```
[Out] (x*(a + b*Log[c*x^n])^3)/(4*(-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)) + (x*(a + b*
Log[c*x^n])^3)/(4*(-d)^(3/2)*(Sqrt[-d] + Sqrt[e]*x)) + (3*b*n*(a + b*Log[c*
x^n])^2*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - ((a + b*Log
[c*x^n])^3*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (3*b*n*(
a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) +
 ((a + b*Log[c*x^n])^3*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]
) - (3*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(
-d)^(3/2)*Sqrt[e]) + (3*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -((Sqrt[e]*x)/S
qrt[-d])])/(4*(-d)^(3/2)*Sqrt[e]) + (3*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2
```

```
, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - (3*b*n*(a + b*Log[c*x^n])
^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) + (3*b^3*n^3*Po
lyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) - (3*b^2*n^2*(a +
 b*Log[c*x^n])*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e])
- (3*b^3*n^3*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) + (3*
b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*
Sqrt[e]) + (3*b^3*n^3*PolyLog[4, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sq
rt[e]) - (3*b^3*n^3*PolyLog[4, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]
)
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2430

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Dist[b*n*(p/q), Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p - 1
)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \int \left(-\frac{e(a+b\log(cx^n))^3}{4d\left(\sqrt{-d}\,\sqrt{e}-ex\right)^2}-\frac{e(a+b\log(cx^n))^3}{4d\left(\sqrt{-d}\,\sqrt{e}+ex\right)^2}-\frac{e(a+b\log(cx^n))^3}{2d\left(-de-e^2x^2\right)}\right) d$$

$$= -\frac{e\int \frac{(a+b\log(cx^n))^3}{\left(\sqrt{-d}\,\sqrt{e}-ex\right)^2}\,dx}{4d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{\left(\sqrt{-d}\,\sqrt{e}+ex\right)^2}\,dx}{4d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{-de-e^2x^2}\,dx}{2d}$$

$$= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}-\frac{e\int\left(-\frac{\sqrt{-d}\,(a+b\log(c}{2de\left(\sqrt{-d}-\sqrt{\right.}}\right.}{}$$

$$= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{3bn(a+b\log(cx^n))^2}{4(-d)^{3/}}$$

$$= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{3bn(a+b\log(cx^n))^2}{4(-d)^{3/}}$$

$$= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{3bn(a+b\log(cx^n))^2}{4(-d)^{3/}}$$

$$= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{3bn(a+b\log(cx^n))^2}{4(-d)^{3/}}$$

$$= \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}\,x\right)}+\frac{3bn(a+b\log(cx^n))^2}{4(-d)^{3/}}$$

Mathematica [C] Result contains complex when optimal does not.
time = 1.55, size = 1073, normalized size = 1.51

Antiderivative was successfully verified.

[In] Integrate[(a + b*Log[c*x^n])^3/(d + e*x^2)^2,x]

[Out] ((2*Sqrt[d]*x*(a - b*n*Log[x] + b*Log[c*x^n])^3)/(d + e*x^2) + (2*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a - b*n*Log[x] + b*Log[c*x^n])^3)/Sqrt[e] + 3*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*((Sqrt[e]*x*Log[x] + I*(Sqrt[d] + I*Sqrt[e]*x)*Log[I*Sqrt[d] - Sqrt[e]*x])/(Sqrt[d]*Sqrt[e] + I*e*x) + (Sqrt[e]*x*Log[x] + ((-I)*Sqrt[d] - Sqrt[e]*x)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d]*Sqrt[e] - I*e*x) - (I*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e] + (I*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e]) + 3*b^2*n^2*(a - b*n*Log[x] + b*Log[c*x^n])*((Log[x]*(Sqrt[e]*x*Log[x] + (2*I)*(Sqrt[d] + I*Sqrt[e]*x)*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]]) + (2*I)*(Sqrt[d] + I*Sqrt[e]*x)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*Sqrt[e] + I*e*x) + (Log[x]*(Sqrt[e]*x*Log[x] - (2*I)*(Sqrt[d] - I*Sqrt[e]*x)*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]]) - 2*(I*Sqrt[d] + Sqrt[e]*x)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*Sqrt[e] - I*e*x) - (I*(Log[x]^2*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 2*Log[x]*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - 2*PolyLog[3, ((-I)*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e] + (I*(Log[x]^2*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 2*Log[x]*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]] - 2*PolyLog[3, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e]) + (I*b^3*n^3*(-Log[x]^3 + (Sqrt[d]*Log[x]^3)/(Sqrt[d] + I*Sqrt[e]*x) + (Sqrt[e]*x*Log[x]^3)/(I*Sqrt[d] + Sqrt[e]*x) - 3*Log[x]^2*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + Log[x]^3*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 3*Log[x]^2*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] - Log[x]^3*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] - 3*(-2 + Log[x])*Log[x]*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 3*(-2 + Log[x])*Log[x]*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]] - 6*PolyLog[3, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 6*Log[x]*PolyLog[3, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 6*PolyLog[3, (I*Sqrt[e]*x)/Sqrt[d]] - 6*Log[x]*PolyLog[3, (I*Sqrt[e]*x)/Sqrt[d]] - 6*PolyLog[4, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 6*PolyLog[4, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e])/(4*d^(3/2))

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln \left(c\,x^{n}\right)\right)^{3}}{\left(e\,x^{2}+d\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a+b*ln(c*x^n))^3/(e*x^2+d)^2,x)

[Out] int((a+b*ln(c*x^n))^3/(e*x^2+d)^2,x)

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] 1/2*a^3*(arctan(x*e^(1/2)/sqrt(d))*e^(-1/2)/d^(3/2) + x/(d*x^2*e + d^2)) +
integrate((b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c
) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)^2 + 2*a*b^2*log(c) +
a^2*b)*log(x^n))/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a^
3)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b \log{(cx^n)})^3}{(d + ex^2)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/(e*x**2+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**3/(d + e*x**2)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^3/(x^2*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\, \ln(c\, x^n))^3}{(e\, x^2 + d)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/(d + e*x^2)^2,x)
```

```
[Out] int((a + b*log(c*x^n))^3/(d + e*x^2)^2, x)
```

3.249 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=25

$$\text{Int}\left(\frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))},x\right)$$

```
[Out] Unintegrable(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx$$

Verification is not applicable to the result.

```
[In] Int[1/((d + e*x^2)^2*(a + b*Log[c*x^n])),x]
[Out] Defer[Int][1/((d + e*x^2)^2*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx = \int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx$$

Mathematica [A]
time = 2.26, size = 0, normalized size = 0.00

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])),x]
[Out] Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{1}{(e\,x^2+d)^2\,(a+b\ln(c\,x^n))}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

```
[Out] int(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^2*e + d)^2*(b*log(c*x^n) + a)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(1/(a*x^4*e^2 + 2*a*d*x^2*e + a*d^2 + (b*x^4*e^2 + 2*b*d*x^2*e + b*
d^2)*log(c*x^n)), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{(a + b\log{(cx^n)})\,(d + ex^2)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(1/((a + b*log(c*x**n))*(d + e*x**2)**2), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(1/((x^2*e + d)^2*(b*log(c*x^n) + a)), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{\left(e\,x^2+d\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d + e*x^2)^2*(a + b*log(c*x^n))),x)
[Out] int(1/((d + e*x^2)^2*(a + b*log(c*x^n))), x)
```

3.250 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=25

$$\text{Int}\left(\frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))^2},x\right)$$

[Out] Unintegrable(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)

Rubi [A]
time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))^2}\,dx$$

Verification is not applicable to the result.

[In] Int[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2),x]

[Out] Defer[Int][1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2), x]

Rubi steps

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))^2}\,dx = \int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))^2}\,dx$$

Mathematica [A]
time = 10.77, size = 0, normalized size = 0.00

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))^2}\,dx$$

Verification is not applicable to the result.

[In] Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2),x]

[Out] Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2), x]

Maple [A]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{1}{(e\,x^2+d)^2\,(a+b\ln(c\,x^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] -x/((b^2*n*log(c) + a*b*n)*x^4*e^2 + b^2*d^2*n*log(c) + a*b*d^2*n + 2*(b^2*
d*n*log(c) + a*b*d*n)*x^2*e + (b^2*n*x^4*e^2 + 2*b^2*d*n*x^2*e + b^2*d^2*n)
*log(x^n)) - integrate((3*x^2*e - d)/((b^2*n*log(c) + a*b*n)*x^6*e^3 + b^2*
d^3*n*log(c) + a*b*d^3*n + 3*(b^2*d*n*log(c) + a*b*d*n)*x^4*e^2 + 3*(b^2*d^
2*n*log(c) + a*b*d^2*n)*x^2*e + (b^2*n*x^6*e^3 + 3*b^2*d*n*x^4*e^2 + 3*b^2*
d^2*n*x^2*e + b^2*d^3*n)*log(x^n)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(1/(a^2*x^4*e^2 + 2*a^2*d*x^2*e + a^2*d^2 + (b^2*x^4*e^2 + 2*b^2*d*
x^2*e + b^2*d^2)*log(c*x^n)^2 + 2*(a*b*x^4*e^2 + 2*a*b*d*x^2*e + a*b*d^2)*l
og(c*x^n)), x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Timed out
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((x^2*e + d)^2*(b*log(c*x^n) + a)^2), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{\left(e\,x^2+d\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d + e*x^2)^2*(a + b*log(c*x^n))^2),x)
```

```
[Out] int(1/((d + e*x^2)^2*(a + b*log(c*x^n))^2), x)
```

3.251 $\int x^5 \sqrt{d+ex^2} \left(a+b\log\left(cx^n\right)\right) \, dx$

Optimal. Leaf size=208

$$-\frac{8bd^3n\sqrt{d+ex^2}}{105e^3}-\frac{8bd^2n(d+ex^2)^{3/2}}{315e^3}+\frac{9bdn(d+ex^2)^{5/2}}{175e^3}-\frac{bn(d+ex^2)^{7/2}}{49e^3}+\frac{8bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{105e^3}+$$

```
[Out] -8/315*b*d^2*n*(e*x^2+d)^(3/2)/e^3+9/175*b*d*n*(e*x^2+d)^(5/2)/e^3-1/49*b*n
*(e*x^2+d)^(7/2)/e^3+8/105*b*d^(7/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3
+1/3*d^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^3-2/5*d*(e*x^2+d)^(5/2)*(a+b*ln(
c*x^n))/e^3+1/7*(e*x^2+d)^(7/2)*(a+b*ln(c*x^n))/e^3-8/105*b*d^3*n*(e*x^2+d)
^(1/2)/e^3
```

Rubi [A]
time = 0.17, antiderivative size = 208, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1265, 911, 1275, 214}

$$\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{8bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{105e^3}-\frac{8bd^3n\sqrt{d+ex^2}}{105e^3}-\frac{8bd^2n(d+ex^2)^{3/2}}{315e^3}+\frac{9bdn(d+ex^2)^{5/2}}{175e^3}-\frac{bn(d+ex^2)^{7/2}}{49e^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-8*b*d^3*n*Sqrt[d + e*x^2])/(105*e^3) - (8*b*d^2*n*(d + e*x^2)^(3/2))/(315
*e^3) + (9*b*d*n*(d + e*x^2)^(5/2))/(175*e^3) - (b*n*(d + e*x^2)^(7/2))/(49
*e^3) + (8*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(105*e^3) + (d^2*(
d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3) - (2*d*(d + e*x^2)^(5/2)*(a +
b*Log[c*x^n]))/(5*e^3) + ((d + e*x^2)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1265

```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a +
 b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Inte
gerQ[(m - 1)/2]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^5\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx = \frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{(a\cdots}{}$$

$$= \frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{(a\cdots}{}$$

$$= \frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{(a\cdots}{}$$

$$= \frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{(a\cdots}{}$$

$$= \frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} - \frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} + \frac{(a\cdots}{}$$

$$= -\frac{8bd^3n\sqrt{d+ex^2}}{105e^3} - \frac{8bd^2n(d+ex^2)^{3/2}}{315e^3} + \frac{9bdn(d+ex^2)^{5/2}}{175e^3} - \frac{bn(d+\cdots}{49\cdots}$$

$$= -\frac{8bd^3n\sqrt{d+ex^2}}{105e^3} - \frac{8bd^2n(d+ex^2)^{3/2}}{315e^3} + \frac{9bdn(d+ex^2)^{5/2}}{175e^3} - \frac{bn(d+\cdots}{49\cdots}$$

Mathematica [A]
time = 0.12, size = 251, normalized size = 1.21

$$-\frac{8bd^{7/2}n\log(x)}{105e^3} + \frac{bn\sqrt{d+ex^2}\,(8d^3-4d^2ex^2+3de^2x^4+15e^3x^6)\log(x)}{105e^3} + \sqrt{d+ex^2}\left(\frac{1}{49}x^6(7a-bn+7b(-n\log(x)+\log(cx^n))) + \frac{dx^4(35a-12bn+35b(-n\log(x)+\log(cx^n)))}{1225e} + \frac{2d^3(420a-389bn+420b(-n\log(x)+\log(cx^n)))}{11025e^3} - \frac{d^2x^2(420a-179bn+420b(-n\log(x)+\log(cx^n)))}{11025e^2}\right) + \frac{8bd^{7/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{105e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-8*b*d^(7/2)*n*Log[x])/(105*e^3) + (b*n*Sqrt[d + e*x^2]*(8*d^3 - 4*d^2*e*x
^2 + 3*d*e^2*x^4 + 15*e^3*x^6)*Log[x])/(105*e^3) + Sqrt[d + e*x^2]*((x^6*(7
*a - b*n + 7*b*(-(n*Log[x]) + Log[c*x^n])))/49 + (d*x^4*(35*a - 12*b*n + 35
*b*(-(n*Log[x]) + Log[c*x^n])))/(1225*e) + (2*d^3*(420*a - 389*b*n + 420*b*
(-(n*Log[x]) + Log[c*x^n])))/(11025*e^3) - (d^2*x^2*(420*a - 179*b*n + 420*
b*(-(n*Log[x]) + Log[c*x^n])))/(11025*e^2)) + (8*b*d^(7/2)*n*Log[d + Sqrt[d
]*Sqrt[d + e*x^2]])/(105*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^5(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.50, size = 224, normalized size = 1.08

$$-\frac{1}{11025}\left(420\,d^{\frac{7}{2}}e^{(-3)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)+\left(225\,(x^2e+d)^{\frac{7}{2}}-567\,(x^2e+d)^{\frac{5}{2}}d+280\,(x^2e+d)^{\frac{3}{2}}d^2+840\,\sqrt{x^2e+d}\,d^3\right)e^{(-3)}\right)bn+\frac{1}{105}\left(15\,(x^2e+d)^{\frac{3}{2}}x^4e^{(-1)}-12\,(x^2e+d)^{\frac{3}{2}}dx^2e^{(-2)}+8\,(x^2e+d)^{\frac{3}{2}}d^2e^{(-3)}\right)b\log\left(cx^n\right)+\frac{1}{105}\left(15\,(x^2e+d)^{\frac{3}{2}}x^4e^{(-1)}-12\,(x^2e+d)^{\frac{3}{2}}dx^2e^{(-2)}+8\,(x^2e+d)^{\frac{3}{2}}d^2e^{(-3)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -1/11025*(420*d^(7/2)*e^(-3)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e +
d) + sqrt(d))) + (225*(x^2*e + d)^(7/2) - 567*(x^2*e + d)^(5/2)*d + 280*(x^
2*e + d)^(3/2)*d^2 + 840*sqrt(x^2*e + d)*d^3)*e^(-3))*b*n + 1/105*(15*(x^2*
e + d)^(3/2)*x^4*e^(-1) - 12*(x^2*e + d)^(3/2)*d*x^2*e^(-2) + 8*(x^2*e + d)
^(3/2)*d^2*e^(-3))*b*log(c*x^n) + 1/105*(15*(x^2*e + d)^(3/2)*x^4*e^(-1) -
12*(x^2*e + d)^(3/2)*d*x^2*e^(-2) + 8*(x^2*e + d)^(3/2)*d^2*e^(-3))*a
```

Fricas [A]
time = 0.43, size = 397, normalized size = 1.91

$$\left[\frac{1}{11025}\left(420\,bd^{\frac{7}{2}}n\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-\left(225\,(bn-7\,a)x^6e^3+9\,(12\,bdn-35\,ad)x^4e^2+778\,bd^3n-840\,ad^3-(179\,bd^2n-420\,ad^2)x^2e-105\,(15\,bx^6e^3+3\,bdx^4e^2-4\,bd^2x^2e+8\,bd^3)\log(c)-105\,(15\,bnx^6e^3+3\,bdnx^4e^2-4\,bd^2nx^2e+8\,bd^3n)\log(x)\right)\sqrt{x^2e+d}\right)e^{(-3)},\ -\frac{1}{11025}\left(840\,b\sqrt{-d}\,d^3n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left(225\,(bn-7\,a)x^6e^3+9\,(12\,bdn-35\,ad)x^4e^2+778\,bd^3n-840\,ad^3-(179\,bd^2n-420\,ad^2)x^2e-105\,(15\,bx^6e^3+3\,bdx^4e^2-4\,bd^2x^2e+8\,bd^3)\log(c)-105\,(15\,bnx^6e^3+3\,bdnx^4e^2-4\,bd^2nx^2e+8\,bd^3n)\log(x)\right)\sqrt{x^2e+d}\right)e^{(-3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [1/11025*(420*b*d^(7/2)*n*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^
2) - (225*(b*n - 7*a)*x^6*e^3 + 9*(12*b*d*n - 35*a*d)*x^4*e^2 + 778*b*d^3*n
 - 840*a*d^3 - (179*b*d^2*n - 420*a*d^2)*x^2*e - 105*(15*b*x^6*e^3 + 3*b*d*
x^4*e^2 - 4*b*d^2*x^2*e + 8*b*d^3)*log(c) - 105*(15*b*n*x^6*e^3 + 3*b*d*n*x
^4*e^2 - 4*b*d^2*n*x^2*e + 8*b*d^3*n)*log(x))*sqrt(x^2*e + d))*e^(-3), -1/1
1025*(840*b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(x^2*e + d)) + (225*(b*n - 7
*a)*x^6*e^3 + 9*(12*b*d*n - 35*a*d)*x^4*e^2 + 778*b*d^3*n - 840*a*d^3 - (17
9*b*d^2*n - 420*a*d^2)*x^2*e - 105*(15*b*x^6*e^3 + 3*b*d*x^4*e^2 - 4*b*d^2*
x^2*e + 8*b*d^3)*log(c) - 105*(15*b*n*x^6*e^3 + 3*b*d*n*x^4*e^2 - 4*b*d^2*n
*x^2*e + 8*b*d^3*n)*log(x))*sqrt(x^2*e + d))*e^(-3)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^5(a+b\log{(cx^n)})\sqrt{d+ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

```
[Out] Integral(x**5*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Giac [A]
time = 2.84, size = 296, normalized size = 1.42

$$\frac{1}{7}\sqrt{x^2e+d}\,bx^6\log(c)+\frac{1}{35}\sqrt{x^2e+d}\,bdx^4e^{(-1)}\log(c)+\frac{1}{7}\sqrt{x^2e+d}\,ax^6+\frac{1}{35}\sqrt{x^2e+d}\,adx^4e^{(-1)}-\frac{4}{105}\sqrt{x^2e+d}\,bd^2x^2e^{(-2)}\log(c)-\frac{4}{105}\sqrt{x^2e+d}\,ad^2x^2e^{(-2)}+\frac{8}{105}\sqrt{x^2e+d}\,bd^3e^{(-3)}\log(c)+\frac{8}{105}\sqrt{x^2e+d}\,ad^3e^{(-3)}+\frac{1}{11025}\left(105\left(15\left(x^2e+d\right)^{\frac{7}{2}}-42\left(x^2e+d\right)^{\frac{5}{2}}d+35\left(x^2e+d\right)^{\frac{3}{2}}d^2\right)e^{(-3)}\log(x)-\left(\frac{840\,d^4\arctan\left(\frac{\sqrt{x^2e+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+225\left(x^2e+d\right)^{\frac{7}{2}}-567\left(x^2e+d\right)^{\frac{5}{2}}d+280\left(x^2e+d\right)^{\frac{3}{2}}d^2+840\sqrt{x^2e+d}\,d^3\right)e^{(-3)}\right)bn$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] 1/7*sqrt(x^2*e + d)*b*x^6*log(c) + 1/35*sqrt(x^2*e + d)*b*d*x^4*e^(-1)*log(
c) + 1/7*sqrt(x^2*e + d)*a*x^6 + 1/35*sqrt(x^2*e + d)*a*d*x^4*e^(-1) - 4/10
5*sqrt(x^2*e + d)*b*d^2*x^2*e^(-2)*log(c) - 4/105*sqrt(x^2*e + d)*a*d^2*x^2
*e^(-2) + 8/105*sqrt(x^2*e + d)*b*d^3*e^(-3)*log(c) + 8/105*sqrt(x^2*e + d)
*a*d^3*e^(-3) + 1/11025*(105*(15*(x^2*e + d)^(7/2) - 42*(x^2*e + d)^(5/2)*d
 + 35*(x^2*e + d)^(3/2)*d^2)*e^(-3)*log(x) - (840*d^4*arctan(sqrt(x^2*e + d
)/sqrt(-d))/sqrt(-d) + 225*(x^2*e + d)^(7/2) - 567*(x^2*e + d)^(5/2)*d + 28
0*(x^2*e + d)^(3/2)*d^2 + 840*sqrt(x^2*e + d)*d^3)*e^(-3))*b*n
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^5\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^5*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.252 $\int x^3\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=154

$$\frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{2bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^2}-\frac{d(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e^2}$$

```
[Out] 2/45*b*d*n*(e*x^2+d)^(3/2)/e^2-1/25*b*n*(e*x^2+d)^(5/2)/e^2-2/15*b*d^(5/2)*
n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^2-1/3*d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)
)/e^2+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^2+2/15*b*d^2*n*(e*x^2+d)^(1/2)/
e^2
```

Rubi [A]
time = 0.12, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 45, 2392, 12, 457, 81, 52, 65, 214}

$$-\frac{d(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e^2}+\frac{(d+ex^2)^{5/2}\,(a+b\log(cx^n))}{5e^2}-\frac{2bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^2}+\frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (2*b*d^2*n*Sqrt[d + e*x^2])/(15*e^2) + (2*b*d*n*(d + e*x^2)^(3/2))/(45*e^2)
 - (b*n*(d + e*x^2)^(5/2))/(25*e^2) - (2*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x^2
]/Sqrt[d]])/(15*e^2) - (d*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2) + (
(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
```

```
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^3\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx = -\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}-(b$$

$$= -\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}-(b$$

$$= -\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{(b}{}$$

$$= -\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{(d+ex^2)^{5/2}(a-}{5e^2}$$

$$= \frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$= \frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{d(d+ex^2)^{3}}{}$$

$$= \frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{d(d+ex^2)^{3}}{}$$

$$= \frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{2bd^{5/2}n\tan}{}$$

Mathematica [A]
time = 0.09, size = 204, normalized size = 1.32

$$\frac{2bd^{5/2}n\log(x)}{15e^2}-\frac{bn\sqrt{d+ex^2}\,(2d^2-dex^2-3e^2x^4)\log(x)}{15e^2}+\sqrt{d+ex^2}\left(\frac{1}{25}x^4(5a-bn+5b(-n\log(x)+\log(cx^n)))+\frac{dx^2(15a-8bn+15b(-n\log(x)+\log(cx^n)))}{225e}-\frac{d^2(30a-31bn+30b(-n\log(x)+\log(cx^n)))}{225e^2}\right)-\frac{2bd^{5/2}n\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{15e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (2*b*d^(5/2)*n*Log[x])/(15*e^2) - (b*n*Sqrt[d + e*x^2]*(2*d^2 - d*e*x^2 - 3
*e^2*x^4)*Log[x])/(15*e^2) + Sqrt[d + e*x^2]*((x^4*(5*a - b*n + 5*b*(-(n*Lo
g[x]) + Log[c*x^n])))/25 + (d*x^2*(15*a - 8*b*n + 15*b*(-(n*Log[x]) + Log[c
*x^n])))/(225*e) - (d^2*(30*a - 31*b*n + 30*b*(-(n*Log[x]) + Log[c*x^n])))/
(225*e^2)) - (2*b*d^(5/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(15*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^3(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.51, size = 170, normalized size = 1.10

$$\frac{1}{225}\left(15\,d^{\frac{5}{2}}e^{(-2)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)-\left(9\left(x^2e+d\right)^{\frac{5}{2}}-10\left(x^2e+d\right)^{\frac{3}{2}}d-30\sqrt{x^2e+d}\,d^2\right)e^{(-2)}\right)bn+\frac{1}{15}\left(3\left(x^2e+d\right)^{\frac{3}{2}}x^2e^{(-1)}-2\left(x^2e+d\right)^{\frac{3}{2}}de^{(-2)}\right)b\log\left(cx^n\right)+\frac{1}{15}\left(3\left(x^2e+d\right)^{\frac{3}{2}}x^2e^{(-1)}-2\left(x^2e+d\right)^{\frac{3}{2}}de^{(-2)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/225*(15*d^(5/2)*e^(-2)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) +
 sqrt(d))) - (9*(x^2*e + d)^(5/2) - 10*(x^2*e + d)^(3/2)*d - 30*sqrt(x^2*e
+ d)*d^2)*e^(-2))*b*n + 1/15*(3*(x^2*e + d)^(3/2)*x^2*e^(-1) - 2*(x^2*e + d
)^(3/2)*d*e^(-2))*b*log(c*x^n) + 1/15*(3*(x^2*e + d)^(3/2)*x^2*e^(-1) - 2*(
x^2*e + d)^(3/2)*d*e^(-2))*a
```

Fricas [A]
time = 0.40, size = 304, normalized size = 1.97

$$\left[\frac{1}{225}\left(15\,bd^{\frac{5}{2}}n\log\left(-\frac{x^2e-2\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-\left(9\,(bn-5\,a)x^4e^2-31\,bd^2n+(8\,bdn-15\,ad)x^2e+30\,ad^2-15\left(3\,bx^4e^2+bdx^2e-2\,bd^2\right)\log\left(c\right)-15\left(3\,bnx^4e^2+bdnx^2e-2\,bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-2)},\ \frac{1}{225}\left(30\,b\sqrt{-d}\,d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)-\left(9\,(bn-5\,a)x^4e^2-31\,bd^2n+(8\,bdn-15\,ad)x^2e+30\,ad^2-15\left(3\,bx^4e^2+bdx^2e-2\,bd^2\right)\log\left(c\right)-15\left(3\,bnx^4e^2+bdnx^2e-2\,bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [1/225*(15*b*d^(5/2)*n*log(-(x^2*e - 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2)
- (9*(b*n - 5*a)*x^4*e^2 - 31*b*d^2*n + (8*b*d*n - 15*a*d)*x^2*e + 30*a*d^2
 - 15*(3*b*x^4*e^2 + b*d*x^2*e - 2*b*d^2)*log(c) - 15*(3*b*n*x^4*e^2 + b*d*
n*x^2*e - 2*b*d^2*n)*log(x))*sqrt(x^2*e + d))*e^(-2), 1/225*(30*b*sqrt(-d)*
d^2*n*arctan(sqrt(-d)/sqrt(x^2*e + d)) - (9*(b*n - 5*a)*x^4*e^2 - 31*b*d^2*
n + (8*b*d*n - 15*a*d)*x^2*e + 30*a*d^2 - 15*(3*b*x^4*e^2 + b*d*x^2*e - 2*b
*d^2)*log(c) - 15*(3*b*n*x^4*e^2 + b*d*n*x^2*e - 2*b*d^2*n)*log(x))*sqrt(x^
2*e + d))*e^(-2)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^3(a+b\log\left(cx^n\right))\sqrt{d+ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Giac [A]
time = 2.64, size = 221, normalized size = 1.44

$$\frac{1}{5}\sqrt{x^2e+d}\,bx^4\log\left(c\right)+\frac{1}{15}\sqrt{x^2e+d}\,bdx^2e^{(-1)}\log\left(c\right)+\frac{1}{5}\sqrt{x^2e+d}\,ax^4+\frac{1}{15}\sqrt{x^2e+d}\,adx^2e^{(-1)}-\frac{2}{15}\sqrt{x^2e+d}\,bd^2e^{(-2)}\log\left(c\right)-\frac{2}{15}\sqrt{x^2e+d}\,ad^2e^{(-2)}+\frac{1}{225}\left(15\left(3\left(x^2e+d\right)^{\frac{5}{2}}-5\left(x^2e+d\right)^{\frac{3}{2}}d\right)e^{(-2)}\log\left(x\right)+\left(\frac{30\,d^3\arctan\left(\frac{\sqrt{x^2e+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-9\left(x^2e+d\right)^{\frac{5}{2}}+10\left(x^2e+d\right)^{\frac{3}{2}}d+30\sqrt{x^2e+d}\,d^2\right)e^{(-2)}\right)bn$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] 1/5*sqrt(x^2*e + d)*b*x^4*log(c) + 1/15*sqrt(x^2*e + d)*b*d*x^2*e^(-1)*log(
c) + 1/5*sqrt(x^2*e + d)*a*x^4 + 1/15*sqrt(x^2*e + d)*a*d*x^2*e^(-1) - 2/15
*sqrt(x^2*e + d)*b*d^2*e^(-2)*log(c) - 2/15*sqrt(x^2*e + d)*a*d^2*e^(-2) +
1/225*(15*(3*(x^2*e + d)^(5/2) - 5*(x^2*e + d)^(3/2)*d)*e^(-2)*log(x) + (30
*d^3*arctan(sqrt(x^2*e + d)/sqrt(-d))/sqrt(-d) - 9*(x^2*e + d)^(5/2) + 10*(
x^2*e + d)^(3/2)*d + 30*sqrt(x^2*e + d)*d^2)*e^(-2))*b*n
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^3*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.253 $\int x\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=102

$$-\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e}+\frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e}$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/e+1/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))
/e+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e-1/3*b*d*n*(e*x^2+d)^(1/2)/e
```

Rubi [A]
time = 0.06, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2376, 272, 52, 65, 214}

$$\frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e}+\frac{bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e}-\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/3*(b*d*n*Sqrt[d + e*x^2])/e - (b*n*(d + e*x^2)^(3/2))/(9*e) + (b*d^(3/2)
*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*e) + ((d + e*x^2)^(3/2)*(a + b*Log[
c*x^n]))/(3*e)
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$\begin{aligned}
\int x\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx &= \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{(bn)\int\frac{(d+ex^2)^{3/2}}{x}\,dx}{3e}\\
&= \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{(bn)\text{Subst}\left(\int\frac{(d+ex)^{3/2}}{x}\,dx,x,x^2\right)}{6e}\\
&= -\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{(bdn)\text{Subst}\left(\int\frac{\sqrt{d}}{}\right.}{6e}\\
&= -\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\\
&= -\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\\
&= -\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e}+
\end{aligned}$$

Mathematica [A]
time = 0.07, size = 136, normalized size = 1.33

$$\frac{3ad\sqrt{d+ex^2}-4bdn\sqrt{d+ex^2}+3aex^2\sqrt{d+ex^2}-benx^2\sqrt{d+ex^2}-3bd^{3/2}n\log(x)+3b(d+ex^2)^{3/2}\log(cx^n)+3bd^{3/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{9e}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (3*a*d*Sqrt[d + e*x^2] - 4*b*d*n*Sqrt[d + e*x^2] + 3*a*e*x^2*Sqrt[d + e*x^2
] - b*e*n*x^2*Sqrt[d + e*x^2] - 3*b*d^(3/2)*n*Log[x] + 3*b*(d + e*x^2)^(3/2
)*Log[c*x^n] + 3*b*d^(3/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(9*e)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.28, size = 85, normalized size = 0.83

$$\frac{1}{3}\left(x^2e+d\right)^{\frac{3}{2}}be^{(-1)}\log\left(cx^n\right)+\frac{1}{9}\left(3\,d^{\frac{3}{2}}\,\operatorname{arsinh}\left(\frac{\sqrt{d}\,e^{\left(-\frac{1}{2}\right)}}{|x|}\right)-\left(x^2e+d\right)^{\frac{3}{2}}-3\,\sqrt{x^2e+d}\,d\right)bne^{(-1)}+\frac{1}{3}\left(x^2e+d\right)^{\frac{3}{2}}ae^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/3*(x^2*e + d)^(3/2)*b*e^(-1)*log(c*x^n) + 1/9*(3*d^(3/2)*arcsinh(sqrt(d)*
e^(-1/2)/abs(x)) - (x^2*e + d)^(3/2) - 3*sqrt(x^2*e + d)*d)*b*n*e^(-1) + 1/
3*(x^2*e + d)^(3/2)*a*e^(-1)
```

Fricas [A]
time = 0.40, size = 209, normalized size = 2.05

$$\left[\frac{1}{18}\left(3\,bd^{\frac{3}{2}}n\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-2\,\left((bn-3\,a)x^2e+4\,bdn-3\,ad-3\,\left(bx^2e+bd\right)\log\left(c\right)-3\,\left(bnx^2e+bdn\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-1)},-\frac{1}{9}\left(3\,b\sqrt{-d}\,dn\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left((bn-3\,a)x^2e+4\,bdn-3\,ad-3\,\left(bx^2e+bd\right)\log\left(c\right)-3\,\left(bnx^2e+bdn\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-1)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [1/18*(3*b*d^(3/2)*n*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2) -
2*((b*n - 3*a)*x^2*e + 4*b*d*n - 3*a*d - 3*(b*x^2*e + b*d)*log(c) - 3*(b*n*
x^2*e + b*d*n)*log(x))*sqrt(x^2*e + d))*e^(-1), -1/9*(3*b*sqrt(-d)*d*n*arct
an(sqrt(-d)/sqrt(x^2*e + d)) + ((b*n - 3*a)*x^2*e + 4*b*d*n - 3*a*d - 3*(b*
x^2*e + b*d)*log(c) - 3*(b*n*x^2*e + b*d*n)*log(x))*sqrt(x^2*e + d))*e^(-1)
]
```

Sympy [A]
time = 12.32, size = 155, normalized size = 1.52

$$a\left(\begin{cases}\frac{\sqrt{d}\,x^2}{2} & \text{for } e=0\\ \frac{(d+ex^2)^{\frac{3}{2}}}{3e} & \text{otherwise}\end{cases}\right)-bn\left(\begin{cases}\frac{\sqrt{d}\,x^2}{4} & \text{for } e=0\\ \frac{4d^{\frac{3}{2}}\sqrt{1+\frac{ex^2}{d}}}{9e}+\frac{d^{\frac{3}{2}}\log\left(\frac{ex^2}{d}\right)}{6e}-\frac{d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{3e}+\frac{\sqrt{d}\,x^2\sqrt{1+\frac{ex^2}{d}}}{9} & \text{otherwise}\end{cases}\right)+b\left(\begin{cases}\frac{\sqrt{d}\,x^2}{2} & \text{for } e=0\\ \frac{(d+ex^2)^{\frac{3}{2}}}{3e} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

```
[Out] a*Piecewise((sqrt(d)*x**2/2, Eq(e, 0)), ((d + e*x**2)**(3/2)/(3*e), True))
- b*n*Piecewise((sqrt(d)*x**2/4, Eq(e, 0)), (4*d**(3/2)*sqrt(1 + e*x**2/d)/
(9*e) + d**(3/2)*log(e*x**2/d)/(6*e) - d**(3/2)*log(sqrt(1 + e*x**2/d) + 1)
/(3*e) + sqrt(d)*x**2*sqrt(1 + e*x**2/d)/9, True)) + b*Piecewise((sqrt(d)*x
**2/2, Eq(e, 0)), ((d + e*x**2)**(3/2)/(3*e), True))*log(c*x**n)
```

Giac [A]
time = 5.38, size = 145, normalized size = 1.42

$$\frac{1}{3}\sqrt{x^2e+d}\,bx^2\log(c)+\frac{1}{3}\sqrt{x^2e+d}\,bde^{(-1)}\log(c)+\frac{1}{3}\sqrt{x^2e+d}\,ax^2+\frac{1}{3}\sqrt{x^2e+d}\,ade^{(-1)}+\frac{1}{9}\left(3\left(x^2e+d\right)^{\frac{3}{2}}e^{(-1)}\log(x)-\left(\frac{3\,d^2\arctan\left(\frac{\sqrt{x^2e+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+\left(x^2e+d\right)^{\frac{3}{2}}+3\sqrt{x^2e+d}\,d\right)e^{(-1)}\right)bn$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] 1/3*sqrt(x^2*e + d)*b*x^2*log(c) + 1/3*sqrt(x^2*e + d)*b*d*e^(-1)*log(c) +
1/3*sqrt(x^2*e + d)*a*x^2 + 1/3*sqrt(x^2*e + d)*a*d*e^(-1) + 1/9*(3*(x^2*e
+ d)^(3/2)*e^(-1)*log(x) - (3*d^2*arctan(sqrt(x^2*e + d)/sqrt(-d))/sqrt(-d)
 + (x^2*e + d)^(3/2) + 3*sqrt(x^2*e + d)*d)*e^(-1))*b*n
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.254 $\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=220

$$-bn\sqrt{d+ex^2}+b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\left(\sqrt{d+ex^2}-\sqrt{d}\,\tanh^{-1}\right.$$

```
[Out] b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*d^(1/2)+1/2*b*n*arctanh((e*x^2+d)^(1/2
)/d^(1/2))^2*d^(1/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(
1/2)-(e*x^2+d)^(1/2)))*d^(1/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^
2+d)^(1/2)))*d^(1/2)-b*n*(e*x^2+d)^(1/2)+(a+b*ln(c*x^n))*(-arctanh((e*x^2+d
)^(1/2)/d^(1/2))*d^(1/2)+(e*x^2+d)^(1/2))
```

Rubi [A]
time = 0.23, antiderivative size = 220, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$,
Rules used = {272, 52, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{1}{2}b\sqrt{d}\,n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)+\left(\sqrt{d+ex^2}-\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-bn\sqrt{d+ex^2}+\frac{1}{2}b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-b\sqrt{d}\,n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -(b*n*Sqrt[d + e*x^2]) + b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]] + (b*
Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/2 + (Sqrt[d + e*x^2] - Sqrt[d
]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])*(a + b*Log[c*x^n]) - b*Sqrt[d]*n*ArcTan
h[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] - (
b*Sqrt[d]*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
```

```
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x}\,dx = \left(\sqrt{d+ex^2}-\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-(bn)\int \Bigg($$

$$= \left(\sqrt{d+ex^2}-\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-(bn)\int \frac{\sqrt{}}{}$$

$$= \left(\sqrt{d+ex^2}-\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-\frac{1}{2}(bn)\text{Sub}$$

$$= -bn\sqrt{d+ex^2}+\left(\sqrt{d+ex^2}-\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log($$

$$= -bn\sqrt{d+ex^2}+\frac{1}{2}b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\left(\sqrt{d+ex^2}-\sqrt{d}\right.$$

$$= -bn\sqrt{d+ex^2}+b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d-}}{\sqrt{}}\right.$$

$$= -bn\sqrt{d+ex^2}+b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d-}}{\sqrt{}}\right.$$

$$= -bn\sqrt{d+ex^2}+b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d-}}{\sqrt{}}\right.$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.22, size = 203, normalized size = 0.92

$$\frac{bn\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{e}x}\right)}{\sqrt{1+\frac{d}{ex^2}}}+\sqrt{d+ex^2}\,(a-bn\log(x)+b\log(cx^n))+\sqrt{d}\,\log(x)\,(a-bn\log(x)+b\log(cx^n))-\sqrt{d}\,(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (b*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -(
d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[Sqrt[d]/(Sqrt[e
]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] + Sqrt[d + e*x^2]*(a - b*n*
Log[x] + b*Log[c*x^n]) + Sqrt[d]*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) - S
qrt[d]*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{e\,x^{2}+d}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x,x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x,x, algorithm="maxima")
```

```
[Out] -(sqrt(d)*arcsinh(sqrt(d)*e^(-1/2)/abs(x)) - sqrt(x^2*e + d))*a + b*integra
te(sqrt(x^2*e + d)*(log(c) + log(x^n))/x, x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x,x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/x, x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\log\left(cx^{n}\right)\right)\sqrt{d+ex^{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x,x)
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x,x, algorithm="giac")
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x,x)
[Out] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x, x)
```

3.255 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=252

$$-\frac{bn\sqrt{d+ex^2}}{4x^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}}+\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4\sqrt{d}}-\frac{\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{2x^2}-\frac{e\tan}{}$$

```
[Out] -1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(1/2)+1/4*b*e*n*arctanh((e*x^
2+d)^(1/2)/d^(1/2))^2/d^(1/2)-1/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*l
n(c*x^n))/d^(1/2)-1/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(
d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-
(e*x^2+d)^(1/2)))/d^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/x^2-1/2*(a+b*ln(c*x^n))*(
e*x^2+d)^(1/2)/x^2
```

Rubi [A]
time = 0.26, antiderivative size = 252, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 11, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.440$, Rules used = {272, 43, 65, 214, 2392, 12, 14, 6131, 6055, 2449, 2352}

$$-\frac{ben\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4\sqrt{d}}-\frac{\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{2x^2}-\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\left(a+b\log\left(cx^n\right)\right)}{2\sqrt{d}}-\frac{bn\sqrt{d+ex^2}}{4x^2}+\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4\sqrt{d}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}}-\frac{ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*n*Sqrt[d + e*x^2])/x^2 - (b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(
4*Sqrt[d]) + (b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/(4*Sqrt[d]) - (Sqrt
[d + e*x^2]*(a + b*Log[c*x^n]))/(2*x^2) - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d
]]*(a + b*Log[c*x^n]))/(2*Sqrt[d]) - (b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]
]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*Sqrt[d]) - (b*e*n*PolyLo
g[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(4*Sqrt[d])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2x^2} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2x^2} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2x^2} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2x^2} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2x^2} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4x^2} - \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2x^2} - \frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(}{2\sqrt{d}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4x^2} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4\sqrt{d}} - \frac{\sqrt{d+ex^2}\,(a+b\log(cx^{}}{2x^2}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4x^2} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4x^2} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4x^2} - \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}} + \frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.32, size = 303, normalized size = 1.20

$$\frac{-2b\sqrt{d}\,n\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)-b\sqrt{e}\,nx\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)(1+2\log(x))+\sqrt{1+\frac{d}{ex^2}}\left(-2a\sqrt{d}\,\sqrt{d+ex^2}-b\sqrt{d}\,n\sqrt{d+ex^2}-2benx^2\log^2(x)-2aex^2\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)+2ex^2\log(x)\left(a+b\log\left(cx^n\right)+bn\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)\right)-2b\log\left(cx^n\right)\left(\sqrt{d}\,\sqrt{d+ex^2}+ex^2\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)\right)\right)}{4\sqrt{d}\,\sqrt{1+\frac{d}{ex^2}}\,x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] (-2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/
2}, -(d/(e*x^2))] - b*Sqrt[e]*n*x*Sqrt[d + e*x^2]*ArcSinh[Sqrt[d]/(Sqrt[e]*
x)]*(1 + 2*Log[x]) + Sqrt[1 + d/(e*x^2)]*(-2*a*Sqrt[d]*Sqrt[d + e*x^2] - b*
Sqrt[d]*n*Sqrt[d + e*x^2] - 2*b*e*n*x^2*Log[x]^2 - 2*a*e*x^2*Log[d + Sqrt[d
]*Sqrt[d + e*x^2]] + 2*e*x^2*Log[x]*(a + b*Log[c*x^n] + b*n*Log[d + Sqrt[d]
*Sqrt[d + e*x^2]]) - 2*b*Log[c*x^n]*(Sqrt[d]*Sqrt[d + e*x^2] + e*x^2*Log[d
+ Sqrt[d]*Sqrt[d + e*x^2]])))/(4*Sqrt[d]*Sqrt[1 + d/(e*x^2)]*x^2)
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{e\,x^{2}+d}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^3,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^3,x, algorithm="maxima")
```

```
[Out] -1/2*(arcsinh(sqrt(d)*e^(-1/2)/abs(x))*e/sqrt(d) - sqrt(x^2*e + d)*e/d + (x
^2*e + d)^(3/2)/(d*x^2))*a + b*integrate(sqrt(x^2*e + d)*(log(c) + log(x^n)
)/x^3, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^3,x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/x^3, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))\sqrt{d + ex^2}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^3,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sqrt{e\,x^2 + d}\,\left(a + b\,\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^3, x)
```

3.256 $\int x^4 \sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=469

$$\frac{7bd^2nx\sqrt{d+ex^2}}{192e^2}-\frac{5bdnx^3\sqrt{d+ex^2}}{288e}-\frac{1}{36}bnx^5\sqrt{d+ex^2}+\frac{5bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{192e^{5/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{bd^{5/2}n\sqrt{d\cdots}}{32\cdots}$$

[Out] 7/192*b*d^2*n*x*(e*x^2+d)^(1/2)/e^2-5/288*b*d*n*x^3*(e*x^2+d)^(1/2)/e-1/36*b*n*x^5*(e*x^2+d)^(1/2)-1/16*d^2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^2+1/24*d*x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e+1/6*x^5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+5/192*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)+1/32*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)-1/16*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)+1/16*d^(5/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)-1/32*b*d^(5/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)

Rubi [A]
time = 0.41, antiderivative size = 469, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.520$, Rules used = {2386, 285, 327, 221, 2392, 12, 14, 201, 5775, 3797, 2221, 2317, 2438}

$$-\frac{bd^{5/2}n\sqrt{d+ex^2}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{32e^{5/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{d^{5/2}\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{d^2x\sqrt{d+ex^2}(a+b\log(cx^n))}{16e^2}+\frac{1}{6}x^5\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{dx^3\sqrt{d+ex^2}(a+b\log(cx^n))}{24e}+\frac{bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{32e^{5/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{5bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{192e^{5/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{16e^{5/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{7bd^2nx\sqrt{d+ex^2}}{192e^2}-\frac{1}{36}bnx^5\sqrt{d+ex^2}-\frac{5bdnx^3\sqrt{d+ex^2}}{288e}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (7*b*d^2*n*x*Sqrt[d + e*x^2])/(192*e^2) - (5*b*d*n*x^3*Sqrt[d + e*x^2])/(288*e) - (b*n*x^5*Sqrt[d + e*x^2])/36 + (5*b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(192*e^(5/2)*Sqrt[1 + (e*x^2)/d]) + (b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(32*e^(5/2)*Sqrt[1 + (e*x^2)/d]) - (b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(16*e^(5/2)*Sqrt[1 + (e*x^2)/d]) - (d^2*x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(16*e^2) + (d*x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(24*e) + (x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/6 + (d^(5/2)*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(16*e^(5/2)*Sqrt[1 + (e*x^2)/d]) - (b*d^(5/2)*n*Sqrt[d + e*x^2]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(32*e^(5/2)*Sqrt[1 + (e*x^2)/d])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !MatchQ[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 285

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + n*p + 1))), x] + Dist[a*n*(p/(m + n*p + 1
)), Int[(c*x)^m*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c, m}, x] && IG
tQ[n, 0] && GtQ[p, 0] && NeQ[m + n*p + 1, 0] && IntBinomialQ[a, b, c, n, m,
 p, x]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
```

```
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int x^4\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx=\frac{\sqrt{d+ex^2}\int x^4\sqrt{1+\frac{ex^2}{d}}\,(a+b\log(cx^n))\,dx}{\sqrt{1+\frac{ex^2}{d}}}$$

$$=-\frac{d^2x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{16e^2}+\frac{dx^3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{24e}+\frac{1}{6}$$

$$=-\frac{d^2x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{16e^2}+\frac{dx^3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{24e}+\frac{1}{6}$$

$$=-\frac{d^2x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{16e^2}+\frac{dx^3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{24e}+\frac{1}{6}$$

$$=-\frac{d^2x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{16e^2}+\frac{dx^3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{24e}+\frac{1}{6}$$

$$=\frac{bd^2nx\sqrt{d+ex^2}}{32e^2}-\frac{bdnx^3\sqrt{d+ex^2}}{96e}-\frac{1}{36}bnx^5\sqrt{d+ex^2}-\frac{d^2x\sqrt{d+}}{}$$

$$=\frac{5bd^2nx\sqrt{d+ex^2}}{192e^2}-\frac{5bdnx^3\sqrt{d+ex^2}}{288e}-\frac{1}{36}bnx^5\sqrt{d+ex^2}+\frac{bd^{5/2}n}{}$$

$$=\frac{7bd^2nx\sqrt{d+ex^2}}{192e^2}-\frac{5bdnx^3\sqrt{d+ex^2}}{288e}-\frac{1}{36}bnx^5\sqrt{d+ex^2}+\frac{7bd^{5/2}n}{}$$

$$=\frac{7bd^2nx\sqrt{d+ex^2}}{192e^2}-\frac{5bdnx^3\sqrt{d+ex^2}}{288e}-\frac{1}{36}bnx^5\sqrt{d+ex^2}+\frac{5bd^{5/2}n}{}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.39, size = 276, normalized size = 0.59

$$\frac{-48be^{5/2}nx^5\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)+75bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log(x)+25\sqrt{1+\frac{ex^2}{d}}\left(a\sqrt{e}\,x\sqrt{d+ex^2}\,(-3d^2+2dex^2+8e^2x^4)+3d^3(a-bn\log(x))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)+b\log\left(cx^n\right)\left(\sqrt{e}\,x\sqrt{d+ex^2}\,(-3d^2+2dex^2+8e^2x^4)+3d^3\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)\right)\right)}{1200e^{5/2}\sqrt{1+\frac{ex^2}{d}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-48*b*e^(5/2)*n*x^5*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 5/2, 5/2}, {7
/2, 7/2}, -((e*x^2)/d)] + 75*b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x
)/Sqrt[d]]*Log[x] + 25*Sqrt[1 + (e*x^2)/d]*(a*Sqrt[e]*x*Sqrt[d + e*x^2]*(-3
*d^2 + 2*d*e*x^2 + 8*e^2*x^4) + 3*d^3*(a - b*n*Log[x])*Log[e*x + Sqrt[e]*Sq
rt[d + e*x^2]] + b*Log[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2]*(-3*d^2 + 2*d*e*x^
2 + 8*e^2*x^4) + 3*d^3*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])))/(1200*e^(5/2)*
Sqrt[1 + (e*x^2)/d])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^4(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^4*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/48*(8*(x^2*e + d)^(3/2)*x^3*e^(-1) + 3*d^3*arcsinh(x*e^(1/2)/sqrt(d))*e^(
-5/2) - 6*(x^2*e + d)^(3/2)*d*x*e^(-2) + 3*sqrt(x^2*e + d)*d^2*x*e^(-2))*a
+ b*integrate((x^4*log(c) + x^4*log(x^n))*sqrt(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
[Out] integral(sqrt(x^2*e + d)*b*x^4*log(c*x^n) + sqrt(x^2*e + d)*a*x^4, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^4 (a + b\log (cx^n))\sqrt{d + ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
[Out] Integral(x**4*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)*x^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^4\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
[Out] int(x^4*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.257 $\int x^2\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=409

$$-\frac{3bdnx\sqrt{d+ex^2}}{32e}-\frac{1}{16}bnx^3\sqrt{d+ex^2}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right.}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

```
[Out] -3/32*b*d*n*x*(e*x^2+d)^(1/2)/e-1/16*b*n*x^3*(e*x^2+d)^(1/2)+1/8*d*x*(a+b*l
n(c*x^n))*(e*x^2+d)^(1/2)/e+1/4*x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)-1/32*b*
d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1
/2)-1/16*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(1/2)/e^(3/2)/(
1+e*x^2/d)^(1/2)+1/8*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)
/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)-1/
8*d^(3/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^(3/2
)/(1+e*x^2/d)^(1/2)+1/16*b*d^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/
d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)
```

Rubi [A]
time = 0.28, antiderivative size = 410, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {2386, 285, 327, 221, 2392, 396, 201, 5775, 3797, 2221, 2317, 2438}

$$\frac{bd^{3/2}n\sqrt{d+ex^2}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{16e^{3/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{d^{3/2}\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{dx\sqrt{d+ex^2}\,(a+b\log(cx^n))}{8e}+\frac{1}{4}x^3\sqrt{d+ex^2}\,(a+b\log(cx^n))-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{16e^{3/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{32e^{3/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{8e^{3/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{bnx(d+ex^2)^{3/2}}{16e}-\frac{bdnx\sqrt{d+ex^2}}{32e}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/32*(b*d*n*x*Sqrt[d + e*x^2])/e - (b*n*x*(d + e*x^2)^(3/2))/(16*e) - (b*d
^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(32*e^(3/2)*Sqrt[1 +
 (e*x^2)/d]) - (b*d^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)
/(16*e^(3/2)*Sqrt[1 + (e*x^2)/d]) + (b*d^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(S
qrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(8*e^(3/2)*
Sqrt[1 + (e*x^2)/d]) + (d*x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(8*e) + (x^
3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/4 - (d^(3/2)*Sqrt[d + e*x^2]*ArcSinh[
(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(8*e^(3/2)*Sqrt[1 + (e*x^2)/d]) +
(b*d^(3/2)*n*Sqrt[d + e*x^2]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]
)/(16*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
```

```
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 285

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + n*p + 1))), x] + Dist[a*n*(p/(m + n*p + 1
)), Int[(c*x)^m*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c, m}, x] && IG
tQ[n, 0] && GtQ[p, 0] && NeQ[m + n*p + 1, 0] && IntBinomialQ[a, b, c, n, m,
 p, x]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 396

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_)*((c_) + (d_.)*(x_)^(n_)), x_Symbol] :> Si
mp[d*x*((a + b*x^n)^(p + 1)/(b*(n*(p + 1) + 1))), x] - Dist[(a*d - b*c*(n*(
p + 1) + 1))/(b*(n*(p + 1) + 1)), Int[(a + b*x^n)^p, x], x] /; FreeQ[{a, b,
 c, d, n}, x] && NeQ[b*c - a*d, 0] && NeQ[n*(p + 1) + 1, 0]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int x^2\sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx=\frac{\sqrt{d+ex^2}\int x^2\sqrt{1+\frac{ex^2}{d}}\,(a+b\log(cx^n))\,dx}{\sqrt{1+\frac{ex^2}{d}}}$$

$$=\frac{dx\sqrt{d+ex^2}\,(a+b\log(cx^n))}{8e}+\frac{1}{4}x^3\sqrt{d+ex^2}\,(a+b\log(cx^n))-\frac{d^{3/2}}{\cdots}$$

$$=\frac{dx\sqrt{d+ex^2}\,(a+b\log(cx^n))}{8e}+\frac{1}{4}x^3\sqrt{d+ex^2}\,(a+b\log(cx^n))-\frac{d^{3/2}}{\cdots}$$

$$=-\frac{bnx(d+ex^2)^{3/2}}{16e}+\frac{dx\sqrt{d+ex^2}\,(a+b\log(cx^n))}{8e}+\frac{1}{4}x^3\sqrt{d+ex^2}\,(a$$

$$=-\frac{bdnx\sqrt{d+ex^2}}{32e}-\frac{bnx(d+ex^2)^{3/2}}{16e}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\cdots}{\sqrt{d}}\right.}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

$$=-\frac{bdnx\sqrt{d+ex^2}}{32e}-\frac{bnx(d+ex^2)^{3/2}}{16e}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\cdots}{\sqrt{d}}\right.}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

$$=-\frac{bdnx\sqrt{d+ex^2}}{32e}-\frac{bnx(d+ex^2)^{3/2}}{16e}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\cdots}{\sqrt{d}}\right.}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

$$=-\frac{bdnx\sqrt{d+ex^2}}{32e}-\frac{bnx(d+ex^2)^{3/2}}{16e}-\frac{bd^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\cdots}{\sqrt{d}}\right.}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order

4 in optimal.
time = 0.27, size = 250, normalized size = 0.61

$$\frac{-8be^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)-9bd^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log(x)+9\sqrt{1+\frac{ex^2}{d}}\left(a\sqrt{e}\,x\sqrt{d+ex^2}\,(d+2ex^2)+d^2(-a+bn\log(x))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)+b\log\left(cx^n\right)\left(\sqrt{e}\,x\sqrt{d+ex^2}\,(d+2ex^2)-d^2\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)\right)\right)}{72e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-8*b*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}, {5/
2, 5/2}, -((e*x^2)/d)] - 9*b*d^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/
Sqrt[d]]*Log[x] + 9*Sqrt[1 + (e*x^2)/d]*(a*Sqrt[e]*x*Sqrt[d + e*x^2]*(d + 2
*e*x^2) + d^2*(-a + b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + b*Log[
c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2]*(d + 2*e*x^2) - d^2*Log[e*x + Sqrt[e]*Sqr
t[d + e*x^2]])))/(72*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^2(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -1/8*(d^2*arcsinh(x*e^(1/2)/sqrt(d))*e^(-3/2) - 2*(x^2*e + d)^(3/2)*x*e^(-1
) + sqrt(x^2*e + d)*d*x*e^(-1))*a + b*integrate(sqrt(x^2*e + d)*(x^2*log(c)
 + x^2*log(x^n)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(x^2*e + d)*b*x^2*log(c*x^n) + sqrt(x^2*e + d)*a*x^2, x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2(a+b\log(cx^n))\sqrt{d+ex^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
[Out] Integral(x**2*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^2\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
[Out] int(x^2*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.258 $\int \sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=330

$$-\frac{1}{4}bnx\sqrt{d+ex^2}+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{e}\,\sqrt{d+ex^2}}-\frac{bdn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{4\sqrt{e}}-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh$$

```
[Out] -1/4*b*d*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/e^(1/2)-1/4*b*n*x*(e*x^2+d)^(
1/2)+1/2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+1/4*b*d^(3/2)*n*arcsinh(x*e^(1/2
)/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-1/2*b*d^(3/2)*n*arcs
inh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x
^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)+1/2*d^(3/2)*arcsinh(x*e^(1/2)/d^(1/2))*
(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-1/4*b*d^(3/2)*n*p
olylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(1/2)
/(e*x^2+d)^(1/2)
```

Rubi [A]
time = 0.14, antiderivative size = 330, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 11, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {2358, 201, 223, 212, 2364, 2362, 5775, 3797, 2221, 2317, 2438}

$$-\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{4\sqrt{e}\,\sqrt{d+ex^2}}+\frac{d^{3/2}\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{e}\,\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}\,(a+b\log(cx^n))+\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{e}\,\sqrt{d+ex^2}}-\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2\sqrt{e}\,\sqrt{d+ex^2}}-\frac{1}{4}bnx\sqrt{d+ex^2}-\frac{bdn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{4\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*n*x*Sqrt[d + e*x^2]) + (b*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sq
rt[e]*x)/Sqrt[d]]^2)/(4*Sqrt[e]*Sqrt[d + e*x^2]) - (b*d*n*ArcTanh[(Sqrt[e]*
x)/Sqrt[d + e*x^2]])/(4*Sqrt[e]) - (b*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh
[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqrt[
e]*Sqrt[d + e*x^2]) + (x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 + (d^(3/2)*S
qrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*Sqrt
[e]*Sqrt[d + e*x^2]) - (b*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*PolyLog[2, E^(2*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]])])/(4*Sqrt[e]*Sqrt[d + e*x^2])
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2358

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_.), x_Sy
mbol] :> Simp[x*(d + e*x^2)^q*((a + b*Log[c*x^n])/(2*q + 1)), x] + (-Dist[b
*(n/(2*q + 1)), Int[(d + e*x^2)^q, x], x] + Dist[2*d*(q/(2*q + 1)), Int[(d
+ e*x^2)^(q - 1)*(a + b*Log[c*x^n]), x], x]) /; FreeQ[{a, b, c, d, e, n}, x
] && GtQ[q, 0]
```

Rule 2362

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Dist[b*(n/Rt[e, 2]), Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

Rule 2364

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Dist[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2], Int[(a + b*Log[c*x^n])/Sqr
t[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \sqrt{d+ex^2}\,(a+b\log(cx^n))\,dx = \frac{1}{2}x\sqrt{d+ex^2}\,(a+b\log(cx^n)) + \frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx - \frac{1}{2}(bn)\int \sqrt{d\cdots}$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} + \frac{1}{2}x\sqrt{d+ex^2}\,(a+b\log(cx^n)) - \frac{1}{4}(bdn)\int \frac{1}{\sqrt{d+ex\cdots}}$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} + \frac{1}{2}x\sqrt{d+ex^2}\,(a+b\log(cx^n)) + \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\ \sinh\cdots}{2\sqrt{\cdots}}$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} - \frac{bdn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{4\sqrt{e}} + \frac{1}{2}x\sqrt{d+ex^2}\,(a+b\log\cdots$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} + \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\ \sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{e}\,\sqrt{d+ex^2}} - \frac{bdn\tanh^{-1}\left(\cdots\right.}{4\sqrt{\cdots}}$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} + \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\ \sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{e}\,\sqrt{d+ex^2}} - \frac{bdn\tanh^{-1}\left(\cdots\right.}{4\sqrt{\cdots}}$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} + \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\ \sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{e}\,\sqrt{d+ex^2}} - \frac{bdn\tanh^{-1}\left(\cdots\right.}{4\sqrt{\cdots}}$$

$$= -\frac{1}{4}bnx\sqrt{d+ex^2} + \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\ \sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{e}\,\sqrt{d+ex^2}} - \frac{bdn\tanh^{-1}\left(\cdots\right.}{4\sqrt{\cdots}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.24, size = 237, normalized size = 0.72

$$\frac{-2b\sqrt{e}\,nx\sqrt{d+ex^2}\;{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right) + b\sqrt{d}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(-1+2\log(x)) + \sqrt{1+\frac{ex^2}{d}}\left(\sqrt{e}\,(2a-bn)x\sqrt{d+ex^2} + 2d(a-bn\log(x))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right) + 2b\log(cx^n)\left(\sqrt{e}\,x\sqrt{d+ex^2} + d\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)\right)\right)}{4\sqrt{e}\,\sqrt{1+\frac{ex^2}{d}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

```
[Out] (-2*b*Sqrt[e]*n*x*Sqrt[d + e*x^2]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2,
3/2}, -((e*x^2)/d)] + b*Sqrt[d]*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[
d]]*(-1 + 2*Log[x]) + Sqrt[1 + (e*x^2)/d]*(Sqrt[e]*(2*a - b*n)*x*Sqrt[d + e
*x^2] + 2*d*(a - b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + 2*b*Log[c
*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2] + d*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])))/
(4*Sqrt[e]*Sqrt[1 + (e*x^2)/d])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \left(a+b\ln \left(c\,x^{n}\right)\right) \sqrt{e\,x^{2}+d}\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/2*(d*arcsinh(x*e^(1/2)/sqrt(d))*e^(-1/2) + sqrt(x^2*e + d)*x)*a + b*integ
rate(sqrt(x^2*e + d)*(log(c) + log(x^n)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \left(a+b\log \left(cx^{n}\right)\right) \sqrt{d+ex^{2}}\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
[Out] int((d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.259 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=345

$$-\frac{bn\sqrt{d+ex^2}}{x}+\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}+\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}-\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\mathrm{s}}{}$$

```
[Out] -b*n*(e*x^2+d)^(1/2)/x-(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x+b*n*arcsinh(x*e^(1
/2)/d^(1/2))*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+1/2*b*n*arcs
inh(x*e^(1/2)/d^(1/2))^2*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)-
b*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2
)*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+arcsinh(x*e^(1/2)/d^(1/
2))*(a+b*ln(c*x^n))*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)-1/2*b
*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*e^(1/2)*(e*x^2+d)^(1/
2)/d^(1/2)/(1+e*x^2/d)^(1/2)
```

Rubi [A]
time = 0.26, antiderivative size = 345, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.400, Rules used = {2386, 283, 221, 2392, 14, 5775, 3797, 2221, 2317, 2438}

$$-\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\mathrm{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x}+\frac{\sqrt{e}\,\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}}-\frac{bn\sqrt{d+ex^2}}{x}+\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}}+\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}}-\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*n*Sqrt[d + e*x^2])/x) + (b*Sqrt[e]*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]])/(Sqrt[d]*Sqrt[1 + (e*x^2)/d]) + (b*Sqrt[e]*n*Sqrt[d + e*x^2]*A
rcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*Sqrt[d]*Sqrt[1 + (e*x^2)/d]) - (b*Sqrt[e]
*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[
e]*x)/Sqrt[d]])])/(Sqrt[d]*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(a + b*L
og[c*x^n]))/x + (Sqrt[e]*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a +
b*Log[c*x^n]))/(Sqrt[d]*Sqrt[1 + (e*x^2)/d]) - (b*Sqrt[e]*n*Sqrt[d + e*x^2]
*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqrt[d]*Sqrt[1 + (e*x^2
)/d])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^2}\,dx = \frac{\sqrt{d+ex^2}\int \frac{\sqrt{1+\frac{ex^2}{d}}\,(a+b\log(cx^n))}{x^2}\,dx}{\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} + \frac{\sqrt{e}\,\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} + \frac{\sqrt{e}\,\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} + \frac{\sqrt{e}\,\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{x} - \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} + \frac{\sqrt{e}\,\sqrt{d+ex^2}\,\sinh^{-1}\Big(}{\sqrt{d}\,\sqrt{1}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{x} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}}{2\sqrt{d}\,\sqrt{1}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{x} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}}{2\sqrt{d}\,\sqrt{1}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{x} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}}{2\sqrt{d}\,\sqrt{1}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{x} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}} + \frac{b\sqrt{e}\,n\sqrt{d+ex^2}}{2\sqrt{d}\,\sqrt{1}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.38, size = 183, normalized size = 0.53

$$\frac{bn\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)-\sqrt{1+\frac{ex^2}{d}}\log(x)+\frac{\sqrt{e}\,x\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log(x)}{\sqrt{d}}\right)}{x\sqrt{1+\frac{ex^2}{d}}}-\frac{\sqrt{d+ex^2}\,(a-bn\log(x)+b\log(cx^n))}{x}+\sqrt{e}\,(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] (b*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -(
(e*x^2)/d)] - Sqrt[1 + (e*x^2)/d]*Log[x] + (Sqrt[e]*x*ArcSinh[(Sqrt[e]*x)/S
qrt[d]]*Log[x])/Sqrt[d]))/(x*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(a - b
*n*Log[x] + b*Log[c*x^n]))/x + Sqrt[e]*(a - b*n*Log[x] + b*Log[c*x^n])*Log[
e*x + Sqrt[e]*Sqrt[d + e*x^2]]
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{e\,x^{2}+d}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^2,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^2,x, algorithm="maxima")
```

```
[Out] (arcsinh(x*e^(1/2)/sqrt(d))*e^(1/2) - sqrt(x^2*e + d)/x)*a + b*integrate(sq
rt(x^2*e + d)*(log(c) + log(x^n))/x^2, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^2,x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))\sqrt{d + ex^2}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**2,x)
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^2,x, algorithm="giac")
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sqrt{e\,x^2 + d}\,\left(a + b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^2,x)
[Out] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^2, x)
```

3.260 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4} dx$

Optimal. Leaf size=112

$$-\frac{ben\sqrt{d+ex^2}}{3dx}-\frac{bn(d+ex^2)^{3/2}}{9dx^3}+\frac{be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d}-\frac{(d+ex^2)^{3/2}\,(a+b\log\left(cx^n\right))}{3dx^3}$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/d/x^3+1/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^
(1/2))/d-1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d/x^3-1/3*b*e*n*(e*x^2+d)^(1/2
)/d/x
```

Rubi [A]
time = 0.07, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {2373, 283, 223, 212}

$$-\frac{(d+ex^2)^{3/2}\,(a+b\log\left(cx^n\right))}{3dx^3}+\frac{be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d}-\frac{ben\sqrt{d+ex^2}}{3dx}-\frac{bn(d+ex^2)^{3/2}}{9dx^3}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/3*(b*e*n*Sqrt[d + e*x^2])/(d*x) - (b*n*(d + e*x^2)^(3/2))/(9*d*x^3) + (b
*e^(3/2)*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(3*d) - ((d + e*x^2)^(3/2)
*(a + b*Log[c*x^n]))/(3*d*x^3)
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3} + \frac{(bn)\int \frac{(d+ex^2)^{3/2}}{x^4}\,dx}{3d}$$

$$= -\frac{bn(d+ex^2)^{3/2}}{9dx^3} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3} + \frac{(ben)\int \frac{\sqrt{d+ex^2}}{x^2}\,dx}{3d}$$

$$= -\frac{ben\sqrt{d+ex^2}}{3dx} - \frac{bn(d+ex^2)^{3/2}}{9dx^3} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3} + \frac{(be^2}{}$$

$$= -\frac{ben\sqrt{d+ex^2}}{3dx} - \frac{bn(d+ex^2)^{3/2}}{9dx^3} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3} + \frac{(be^2}{}$$

$$= -\frac{ben\sqrt{d+ex^2}}{3dx} - \frac{bn(d+ex^2)^{3/2}}{9dx^3} + \frac{be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d} - \frac{(d-}{}$$

Mathematica [A]
time = 0.09, size = 99, normalized size = 0.88

$$-\frac{\sqrt{d+ex^2}\,(3a(d+ex^2)+bn(d+4ex^2))+3b(d+ex^2)^{3/2}\log(cx^n)-3be^{3/2}nx^3\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{9dx^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(Sqrt[d + e*x^2]*(3*a*(d + e*x^2) + b*n*(d + 4*e*x^2)) + 3*b*(d + e*x^
2)^(3/2)*Log[c*x^n] - 3*b*e^(3/2)*n*x^3*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])
/(d*x^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^4,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^4,x)
```

Maxima [A]
time = 0.28, size = 121, normalized size = 1.08

$$\frac{\left(3\,\text{arsinh}\left(\frac{xe^{\frac{1}{2}}}{\sqrt{d}}\right)e^{\frac{3}{2}} + \frac{3\sqrt{x^2e+d}\,xe^2}{d} - \frac{2\,(x^2e+d)^{\frac{3}{2}}e}{dx} - \frac{(x^2e+d)^{\frac{5}{2}}}{dx^3}\right)bn}{9\,d} - \frac{(x^2e+d)^{\frac{3}{2}}b\log(cx^n)}{3\,dx^3} - \frac{(x^2e+d)^{\frac{3}{2}}a}{3\,dx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^4,x, algorithm="maxima")
```

```
[Out] 1/9*(3*arcsinh(x*e^(1/2)/sqrt(d))*e^(3/2) + 3*sqrt(x^2*e + d)*x*e^2/d - 2*(
x^2*e + d)^(3/2)*e/(d*x) - (x^2*e + d)^(5/2)/(d*x^3))*b*n/d - 1/3*(x^2*e +
d)^(3/2)*b*log(c*x^n)/(d*x^3) - 1/3*(x^2*e + d)^(3/2)*a/(d*x^3)
```

Fricas [A]
time = 0.38, size = 112, normalized size = 1.00

$$\frac{3\,bnx^3e^{\frac{3}{2}}\log\left(-2\,x^2e - 2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}} - d\right) - 2\left((4\,bn+3\,a)x^2e + bdn + 3\,ad + 3\,(bx^2e+bd)\log(c) + 3\,(bnx^2e+bdn)\log(x)\right)\sqrt{x^2e+d}}{18\,dx^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^4,x, algorithm="fricas")
```

```
[Out] 1/18*(3*b*n*x^3*e^(3/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) - d) - 2
*((4*b*n + 3*a)*x^2*e + b*d*n + 3*a*d + 3*(b*x^2*e + b*d)*log(c) + 3*(b*n*x
^2*e + b*d*n)*log(x))*sqrt(x^2*e + d))/(d*x^3)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))\sqrt{d+ex^2}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**4,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^4,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^4, x)
```

3.261 $\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=170

$$\frac{2be^2n\sqrt{d+ex^2}}{15d^2x}+\frac{2ben(d+ex^2)^{3/2}}{45d^2x^3}-\frac{bn(d+ex^2)^{5/2}}{25d^2x^5}-\frac{2be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{15d^2}-\frac{(d+ex^2)^{3/2}\,(a+b\log$$

```
[Out] 2/45*b*e*n*(e*x^2+d)^(3/2)/d^2/x^3-1/25*b*n*(e*x^2+d)^(5/2)/d^2/x^5-2/15*b*
e^(5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^2-1/5*(e*x^2+d)^(3/2)*(a+b*l
n(c*x^n))/d/x^5+2/15*e*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d^2/x^3+2/15*b*e^2*n
*(e*x^2+d)^(1/2)/d^2/x
```

Rubi [A]
time = 0.10, antiderivative size = 170, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {277, 270, 2392, 12, 462, 283, 223, 212}

$$\frac{2e(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{5dx^5}-\frac{2be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{15d^2}+\frac{2be^2n\sqrt{d+ex^2}}{15d^2x}-\frac{bn(d+ex^2)^{5/2}}{25d^2x^5}+\frac{2ben(d+ex^2)^{3/2}}{45d^2x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] (2*b*e^2*n*Sqrt[d + e*x^2])/(15*d^2*x) + (2*b*e*n*(d + e*x^2)^(3/2))/(45*d^
2*x^3) - (b*n*(d + e*x^2)^(5/2))/(25*d^2*x^5) - (2*b*e^(5/2)*n*ArcTanh[(Sqr
t[e]*x)/Sqrt[d + e*x^2]])/(15*d^2) - ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))
/(5*d*x^5) + (2*e*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(15*d^2*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5} + \frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3} - (bn$$

$$= -\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5} + \frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3} - \frac{(bn}{}$$

$$= -\frac{bn(d+ex^2)^{5/2}}{25d^2x^5} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5} + \frac{2e(d+ex^2)^{3/2}(a+}{15d^2x^3}$$

$$= \frac{2ben(d+ex^2)^{3/2}}{45d^2x^3} - \frac{bn(d+ex^2)^{5/2}}{25d^2x^5} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5} + \frac{2}{}$$

$$= \frac{2be^2n\sqrt{d+ex^2}}{15d^2x} + \frac{2ben(d+ex^2)^{3/2}}{45d^2x^3} - \frac{bn(d+ex^2)^{5/2}}{25d^2x^5} - \frac{(d+ex^2)^{3/2}(}{5}$$

$$= \frac{2be^2n\sqrt{d+ex^2}}{15d^2x} + \frac{2ben(d+ex^2)^{3/2}}{45d^2x^3} - \frac{bn(d+ex^2)^{5/2}}{25d^2x^5} - \frac{(d+ex^2)^{3/2}(}{5}$$

$$= \frac{2be^2n\sqrt{d+ex^2}}{15d^2x} + \frac{2ben(d+ex^2)^{3/2}}{45d^2x^3} - \frac{bn(d+ex^2)^{5/2}}{25d^2x^5} - \frac{2be^{5/2}n\tanh^{-}}{1}$$

Mathematica [A]
time = 0.12, size = 145, normalized size = 0.85

$$-\frac{\sqrt{d+ex^2}\,(bn(9d^2+8dex^2-31e^2x^4)+15a(3d^2+dex^2-2e^2x^4))+15b\sqrt{d+ex^2}\,(3d^2+dex^2-2e^2x^4)\log(cx^n)+30be^{5/2}nx^5\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{225d^2x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/225*(Sqrt[d + e*x^2]*(b*n*(9*d^2 + 8*d*e*x^2 - 31*e^2*x^4) + 15*a*(3*d^2
 + d*e*x^2 - 2*e^2*x^4)) + 15*b*Sqrt[d + e*x^2]*(3*d^2 + d*e*x^2 - 2*e^2*x^
4)*Log[c*x^n] + 30*b*e^(5/2)*n*x^5*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^2
*x^5)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^6,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^6,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^6,x, algorithm="maxima")
```

```
[Out] 1/15*a*(2*(x^2*e + d)^(3/2)*e/(d^2*x^3) - 3*(x^2*e + d)^(3/2)/(d*x^5)) + b*
integrate(sqrt(x^2*e + d)*(log(c) + log(x^n))/x^6, x)
```

Fricas [A]
time = 0.40, size = 160, normalized size = 0.94

$$\frac{15\,bnx^5e^{\frac{5}{2}}\log\left(-2\,x^2e+2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)+\left((31\,bn+30\,a)x^4e^2-9\,bd^2n-(8\,bdn+15\,ad)x^2e-45\,ad^2+15\,(2\,bx^4e^2-bdx^2e-3\,bd^2)\log\left(c\right)+15\,(2\,bnx^4e^2-bdnx^2e-3\,bd^2n)\log\left(x\right)\right)\sqrt{x^2e+d}}{225\,d^2x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^6,x, algorithm="fricas")
```

```
[Out] 1/225*(15*b*n*x^5*e^(5/2)*log(-2*x^2*e + 2*sqrt(x^2*e + d)*x*e^(1/2) - d) +
 ((31*b*n + 30*a)*x^4*e^2 - 9*b*d^2*n - (8*b*d*n + 15*a*d)*x^2*e - 45*a*d^2
 + 15*(2*b*x^4*e^2 - b*d*x^2*e - 3*b*d^2)*log(c) + 15*(2*b*n*x^4*e^2 - b*d*
n*x^2*e - 3*b*d^2*n)*log(x))*sqrt(x^2*e + d))/(d^2*x^5)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**6,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**6, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^6,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^6,x)
[Out] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^6, x)
```

3.262 $\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^8}\,dx$

Optimal. Leaf size=230

$$-\frac{8be^3n\sqrt{d+ex^2}}{105d^3x}-\frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3}-\frac{bn(d+ex^2)^{5/2}}{49d^2x^7}+\frac{38ben(d+ex^2)^{5/2}}{1225d^3x^5}+\frac{8be^{7/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{105d^3}-$$

```
[Out] -1/49*b*n*(e*x^2+d)^(3/2)/d/x^7+13/1225*b*e*n*(e*x^2+d)^(3/2)/d^2/x^5+62/11
025*b*e^2*n*(e*x^2+d)^(3/2)/d^3/x^3+8/105*b*e^(7/2)*n*arctanh(x*e^(1/2)/(e*
x^2+d)^(1/2))/d^3-1/7*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d/x^7+4/35*e*(e*x^2+d
)^(3/2)*(a+b*ln(c*x^n))/d^2/x^5-8/105*e^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d
^3/x^3-8/105*b*e^3*n*(e*x^2+d)^(1/2)/d^3/x
```

Rubi [A]
time = 0.13, antiderivative size = 230, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {277, 270, 2392, 12, 1279, 462, 283, 223, 212}

$$-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}+\frac{8be^{7/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{105d^3}-\frac{8be^3n\sqrt{d+ex^2}}{105d^3x}-\frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3}+\frac{38ben(d+ex^2)^{5/2}}{1225d^3x^5}-\frac{bn(d+ex^2)^{5/2}}{49d^2x^7}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] (-8*b*e^3*n*Sqrt[d + e*x^2])/(105*d^3*x) - (8*b*e^2*n*(d + e*x^2)^(3/2))/(3
15*d^3*x^3) - (b*n*(d + e*x^2)^(5/2))/(49*d^2*x^7) + (38*b*e*n*(d + e*x^2)^
(5/2))/(1225*d^3*x^5) + (8*b*e^(7/2)*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
)/(105*d^3) - ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(7*d*x^7) + (4*e*(d +
e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(35*d^2*x^5) - (8*e^2*(d + e*x^2)^(3/2)*(a
 + b*Log[c*x^n]))/(105*d^3*x^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
```

```
InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7} + \frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5} - \frac{8e^2(\cdots}{}$$

$$= -\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7} + \frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5} - \frac{8e^2(\cdots}{}$$

$$= -\frac{bn(d+ex^2)^{5/2}}{49d^2x^7} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7} + \frac{4e(d+ex^2)^{3/2}(a+b\cdots}{35d^2x^5}$$

$$= -\frac{bn(d+ex^2)^{5/2}}{49d^2x^7} + \frac{38ben(d+ex^2)^{5/2}}{1225d^3x^5} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7} + \cdots$$

$$= -\frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3} - \frac{bn(d+ex^2)^{5/2}}{49d^2x^7} + \frac{38ben(d+ex^2)^{5/2}}{1225d^3x^5} - \frac{(d+ex^2)^{3\cdots}}{}$$

$$= -\frac{8be^3n\sqrt{d+ex^2}}{105d^3x} - \frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3} - \frac{bn(d+ex^2)^{5/2}}{49d^2x^7} + \frac{38ben(d+e\cdots}{1225d^3x\cdots}$$

$$= -\frac{8be^3n\sqrt{d+ex^2}}{105d^3x} - \frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3} - \frac{bn(d+ex^2)^{5/2}}{49d^2x^7} + \frac{38ben(d+e\cdots}{1225d^3x\cdots}$$

$$= -\frac{8be^3n\sqrt{d+ex^2}}{105d^3x} - \frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3} - \frac{bn(d+ex^2)^{5/2}}{49d^2x^7} + \frac{38ben(d+e\cdots}{1225d^3x\cdots}$$

Mathematica [A]
time = 0.15, size = 180, normalized size = 0.78

$$-\frac{\sqrt{d+ex^2}\,(105a(15d^3+3d^2ex^2-4de^2x^4+8e^3x^6)+bn(225d^3+108d^2ex^2-179de^2x^4+778e^3x^6))+105b\sqrt{d+ex^2}\,(15d^3+3d^2ex^2-4de^2x^4+8e^3x^6)\log(cx^n)-840be^{7/2}nx^7\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{11025d^3x^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^8,x]
[Out] -1/11025*(Sqrt[d + e*x^2]*(105*a*(15*d^3 + 3*d^2*e*x^2 - 4*d*e^2*x^4 + 8*e^
3*x^6) + b*n*(225*d^3 + 108*d^2*e*x^2 - 179*d*e^2*x^4 + 778*e^3*x^6)) + 105
*b*Sqrt[d + e*x^2]*(15*d^3 + 3*d^2*e*x^2 - 4*d*e^2*x^4 + 8*e^3*x^6)*Log[c*x
^n] - 840*b*e^(7/2)*n*x^7*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^3*x^7)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^8,x)
```

```
[Out] int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^8,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^8,x, algorithm="maxima")
```

```
[Out] -1/105*a*(8*(x^2*e + d)^(3/2)*e^2/(d^3*x^3) - 12*(x^2*e + d)^(3/2)*e/(d^2*x
^5) + 15*(x^2*e + d)^(3/2)/(d*x^7)) + b*integrate(sqrt(x^2*e + d)*(log(c) +
 log(x^n))/x^8, x)
```

Fricas [A]
time = 0.42, size = 206, normalized size = 0.90

$$\frac{420\,bnx^{7}e^{\frac{7}{2}}\log\left(-2\,x^{2}e-2\,\sqrt{x^{2}e+d}\,xe^{\frac{1}{2}}-d\right)-(2\,(389\,bn+420\,a)x^{6}e^{3}-(179\,bdn+420\,ad)x^{4}e^{2}+225\,bd^{3}n+1575\,ad^{3}+9\,(12\,bd^{2}n+35\,ad^{2})x^{2}e+105\,(8\,bx^{6}e^{3}-4\,bdx^{4}e^{2}+3\,bd^{2}x^{2}e+15\,bd^{3})\log(c)+105\,(8\,bnx^{6}e^{3}-4\,bdnx^{4}e^{2}+3\,bd^{2}nx^{2}e+15\,bd^{3}n)\log(x))\sqrt{x^{2}e+d}}{11025\,d^{3}x^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^8,x, algorithm="fricas")
```

```
[Out] 1/11025*(420*b*n*x^7*e^(7/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) - d
) - (2*(389*b*n + 420*a)*x^6*e^3 - (179*b*d*n + 420*a*d)*x^4*e^2 + 225*b*d^
3*n + 1575*a*d^3 + 9*(12*b*d^2*n + 35*a*d^2)*x^2*e + 105*(8*b*x^6*e^3 - 4*b
*d*x^4*e^2 + 3*b*d^2*x^2*e + 15*b*d^3)*log(c) + 105*(8*b*n*x^6*e^3 - 4*b*d*
n*x^4*e^2 + 3*b*d^2*n*x^2*e + 15*b*d^3*n)*log(x))*sqrt(x^2*e + d))/(d^3*x^7
)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^{n}))\sqrt{d+ex^{2}}}{x^{8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**8,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**8, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^8,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x^2*e + d)*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sqrt{e\,x^2+d}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^8,x)
```

```
[Out] int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^8, x)
```

3.263 $\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal. Leaf size=231

$$-\frac{8bd^4n\sqrt{d+ex^2}}{315e^3}-\frac{8bd^3n(d+ex^2)^{3/2}}{945e^3}-\frac{8bd^2n(d+ex^2)^{5/2}}{1575e^3}+\frac{11bdn(d+ex^2)^{7/2}}{441e^3}-\frac{bn(d+ex^2)^{9/2}}{81e^3}+\frac{8bd^{9/2}n\,\mathrm{ta}}{}$$

```
[Out] -8/945*b*d^3*n*(e*x^2+d)^(3/2)/e^3-8/1575*b*d^2*n*(e*x^2+d)^(5/2)/e^3+11/44
1*b*d*n*(e*x^2+d)^(7/2)/e^3-1/81*b*n*(e*x^2+d)^(9/2)/e^3+8/315*b*d^(9/2)*n*
arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3+1/5*d^2*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n)
)/e^3-2/7*d*(e*x^2+d)^(7/2)*(a+b*ln(c*x^n))/e^3+1/9*(e*x^2+d)^(9/2)*(a+b*ln
(c*x^n))/e^3-8/315*b*d^4*n*(e*x^2+d)^(1/2)/e^3
```

Rubi [A]
time = 0.19, antiderivative size = 231, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1265, 911, 1275, 214}

$$\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}+\frac{8bd^{9/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{315e^3}-\frac{8bd^4n\sqrt{d+ex^2}}{315e^3}-\frac{8bd^3n(d+ex^2)^{3/2}}{945e^3}-\frac{8bd^2n(d+ex^2)^{5/2}}{1575e^3}+\frac{11bdn(d+ex^2)^{7/2}}{441e^3}-\frac{bn(d+ex^2)^{9/2}}{81e^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-8*b*d^4*n*Sqrt[d + e*x^2])/(315*e^3) - (8*b*d^3*n*(d + e*x^2)^(3/2))/(945
*e^3) - (8*b*d^2*n*(d + e*x^2)^(5/2))/(1575*e^3) + (11*b*d*n*(d + e*x^2)^(7
/2))/(441*e^3) - (b*n*(d + e*x^2)^(9/2))/(81*e^3) + (8*b*d^(9/2)*n*ArcTanh[
Sqrt[d + e*x^2]/Sqrt[d]])/(315*e^3) + (d^2*(d + e*x^2)^(5/2)*(a + b*Log[c*x
^n]))/(5*e^3) - (2*d*(d + e*x^2)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3) + ((d +
e*x^2)^(9/2)*(a + b*Log[c*x^n]))/(9*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1265

```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a +
 b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Inte
gerQ[(m - 1)/2]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int x^5 \left(d+ex^2\right)^{3/2} (a+b\log(cx^n))\,dx = \frac{d^2 \left(d+ex^2\right)^{5/2} (a+b\log(cx^n))}{5e^3} - \frac{2d \left(d+ex^2\right)^{7/2} (a+b\log(cx^n))}{7e^3}$$

$$= \frac{d^2 \left(d+ex^2\right)^{5/2} (a+b\log(cx^n))}{5e^3} - \frac{2d \left(d+ex^2\right)^{7/2} (a+b\log(cx^n))}{7e^3}$$

$$= \frac{d^2 \left(d+ex^2\right)^{5/2} (a+b\log(cx^n))}{5e^3} - \frac{2d \left(d+ex^2\right)^{7/2} (a+b\log(cx^n))}{7e^3}$$

$$= \frac{d^2 \left(d+ex^2\right)^{5/2} (a+b\log(cx^n))}{5e^3} - \frac{2d \left(d+ex^2\right)^{7/2} (a+b\log(cx^n))}{7e^3}$$

$$= \frac{d^2 \left(d+ex^2\right)^{5/2} (a+b\log(cx^n))}{5e^3} - \frac{2d \left(d+ex^2\right)^{7/2} (a+b\log(cx^n))}{7e^3}$$

$$= -\frac{8bd^4n\sqrt{d+ex^2}}{315e^3} - \frac{8bd^3n \left(d+ex^2\right)^{3/2}}{945e^3} - \frac{8bd^2n \left(d+ex^2\right)^{5/2}}{1575e^3} + 11$$

$$= -\frac{8bd^4n\sqrt{d+ex^2}}{315e^3} - \frac{8bd^3n \left(d+ex^2\right)^{3/2}}{945e^3} - \frac{8bd^2n \left(d+ex^2\right)^{5/2}}{1575e^3} + 11$$

Mathematica [A]
time = 0.24, size = 256, normalized size = 1.11

$$\frac{-2520bd^{9/2}n\log(x) + 315bn(d+ex^2)^{5/2}(8d^2-20dex^2+35e^2x^4)\log(x) + \sqrt{d+ex^2}\left(1225e^4x^8(9a-bn-9bn\log(x)+9b\log(cx^n)) + 3d^2e^2x^4(315a-143bn+315b(-n\log(x)+\log(cx^n))) + 25de^3x^6(630a-97bn+630b(-n\log(x)+\log(cx^n))) + 2d^4(1260a-1307bn+1260b(-n\log(x)+\log(cx^n))) - d^3ex^2(1260a-677bn+1260b(-n\log(x)+\log(cx^n)))\right) + 2520bd^{9/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{99225e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-2520*b*d^(9/2)*n*Log[x] + 315*b*n*(d + e*x^2)^(5/2)*(8*d^2 - 20*d*e*x^2 +
 35*e^2*x^4)*Log[x] + Sqrt[d + e*x^2]*(1225*e^4*x^8*(9*a - b*n - 9*b*n*Log[
x] + 9*b*Log[c*x^n]) + 3*d^2*e^2*x^4*(315*a - 143*b*n + 315*b*(-(n*Log[x])
+ Log[c*x^n])) + 25*d*e^3*x^6*(630*a - 97*b*n + 630*b*(-(n*Log[x]) + Log[c*
x^n])) + 2*d^4*(1260*a - 1307*b*n + 1260*b*(-(n*Log[x]) + Log[c*x^n])) - d^
3*e*x^2*(1260*a - 677*b*n + 1260*b*(-(n*Log[x]) + Log[c*x^n]))) + 2520*b*d^
(9/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(99225*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^5 \left(e\,x^2+d\right)^{\frac{3}{2}} (a+b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

```
[Out] int(x^5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.49, size = 239, normalized size = 1.03

$$-\frac{1}{99225}\left(1260\,d^{\frac{9}{2}}e^{(-3)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)+\left(1225\,(x^2e+d)^{\frac{9}{2}}-2475\,(x^2e+d)^{\frac{7}{2}}d+504\,(x^2e+d)^{\frac{5}{2}}d^2+840\,(x^2e+d)^{\frac{3}{2}}d^3+2520\,\sqrt{x^2e+d}\,d^4\right)e^{(-3)}\right)bn+\frac{1}{315}\left(35\,(x^2e+d)^{\frac{5}{2}}x^4e^{(-1)}-20\,(x^2e+d)^{\frac{5}{2}}dx^2e^{(-2)}+8\,(x^2e+d)^{\frac{5}{2}}d^2e^{(-3)}\right)b\log\left(cx^n\right)+\frac{1}{315}\left(35\,(x^2e+d)^{\frac{5}{2}}x^4e^{(-1)}-20\,(x^2e+d)^{\frac{5}{2}}dx^2e^{(-2)}+8\,(x^2e+d)^{\frac{5}{2}}d^2e^{(-3)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/99225*(1260*d^(9/2)*e^(-3)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e +
 d) + sqrt(d))) + (1225*(x^2*e + d)^(9/2) - 2475*(x^2*e + d)^(7/2)*d + 504*
(x^2*e + d)^(5/2)*d^2 + 840*(x^2*e + d)^(3/2)*d^3 + 2520*sqrt(x^2*e + d)*d^
4)*e^(-3))*b*n + 1/315*(35*(x^2*e + d)^(5/2)*x^4*e^(-1) - 20*(x^2*e + d)^(5
/2)*d*x^2*e^(-2) + 8*(x^2*e + d)^(5/2)*d^2*e^(-3))*b*log(c*x^n) + 1/315*(35
*(x^2*e + d)^(5/2)*x^4*e^(-1) - 20*(x^2*e + d)^(5/2)*d*x^2*e^(-2) + 8*(x^2*
e + d)^(5/2)*d^2*e^(-3))*a
```

Fricas [A]
time = 0.45, size = 485, normalized size = 2.10

$$\left[\frac{1}{99225}\left(1260\,bd^{\frac{9}{2}}n\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-\left(1225\,(bn-9\,a)x^8e^4+25\,(97\,bdn-630\,ad)x^6e^3+2614\,bd^4n+3\,(143\,bd^2n-315\,ad^2)x^4e^2-2520\,ad^4-(677\,bd^3n-1260\,ad^3)x^2e-315\,(35\,bx^8e^4+50\,bdx^6e^3+3\,bd^2x^4e^2-4\,bd^3x^2e+8\,bd^4)\log(c)-315\,(35\,bnx^8e^4+50\,bdnx^6e^3+3\,bd^2nx^4e^2-4\,bd^3nx^2e+8\,bd^4n)\log(x)\right)\sqrt{x^2e+d}\right)e^{(-3)},\ -\frac{1}{99225}\left(2520\,b\sqrt{-d}\,d^4n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left(1225\,(bn-9\,a)x^8e^4+25\,(97\,bdn-630\,ad)x^6e^3+2614\,bd^4n+3\,(143\,bd^2n-315\,ad^2)x^4e^2-2520\,ad^4-(677\,bd^3n-1260\,ad^3)x^2e-315\,(35\,bx^8e^4+50\,bdx^6e^3+3\,bd^2x^4e^2-4\,bd^3x^2e+8\,bd^4)\log(c)-315\,(35\,bnx^8e^4+50\,bdnx^6e^3+3\,bd^2nx^4e^2-4\,bd^3nx^2e+8\,bd^4n)\log(x)\right)\sqrt{x^2e+d}\right)e^{(-3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] [1/99225*(1260*b*d^(9/2)*n*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x
^2) - (1225*(b*n - 9*a)*x^8*e^4 + 25*(97*b*d*n - 630*a*d)*x^6*e^3 + 2614*b*
d^4*n + 3*(143*b*d^2*n - 315*a*d^2)*x^4*e^2 - 2520*a*d^4 - (677*b*d^3*n - 1
260*a*d^3)*x^2*e - 315*(35*b*x^8*e^4 + 50*b*d*x^6*e^3 + 3*b*d^2*x^4*e^2 - 4
*b*d^3*x^2*e + 8*b*d^4)*log(c) - 315*(35*b*n*x^8*e^4 + 50*b*d*n*x^6*e^3 + 3
*b*d^2*n*x^4*e^2 - 4*b*d^3*n*x^2*e + 8*b*d^4*n)*log(x))*sqrt(x^2*e + d))*e^
(-3), -1/99225*(2520*b*sqrt(-d)*d^4*n*arctan(sqrt(-d)/sqrt(x^2*e + d)) + (1
225*(b*n - 9*a)*x^8*e^4 + 25*(97*b*d*n - 630*a*d)*x^6*e^3 + 2614*b*d^4*n +
3*(143*b*d^2*n - 315*a*d^2)*x^4*e^2 - 2520*a*d^4 - (677*b*d^3*n - 1260*a*d^
3)*x^2*e - 315*(35*b*x^8*e^4 + 50*b*d*x^6*e^3 + 3*b*d^2*x^4*e^2 - 4*b*d^3*x
^2*e + 8*b*d^4)*log(c) - 315*(35*b*n*x^8*e^4 + 50*b*d*n*x^6*e^3 + 3*b*d^2*n
*x^4*e^2 - 4*b*d^3*n*x^2*e + 8*b*d^4*n)*log(x))*sqrt(x^2*e + d))*e^(-3)]
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)*x^5, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^5\,{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
[Out] int(x^5*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.264 $\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal. Leaf size=177

$$\frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n(d+ex^2)^{3/2}}{105e^2}+\frac{2bdn(d+ex^2)^{5/2}}{175e^2}-\frac{bn(d+ex^2)^{7/2}}{49e^2}-\frac{2bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{35e^2}-d($$

```
[Out] 2/105*b*d^2*n*(e*x^2+d)^(3/2)/e^2+2/175*b*d*n*(e*x^2+d)^(5/2)/e^2-1/49*b*n*
(e*x^2+d)^(7/2)/e^2-2/35*b*d^(7/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^2-1
/5*d*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^2+1/7*(e*x^2+d)^(7/2)*(a+b*ln(c*x^n)
)/e^2+2/35*b*d^3*n*(e*x^2+d)^(1/2)/e^2
```

Rubi [A]
time = 0.14, antiderivative size = 177, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 45, 2392, 12, 457, 81, 52, 65, 214}

$$-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2bd^{7/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{35e^2}+\frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n(d+ex^2)^{3/2}}{105e^2}+\frac{2bdn(d+ex^2)^{5/2}}{175e^2}-\frac{bn(d+ex^2)^{7/2}}{49e^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (2*b*d^3*n*Sqrt[d + e*x^2])/(35*e^2) + (2*b*d^2*n*(d + e*x^2)^(3/2))/(105*e
^2) + (2*b*d*n*(d + e*x^2)^(5/2))/(175*e^2) - (b*n*(d + e*x^2)^(7/2))/(49*e
^2) - (2*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(35*e^2) - (d*(d + e
*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^2) + ((d + e*x^2)^(7/2)*(a + b*Log[c*x
^n]))/(7*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
```

```
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\begin{aligned}
\int x^3\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx &= -\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{\left(d+ex^2\right)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-\cdots \\
&= -\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{\left(d+ex^2\right)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-\cdots \\
&= -\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{\left(d+ex^2\right)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}-\cdots \\
&= -\frac{bn\left(d+ex^2\right)^{7/2}}{49e^2}-\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{\left(d+ex^2\right)^{7/2}\left(a\cdots\right.}{7e\cdots} \\
&= \frac{2bdn\left(d+ex^2\right)^{5/2}}{175e^2}-\frac{bn\left(d+ex^2\right)^{7/2}}{49e^2}-\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}\cdots \\
&= \frac{2bd^2n\left(d+ex^2\right)^{3/2}}{105e^2}+\frac{2bdn\left(d+ex^2\right)^{5/2}}{175e^2}-\frac{bn\left(d+ex^2\right)^{7/2}}{49e^2}-\frac{d\left(d+ex\cdots\right.}{\cdots} \\
&= \frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n\left(d+ex^2\right)^{3/2}}{105e^2}+\frac{2bdn\left(d+ex^2\right)^{5/2}}{175e^2}-\frac{bn\left(d+\cdots\right.}{49\cdots} \\
&= \frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n\left(d+ex^2\right)^{3/2}}{105e^2}+\frac{2bdn\left(d+ex^2\right)^{5/2}}{175e^2}-\frac{bn\left(d+\cdots\right.}{49\cdots} \\
&= \frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n\left(d+ex^2\right)^{3/2}}{105e^2}+\frac{2bdn\left(d+ex^2\right)^{5/2}}{175e^2}-\frac{bn\left(d+\cdots\right.}{49\cdots}
\end{aligned}$$

Mathematica [A]
time = 0.12, size = 227, normalized size = 1.28

$$\frac{2bd^{7/2}n\log(x)}{35e^2}-\frac{bn\left(2d-5ex^2\right)\left(d+ex^2\right)^{5/2}\log(x)}{35e^2}+\sqrt{d+ex^2}\left(\frac{1}{49}ex^6\left(7a-bn+7b\left(-n\log(x)+\log\left(cx^n\right)\right)\right)+\frac{d^2x^2\left(105a-71bn+105b\left(-n\log(x)+\log\left(cx^n\right)\right)\right)}{3675e}-\frac{d^3\left(210a-247bn+210b\left(-n\log(x)+\log\left(cx^n\right)\right)\right)}{3675e^2}+\frac{dx^4\left(280a-61bn+280b\left(-n\log(x)+\log\left(cx^n\right)\right)\right)}{1225}\right)-\frac{2bd^{7/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{35e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (2*b*d^(7/2)*n*Log[x])/(35*e^2) - (b*n*(2*d - 5*e*x^2)*(d + e*x^2)^(5/2)*Lo
g[x])/(35*e^2) + Sqrt[d + e*x^2]*((e*x^6*(7*a - b*n + 7*b*(-(n*Log[x]) + Lo
g[c*x^n])))/49 + (d^2*x^2*(105*a - 71*b*n + 105*b*(-(n*Log[x]) + Log[c*x^n]
)))/(3675*e) - (d^3*(210*a - 247*b*n + 210*b*(-(n*Log[x]) + Log[c*x^n])))/(
3675*e^2) + (d*x^4*(280*a - 61*b*n + 280*b*(-(n*Log[x]) + Log[c*x^n])))/122
5) - (2*b*d^(7/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(35*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^{3} \left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
[Out] int(x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.51, size = 185, normalized size = 1.05

$$\frac{1}{3675}\left(105\,d^{\frac{7}{2}}e^{(-2)}\log\left(\frac{\sqrt{x^{2}e+d}-\sqrt{d}}{\sqrt{x^{2}e+d}+\sqrt{d}}\right)-\left(75\left(x^{2}e+d\right)^{\frac{7}{2}}-42\left(x^{2}e+d\right)^{\frac{5}{2}}d-70\left(x^{2}e+d\right)^{\frac{3}{2}}d^{2}-210\sqrt{x^{2}e+d}\,d^{3}\right)e^{(-2)}\right)bn+\frac{1}{35}\left(5\left(x^{2}e+d\right)^{\frac{5}{2}}x^{2}e^{(-1)}-2\left(x^{2}e+d\right)^{\frac{5}{2}}de^{(-2)}\right)b\log\left(cx^{n}\right)+\frac{1}{35}\left(5\left(x^{2}e+d\right)^{\frac{5}{2}}x^{2}e^{(-1)}-2\left(x^{2}e+d\right)^{\frac{5}{2}}de^{(-2)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] 1/3675*(105*d^(7/2)*e^(-2)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d)
 + sqrt(d))) - (75*(x^2*e + d)^(7/2) - 42*(x^2*e + d)^(5/2)*d - 70*(x^2*e +
 d)^(3/2)*d^2 - 210*sqrt(x^2*e + d)*d^3)*e^(-2))*b*n + 1/35*(5*(x^2*e + d)^
(5/2)*x^2*e^(-1) - 2*(x^2*e + d)^(5/2)*d*e^(-2))*b*log(c*x^n) + 1/35*(5*(x^
2*e + d)^(5/2)*x^2*e^(-1) - 2*(x^2*e + d)^(5/2)*d*e^(-2))*a
```

Fricas [A]
time = 0.45, size = 392, normalized size = 2.21

$$\left[\frac{1}{3675}\left(105\,bd^{\frac{7}{2}}n\log\left(-\frac{x^{2}e-2\sqrt{x^{2}e+d}\sqrt{d}+2\,d}{x^{2}}\right)-\left(75\left(bn-7\,a\right)x^{6}e^{3}+3\left(61\,bdn-280\,ad\right)x^{4}e^{2}-247\,bd^{3}n+210\,ad^{3}+\left(71\,bd^{2}n-105\,ad^{2}\right)x^{2}e-105\left(5\,bx^{6}e^{3}+8\,bdx^{4}e^{2}+bd^{2}x^{2}e-2\,bd^{3}\right)\log\left(c\right)-105\left(5\,bnx^{6}e^{3}+8\,bdnx^{4}e^{2}+bd^{2}nx^{2}e-2\,bd^{3}n\right)\log\left(x\right)\right)\sqrt{x^{2}e+d}\right)e^{(-2)},\ \frac{1}{3675}\left(210\,b\sqrt{-d}\,d^{3}n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^{2}e+d}}\right)-\left(75\left(bn-7\,a\right)x^{6}e^{3}+3\left(61\,bdn-280\,ad\right)x^{4}e^{2}-247\,bd^{3}n+210\,ad^{3}+\left(71\,bd^{2}n-105\,ad^{2}\right)x^{2}e-105\left(5\,bx^{6}e^{3}+8\,bdx^{4}e^{2}+bd^{2}x^{2}e-2\,bd^{3}\right)\log\left(c\right)-105\left(5\,bnx^{6}e^{3}+8\,bdnx^{4}e^{2}+bd^{2}nx^{2}e-2\,bd^{3}n\right)\log\left(x\right)\right)\sqrt{x^{2}e+d}\right)e^{(-2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] [1/3675*(105*b*d^(7/2)*n*log(-(x^2*e - 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2
) - (75*(b*n - 7*a)*x^6*e^3 + 3*(61*b*d*n - 280*a*d)*x^4*e^2 - 247*b*d^3*n
+ 210*a*d^3 + (71*b*d^2*n - 105*a*d^2)*x^2*e - 105*(5*b*x^6*e^3 + 8*b*d*x^4
*e^2 + b*d^2*x^2*e - 2*b*d^3)*log(c) - 105*(5*b*n*x^6*e^3 + 8*b*d*n*x^4*e^2
 + b*d^2*n*x^2*e - 2*b*d^3*n)*log(x))*sqrt(x^2*e + d))*e^(-2), 1/3675*(210*
b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(x^2*e + d)) - (75*(b*n - 7*a)*x^6*e^3
 + 3*(61*b*d*n - 280*a*d)*x^4*e^2 - 247*b*d^3*n + 210*a*d^3 + (71*b*d^2*n -
 105*a*d^2)*x^2*e - 105*(5*b*x^6*e^3 + 8*b*d*x^4*e^2 + b*d^2*x^2*e - 2*b*d^
3)*log(c) - 105*(5*b*n*x^6*e^3 + 8*b*d*n*x^4*e^2 + b*d^2*n*x^2*e - 2*b*d^3*
n)*log(x))*sqrt(x^2*e + d))*e^(-2)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^{3}\left(a+b\log\left(cx^{n}\right)\right)\left(d+ex^{2}\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))*(d + e*x**2)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)*x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\,{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^3*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.265 $\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal. Leaf size=125

$$-\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn(d+ex^2)^{3/2}}{15e}-\frac{bn(d+ex^2)^{5/2}}{25e}+\frac{bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e}+\frac{(d+ex^2)^{5/2}(a+b\log}{5e}$$

```
[Out] -1/15*b*d*n*(e*x^2+d)^(3/2)/e-1/25*b*n*(e*x^2+d)^(5/2)/e+1/5*b*d^(5/2)*n*ar
ctanh((e*x^2+d)^(1/2)/d^(1/2))/e+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e-1/5*
b*d^2*n*(e*x^2+d)^(1/2)/e
```

Rubi [A]
time = 0.08, antiderivative size = 125, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2376, 272, 52, 65, 214}

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}+\frac{bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e}-\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn(d+ex^2)^{3/2}}{15e}-\frac{bn(d+ex^2)^{5/2}}{25e}$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/5*(b*d^2*n*Sqrt[d + e*x^2])/e - (b*d*n*(d + e*x^2)^(3/2))/(15*e) - (b*n*
(d + e*x^2)^(5/2))/(25*e) + (b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/
(5*e) + ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e)
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$\int x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e}-\frac{(bn)\int\frac{\left(d+ex^2\right)^{5/2}}{x}\,dx}{5e}$$

$$=\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e}-\frac{(bn)\text{Subst}\left(\int\frac{(d+ex)^{5/2}}{x}\,dx,x,x^2\right)}{10e}$$

$$=-\frac{bn\left(d+ex^2\right)^{5/2}}{25e}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e}-\frac{(bdn)\text{Subst}\left(\int\frac{(d+\cdots}{\cdots}\right.}{10\cdots}$$

$$=-\frac{bdn\left(d+ex^2\right)^{3/2}}{15e}-\frac{bn\left(d+ex^2\right)^{5/2}}{25e}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e}-\cdots$$

$$=-\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn\left(d+ex^2\right)^{3/2}}{15e}-\frac{bn\left(d+ex^2\right)^{5/2}}{25e}+\frac{\left(d+ex^2\right)^{5/2}\cdots}{\cdots}$$

$$=-\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn\left(d+ex^2\right)^{3/2}}{15e}-\frac{bn\left(d+ex^2\right)^{5/2}}{25e}+\frac{\left(d+ex^2\right)^{5/2}\cdots}{\cdots}$$

$$=-\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn\left(d+ex^2\right)^{3/2}}{15e}-\frac{bn\left(d+ex^2\right)^{5/2}}{25e}+\frac{bd^{5/2}n\tanh\cdots}{\cdots}$$

Mathematica [A]

time = 0.09, size = 181, normalized size = 1.45

$$-\frac{bd^{5/2}n\log(x)}{5e}+\frac{bn(d+ex^2)^{5/2}\log(x)}{5e}+\sqrt{d+ex^2}\left(\frac{1}{25}ex^4(5a-bn+5b(-n\log(x)+\log(cx^n)))+\frac{d^2(15a-23bn+15b(-n\log(x)+\log(cx^n)))}{75e}+\frac{1}{75}dx^2(30a-11bn+30b(-n\log(x)+\log(cx^n)))\right)+\frac{bd^{5/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{5e}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/5*(b*d^(5/2)*n*Log[x])/e + (b*n*(d + e*x^2)^(5/2)*Log[x])/(5*e) + Sqrt[d
 + e*x^2]*((e*x^4*(5*a - b*n + 5*b*(-(n*Log[x]) + Log[c*x^n])))/25 + (d^2*(
15*a - 23*b*n + 15*b*(-(n*Log[x]) + Log[c*x^n])))/(75*e) + (d*x^2*(30*a - 1
1*b*n + 30*b*(-(n*Log[x]) + Log[c*x^n])))/75) + (b*d^(5/2)*n*Log[d + Sqrt[d
]*Sqrt[d + e*x^2]])/(5*e)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x\left(e\,x^2+d\right)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

```
[Out] int(x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.28, size = 100, normalized size = 0.80

$$\frac{1}{5}\left(x^2e+d\right)^{\frac{5}{2}}be^{(-1)}\log\left(cx^n\right)+\frac{1}{5}\left(x^2e+d\right)^{\frac{5}{2}}ae^{(-1)}+\frac{1}{75}\left(15\,d^{\frac{5}{2}}\,\mathrm{arsinh}\left(\frac{\sqrt{d}\,e^{\left(-\frac{1}{2}\right)}}{|x|}\right)-3\left(x^2e+d\right)^{\frac{5}{2}}-5\left(x^2e+d\right)^{\frac{3}{2}}d-15\sqrt{x^2e+d}\,d^2\right)bne^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] 1/5*(x^2*e + d)^(5/2)*b*e^(-1)*log(c*x^n) + 1/5*(x^2*e + d)^(5/2)*a*e^(-1)
+ 1/75*(15*d^(5/2)*arcsinh(sqrt(d)*e^(-1/2)/abs(x)) - 3*(x^2*e + d)^(5/2) -
 5*(x^2*e + d)^(3/2)*d - 15*sqrt(x^2*e + d)*d^2)*b*n*e^(-1)
```

Fricas [A]
time = 0.44, size = 299, normalized size = 2.39

$$\left[\frac{1}{150}\left(15\,bd^{\frac{5}{2}}n\log\left(-\frac{x^2e+2\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-2\left(3\,(bn-5\,a)x^4e^2+23\,bd^2n+(11\,bdn-30\,ad)x^2e-15\,ad^2-15\left(bx^4e^2+2\,bdx^2e+bd^2\right)\log\left(c\right)-15\left(bnx^4e^2+2\,bdnx^2e+bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-1)},-\frac{1}{75}\left(15\,b\sqrt{-d}\,d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left(3\,(bn-5\,a)x^4e^2+23\,bd^2n+(11\,bdn-30\,ad)x^2e-15\,ad^2-15\left(bx^4e^2+2\,bdx^2e+bd^2\right)\log\left(c\right)-15\left(bnx^4e^2+2\,bdnx^2e+bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-1)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] [1/150*(15*b*d^(5/2)*n*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2)
- 2*(3*(b*n - 5*a)*x^4*e^2 + 23*b*d^2*n + (11*b*d*n - 30*a*d)*x^2*e - 15*a*
```

```
d^2 - 15*(b*x^4*e^2 + 2*b*d*x^2*e + b*d^2)*log(c) - 15*(b*n*x^4*e^2 + 2*b*d
*n*x^2*e + b*d^2*n)*log(x))*sqrt(x^2*e + d))*e^(-1), -1/75*(15*b*sqrt(-d)*d
^2*n*arctan(sqrt(-d)/sqrt(x^2*e + d)) + (3*(b*n - 5*a)*x^4*e^2 + 23*b*d^2*n
 + (11*b*d*n - 30*a*d)*x^2*e - 15*a*d^2 - 15*(b*x^4*e^2 + 2*b*d*x^2*e + b*d
^2)*log(c) - 15*(b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*log(x))*sqrt(x^2*e
+ d))*e^(-1)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x(a + b\log(cx^n)) \left(d + ex^2\right)^{\frac{3}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))*(d + e*x**2)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)*x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x \left(e\,x^2 + d\right)^{3/2} \left(a + b\,\ln\left(c\,x^n\right)\right) \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.266 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=260

$$-\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}+\frac{4}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{1}{3}\Bigg($$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)+4/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))+1
/2*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2-b*d^(3/2)*n*arctanh((e*x^
2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))-1/2*b*d^(3/2)*n
*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))-4/3*b*d*n*(e*x^2+d)^(1/2)
+1/3*(a+b*ln(c*x^n))*((e*x^2+d)^(3/2)-3*d^(3/2)*arctanh((e*x^2+d)^(1/2)/d^(
1/2))+3*d*(e*x^2+d)^(1/2))
```

Rubi [A]

time = 0.27, antiderivative size = 260, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 52, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{1}{2}bd^{3/2}n\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)+\frac{1}{3}\left(-3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/2}\right)(a+b\log(cx^n))+\frac{1}{2}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{4}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-bd^{3/2}n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}-\frac{4}{3}bdn\sqrt{d+ex^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-4*b*d*n*Sqrt[d + e*x^2])/3 - (b*n*(d + e*x^2)^(3/2))/9 + (4*b*d^(3/2)*n*A
rcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/3 + (b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x^2]/S
qrt[d]]^2)/2 + ((3*d*Sqrt[d + e*x^2] + (d + e*x^2)^(3/2) - 3*d^(3/2)*ArcTan
h[Sqrt[d + e*x^2]/Sqrt[d]])*(a + b*Log[c*x^n]))/3 - b*d^(3/2)*n*ArcTanh[Sqr
t[d + e*x^2]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] - (b*d^(
3/2)*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
```

```
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{1}{3}\left(3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/2}-3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+$$

$$= \frac{1}{3}\left(3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/2}-3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+$$

$$= \frac{1}{3}\left(3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/2}-3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+$$

$$= -bdn\sqrt{d+ex^2}-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}+\frac{1}{3}\left(3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/}\right.$$

$$= -\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}+\frac{1}{2}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right.$$

$$= -\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}+bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)$$

$$= -\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}+\frac{4}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right.$$

$$= -\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn\left(d+ex^2\right)^{3/2}+\frac{4}{3}bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right.$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

time = 0.49, size = 301, normalized size = 1.16

$$\frac{benx^2\sqrt{d+ex^2}\left(-\frac{1}{4}\,{}_3F_2\left(-\frac{1}{2},1,1;2,2;-\frac{ex^2}{d}\right)+\frac{d\left(-1+\left(1+\frac{ex^2}{d}\right)^{3/2}\right)\log(x)}{3ex^2}\right)}{\sqrt{1+\frac{ex^2}{d}}}+\frac{bdn\sqrt{d+ex^2}\left(-\,{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)\log(x)}{\sqrt{e}\,x}\right)}{\sqrt{1+\frac{d}{ex^2}}}+\frac{1}{3}\sqrt{d+ex^2}\left(4d+ex^2\right)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)+d^{3/2}\log(x)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)-d^{3/2}\left(a-bn\log(x)+b\log\left(cx^n\right)\right)\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (b*e*n*x^2*Sqrt[d + e*x^2]*(-1/4*HypergeometricPFQ[{-1/2, 1, 1}, {2, 2}, -(
(e*x^2)/d)] + (d*(-1 + (1 + (e*x^2)/d)^(3/2))*Log[x])/(3*e*x^2)))/Sqrt[1 +
(e*x^2)/d] + (b*d*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2},
 {1/2, 1/2}, -(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[
Sqrt[d]/(Sqrt[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] + (Sqrt[d +
e*x^2]*(4*d + e*x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/3 + d^(3/2)*Log[x]*(a
 - b*n*Log[x] + b*Log[c*x^n]) - d^(3/2)*(a - b*n*Log[x] + b*Log[c*x^n])*Log
[d + Sqrt[d]*Sqrt[d + e*x^2]]
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a +b\ln \left(c\,x^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -1/3*(3*d^(3/2)*arcsinh(sqrt(d)*e^(-1/2)/abs(x)) - (x^2*e + d)^(3/2) - 3*sq
rt(x^2*e + d)*d)*a + b*integrate((x^2*e*log(c) + d*log(c) + (x^2*e + d)*log
(x^n))*sqrt(x^2*e + d)/x, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] integral(((b*x^2*e + b*d)*sqrt(x^2*e + d)*log(c*x^n) + (a*x^2*e + a*d)*sqrt
(x^2*e + d))/x, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})\,(d + ex^2)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x,x)
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x,x)
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x, x)
```

3.267 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=295

$$-ben\sqrt{d+ex^2}-\frac{bdn\sqrt{d+ex^2}}{4x^2}+\frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{3}{2}e\sqrt{d}$$

```
[Out] -1/2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2+3/4*b*e*n*arctanh((e*x^2+d)^(1/2)/
d^(1/2))*d^(1/2)+3/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2*d^(1/2)-3/2*e
*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)-3/2*b*e*n*arctanh
((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))*d^(1/2)-3
/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))*d^(1/2)-b*e*n*(e*
x^2+d)^(1/2)-1/4*b*d*n*(e*x^2+d)^(1/2)/x^2+3/2*e*(a+b*ln(c*x^n))*(e*x^2+d)^
(1/2)
```

Rubi [A]
time = 0.31, antiderivative size = 295, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {272, 43, 52, 65, 214, 2392, 12, 14, 6131, 6055, 2449, 2352}

$$-\frac{3}{4}b\sqrt{d}\,en\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{3}{2}\sqrt{d}\,e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-ben\sqrt{d+ex^2}-\frac{bdn\sqrt{d+ex^2}}{4x^2}+\frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-\frac{3}{2}b\sqrt{d}\,en\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -(b*e*n*Sqrt[d + e*x^2]) - (b*d*n*Sqrt[d + e*x^2])/(4*x^2) + (3*b*Sqrt[d]*e
*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/4 + (3*b*Sqrt[d]*e*n*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]]^2)/4 + (3*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 - ((d + e
*x^2)^(3/2)*(a + b*Log[c*x^n]))/(2*x^2) - (3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x
^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/2 - (3*b*Sqrt[d]*e*n*ArcTanh[Sqrt[d + e*x^
2]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2 - (3*b*Sqrt[d]*
e*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/4
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{3}{2}e\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right) - \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{2x^2} - \frac{3}{2}\sqrt{d}$$

$$= \frac{3}{2}e\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right) - \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{2x^2} - \frac{3}{2}\sqrt{d}$$

$$= \frac{3}{2}e\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right) - \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{2x^2} - \frac{3}{2}\sqrt{d}$$

$$= \frac{3}{2}e\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right) - \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{2x^2} - \frac{3}{2}\sqrt{d}$$

$$= \frac{3}{2}e\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right) - \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{2x^2} - \frac{3}{2}\sqrt{d}$$

$$= -ben\sqrt{d+ex^2} - \frac{bdn\sqrt{d+ex^2}}{4x^2} + \frac{3}{2}e\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right) -$$

$$= -ben\sqrt{d+ex^2} - \frac{bdn\sqrt{d+ex^2}}{4x^2} + \frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2$$

$$= -ben\sqrt{d+ex^2} - \frac{bdn\sqrt{d+ex^2}}{4x^2} + \frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)$$

$$= -ben\sqrt{d+ex^2} - \frac{bdn\sqrt{d+ex^2}}{4x^2} + \frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)$$

$$= -ben\sqrt{d+ex^2} - \frac{bdn\sqrt{d+ex^2}}{4x^2} + \frac{3}{4}b\sqrt{d}\,en\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.61, size = 349, normalized size = 1.18

$$\frac{ben\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{e}x}\right)}{\sqrt{1+\frac{d}{ex^2}}}-\frac{b\sqrt{d}n\sqrt{d+ex^2}\left(2\sqrt{d}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)+\left(\sqrt{d}\sqrt{1+\frac{d}{ex^2}}+\sqrt{e}x\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\right)(1+2\log(x))\right)}{4\sqrt{1+\frac{d}{ex^2}}x^2}-\frac{(d-2ex^2)\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{2x^2}+\frac{3}{2}\sqrt{d}e\log(x)(a-bn\log(x)+b\log(cx^n))-\frac{3}{2}\sqrt{d}e(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] (b*e*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2},
-(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[Sqrt[d]/(Sqrt
[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] - (b*Sqrt[d]*n*Sqrt[d + e
*x^2]*(2*Sqrt[d]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -(d/(e*x^2)
)] + (Sqrt[d]*Sqrt[1 + d/(e*x^2)] + Sqrt[e]*x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)])
*(1 + 2*Log[x])))/(4*Sqrt[1 + d/(e*x^2)]*x^2) - ((d - 2*e*x^2)*Sqrt[d + e*x
^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*x^2) + (3*Sqrt[d]*e*Log[x]*(a - b*n
*Log[x] + b*Log[c*x^n]))/2 - (3*Sqrt[d]*e*(a - b*n*Log[x] + b*Log[c*x^n])*L
og[d + Sqrt[d]*Sqrt[d + e*x^2]])/2
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] -1/2*(3*sqrt(d)*arcsinh(sqrt(d)*e^(-1/2)/abs(x))*e - 3*sqrt(x^2*e + d)*e -
(x^2*e + d)^(3/2)*e/d + (x^2*e + d)^(5/2)/(d*x^2))*a + b*integrate((x^2*e*l
og(c) + d*log(c) + (x^2*e + d)*log(x^n))*sqrt(x^2*e + d)/x^3, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] integral(((b*x^2*e + b*d)*sqrt(x^2*e + d)*log(c*x^n) + (a*x^2*e + a*d)*sqrt
(x^2*e + d))/x^3, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))\left(d+ex^2\right)^{\frac{3}{2}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(e\,x^2+d\right)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^3, x)
```

3.268 $\int x^2(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

Optimal. Leaf size=464

$$-\frac{11bd^2nx\sqrt{d+ex^2}}{192e}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}-\frac{1}{36}benx^5\sqrt{d+ex^2}-\frac{bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{192e^{3/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{5/2}n}{}$$

[Out] 1/6*x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))-11/192*b*d^2*n*x*(e*x^2+d)^(1/2)/e-23/288*b*d*n*x^3*(e*x^2+d)^(1/2)-1/36*b*e*n*x^5*(e*x^2+d)^(1/2)+1/16*d^2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e+1/8*d*x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)-1/192*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)-1/32*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)+1/16*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)-1/16*d^(5/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)+1/32*b*d^(5/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)

Rubi [A]

time = 0.41, antiderivative size = 464, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.520$, Rules used = {2386, 285, 327, 221, 2392, 12, 14, 201, 5775, 3797, 2221, 2317, 2438}

$$\frac{bd^{5/2}n\sqrt{d+ex^2}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{32e^{3/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{d^{5/2}\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{d^2x\sqrt{d+ex^2}(a+b\log(cx^n))}{16e}+\frac{1}{6}x^3(d+ex^2)^{3/2}(a+b\log(cx^n))+\frac{1}{8}dx^3\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{32e^{3/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{192e^{3/2}\sqrt{\frac{ex^2}{d}+1}}+\frac{bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{16e^{3/2}\sqrt{\frac{ex^2}{d}+1}}-\frac{11bd^2nx\sqrt{d+ex^2}}{192e}-\frac{1}{36}benx^5\sqrt{d+ex^2}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}$$

Antiderivative was successfully verified.

[In] Int[x^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]

[Out] (-11*b*d^2*n*x*Sqrt[d + e*x^2])/(192*e) - (23*b*d*n*x^3*Sqrt[d + e*x^2])/288 - (b*e*n*x^5*Sqrt[d + e*x^2])/36 - (b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(192*e^(3/2)*Sqrt[1 + (e*x^2)/d]) - (b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(32*e^(3/2)*Sqrt[1 + (e*x^2)/d]) + (b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(16*e^(3/2)*Sqrt[1 + (e*x^2)/d]) + (d^2*x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(16*e) + (d*x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/8 + (x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/6 - (d^(5/2)*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(16*e^(3/2)*Sqrt[1 + (e*x^2)/d]) + (b*d^(5/2)*n*Sqrt[d + e*x^2]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(32*e^(3/2)*Sqrt[1 + (e*x^2)/d])

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 285

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + n*p + 1))), x] + Dist[a*n*(p/(m + n*p + 1
)), Int[(c*x)^m*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c, m}, x] && IG
tQ[n, 0] && GtQ[p, 0] && NeQ[m + n*p + 1, 0] && IntBinomialQ[a, b, c, n, m,
 p, x]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
```

```
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int x^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(d\sqrt{d+ex^2}\right)\int x^2\left(1+\frac{ex^2}{d}\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx}{\sqrt{1+\frac{ex^2}{d}}}$$

$$=\frac{d^2x\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{16e}+\frac{1}{8}dx^3\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)-$$

$$=\frac{d^2x\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{16e}+\frac{1}{8}dx^3\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)-$$

$$=\frac{d^2x\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{16e}+\frac{1}{8}dx^3\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)-$$

$$=\frac{d^2x\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{16e}+\frac{1}{8}dx^3\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)-$$

$$=-\frac{bd^2nx\sqrt{d+ex^2}}{32e}-\frac{7}{96}bdnx^3\sqrt{d+ex^2}-\frac{1}{36}benx^5\sqrt{d+ex^2}+$$

$$=-\frac{13bd^2nx\sqrt{d+ex^2}}{192e}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}-\frac{1}{36}benx^5\sqrt{d+ex^2}$$

$$=-\frac{11bd^2nx\sqrt{d+ex^2}}{192e}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}-\frac{1}{36}benx^5\sqrt{d+ex^2}$$

$$=-\frac{11bd^2nx\sqrt{d+ex^2}}{192e}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}-\frac{1}{36}benx^5\sqrt{d+ex^2}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.69, size = 331, normalized size = 0.71

$$\frac{-400bde^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)-144be^{5/2}nx^5\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)-75\left(3bd^{5/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log(x)+\sqrt{1+\frac{ex^2}{d}}\left(-a\sqrt{e}\,x\sqrt{d+ex^2}\,(3d^2+14dex^2+8e^2x^4)+3d^3(a-bn\log(x))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)-b\log\left(cx^n\right)\left(\sqrt{e}\,x\sqrt{d+ex^2}\,(3d^2+14dex^2+8e^2x^4)-3d^3\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)\right)\right)\right)}{3600e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-400*b*d*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2},
 {5/2, 5/2}, -((e*x^2)/d)] - 144*b*e^(5/2)*n*x^5*Sqrt[d + e*x^2]*Hypergeome
tricPFQ[{-1/2, 5/2, 5/2}, {7/2, 7/2}, -((e*x^2)/d)] - 75*(3*b*d^(5/2)*n*Sqr
t[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[x] + Sqrt[1 + (e*x^2)/d]*(-(a
*Sqrt[e]*x*Sqrt[d + e*x^2]*(3*d^2 + 14*d*e*x^2 + 8*e^2*x^4)) + 3*d^3*(a - b
*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] - b*Log[c*x^n]*(Sqrt[e]*x*Sqr
t[d + e*x^2]*(3*d^2 + 14*d*e*x^2 + 8*e^2*x^4) - 3*d^3*Log[e*x + Sqrt[e]*Sqr
t[d + e*x^2]]))))/(3600*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int x^2\left(e\,x^2+d\right)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

```
[Out] int(x^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/48*(3*d^3*arcsinh(x*e^(1/2)/sqrt(d))*e^(-3/2) - 8*(x^2*e + d)^(5/2)*x*e^
(-1) + 2*(x^2*e + d)^(3/2)*d*x*e^(-1) + 3*sqrt(x^2*e + d)*d^2*x*e^(-1))*a +
 b*integrate((x^4*e*log(c) + d*x^2*log(c) + (x^4*e + d*x^2)*log(x^n))*sqrt(
x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral((b*x^4*e + b*d*x^2)*sqrt(x^2*e + d)*log(c*x^n) + (a*x^4*e + a*d*x^
2)*sqrt(x^2*e + d), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2(a + b\log{(cx^n)})\left(d + ex^2\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))*(d + e*x**2)**(3/2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)*x^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int x^2\,{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^2*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.269 $\int (d+ex^2)^{3/2} (a+b\log(cx^n))\,dx$

Optimal. Leaf size=378

$$-\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{16\sqrt{e}\,\sqrt{d+ex^2}}-\frac{9bd^2n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{32\sqrt{e}}$$

```
[Out] -1/16*b*n*x*(e*x^2+d)^(3/2)+1/4*x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))-9/32*b*d^
2*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/e^(1/2)-9/32*b*d*n*x*(e*x^2+d)^(1/2)
+3/8*d*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+3/16*b*d^(5/2)*n*arcsinh(x*e^(1/2)
/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-3/8*b*d^(5/2)*n*arcsi
nh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^
2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)+3/8*d^(5/2)*arcsinh(x*e^(1/2)/d^(1/2))*(
a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-3/16*b*d^(5/2)*n*p
olylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(1/2)
/(e*x^2+d)^(1/2)
```

Rubi [A]

time = 0.19, antiderivative size = 378, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 11, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {2358, 201, 223, 212, 2364, 2362, 5775, 3797, 2221, 2317, 2438}

$$-\frac{3bd^{5/2}n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{16\sqrt{e}\,\sqrt{d+ex^2}}+\frac{3d^{5/2}\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8\sqrt{e}\,\sqrt{d+ex^2}}+\frac{3}{8}dx\sqrt{d+ex^2}\,(a+b\log(cx^n))+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))+\frac{3bd^{5/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{16\sqrt{e}\,\sqrt{d+ex^2}}-\frac{3bd^{5/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{8\sqrt{e}\,\sqrt{d+ex^2}}-\frac{9bd^2n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{32\sqrt{e}}-\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-9*b*d*n*x*Sqrt[d + e*x^2])/32 - (b*n*x*(d + e*x^2)^(3/2))/16 + (3*b*d^(5/
2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(16*Sqrt[e]*Sqrt[d
 + e*x^2]) - (9*b*d^2*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(32*Sqrt[e])
- (3*b*d^(5/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E
^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(8*Sqrt[e]*Sqrt[d + e*x^2]) + (3*d*x*Sq
rt[d + e*x^2]*(a + b*Log[c*x^n]))/8 + (x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n
]))/4 + (3*d^(5/2)*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*
Log[c*x^n]))/(8*Sqrt[e]*Sqrt[d + e*x^2]) - (3*b*d^(5/2)*n*Sqrt[1 + (e*x^2)/
d]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(16*Sqrt[e]*Sqrt[d + e*x
^2])
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
```

```
 Denominator[p]])
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2358

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_.), x_Sy
mbol] :> Simp[x*(d + e*x^2)^q*((a + b*Log[c*x^n])/(2*q + 1)), x] + (-Dist[b
*(n/(2*q + 1)), Int[(d + e*x^2)^q, x], x] + Dist[2*d*(q/(2*q + 1)), Int[(d
+ e*x^2)^(q - 1)*(a + b*Log[c*x^n]), x], x]) /; FreeQ[{a, b, c, d, e, n}, x
] && GtQ[q, 0]
```

Rule 2362

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Dist[b*(n/Rt[e, 2]), Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

Rule 2364

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Dist[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2], Int[(a + b*Log[c*x^n])/Sqr
```

```
t[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)+\frac{1}{4}(3d)\int \sqrt{d+ex^2}\left(a+b\log\left(cx^n\right.\right.$$

$$= -\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3}{8}dx\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)+\frac{1}{4}x\left(d+ex^2\right.$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3}{8}dx\sqrt{d+ex^2}\left(a+b\log\right.$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3}{8}dx\sqrt{d+ex^2}\left(a+b\log\right.$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}-\frac{9bd^2n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex}}\right.}{32\sqrt{e}}$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh}{16\sqrt{e}\,\sqrt{d+e}}$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh}{16\sqrt{e}\,\sqrt{d+e}}$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh}{16\sqrt{e}\,\sqrt{d+e}}$$

$$= -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}+\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh}{16\sqrt{e}\,\sqrt{d+e}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.58, size = 314, normalized size = 0.83

$$\frac{-8be^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9\left(-4bd\sqrt{e}\,nx\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right)+bd^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(-2+3\log(x))+\sqrt{1+\frac{ex^2}{d}}\left(\sqrt{e}\,x\sqrt{d+ex^2}\,(5ad-2bdn+2aex^2)+3d^2(a-bn\log(x))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)+b\log\left(cx^n\right)\left(\sqrt{e}\,x\sqrt{d+ex^2}\,(5d+2ex^2)+3d^2\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)\right)\right)\right)}{72\sqrt{e}\,\sqrt{1+\frac{ex^2}{d}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (-8*b*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}, {5/
2, 5/2}, -((e*x^2)/d)] + 9*(-4*b*d*Sqrt[e]*n*x*Sqrt[d + e*x^2]*Hypergeometr
icPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -((e*x^2)/d)] + b*d^(3/2)*n*Sqrt[d + e*x
^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(-2 + 3*Log[x]) + Sqrt[1 + (e*x^2)/d]*(Sqr
t[e]*x*Sqrt[d + e*x^2]*(5*a*d - 2*b*d*n + 2*a*e*x^2) + 3*d^2*(a - b*n*Log[x
])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + b*Log[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*
x^2]*(5*d + 2*e*x^2) + 3*d^2*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]))))/(72*Sqr
t[e]*Sqrt[1 + (e*x^2)/d])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] 1/8*(3*d^2*arcsinh(x*e^(1/2)/sqrt(d))*e^(-1/2) + 2*(x^2*e + d)^(3/2)*x + 3*
sqrt(x^2*e + d)*d*x)*a + b*integrate((x^2*e*log(c) + d*log(c) + (x^2*e + d)
*log(x^n))*sqrt(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral((b*x^2*e + b*d)*sqrt(x^2*e + d)*log(c*x^n) + (a*x^2*e + a*d)*sqrt(
x^2*e + d), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \left(a+b\log\left(cx^{n}\right)\right)\left(d+ex^{2}\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int {\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int((d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.270 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=400

$$-\frac{bdn\sqrt{d+ex^2}}{x}-\frac{1}{4}benx\sqrt{d+ex^2}+\frac{3b\sqrt{d}\,\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4\sqrt{1+\frac{ex^2}{d}}}+\frac{3b\sqrt{d}\,\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}$$

```
[Out] -(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x-b*d*n*(e*x^2+d)^(1/2)/x-1/4*b*e*n*x*(e*x
^2+d)^(1/2)+3/2*e*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+3/4*b*n*arcsinh(x*e^(1/
2)/d^(1/2))*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)+3/4*b*n*arcsi
nh(x*e^(1/2)/d^(1/2))^2*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)-3
/2*b*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2)
)^2)*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)+3/2*arcsinh(x*e^(1/2
)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2
)-3/4*b*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*e^(1/2
)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)
```

Rubi [A]
time = 0.32, antiderivative size = 400, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {2386, 283, 201, 221, 2392, 12, 14, 5775, 3797, 2221, 2317, 2438}

$$-\frac{3b\sqrt{d}\,\sqrt{e}\,n\sqrt{d+ex^2}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{4\sqrt{\frac{ex^2}{d}+1}}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}+\frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{3\sqrt{d}\,\sqrt{e}\,\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{\frac{ex^2}{d}+1}}-\frac{1}{4}benx\sqrt{d+ex^2}-\frac{bdn\sqrt{d+ex^2}}{x}+\frac{3b\sqrt{d}\,\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4\sqrt{\frac{ex^2}{d}+1}}+\frac{3b\sqrt{d}\,\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4\sqrt{\frac{ex^2}{d}+1}}-\frac{3b\sqrt{d}\,\sqrt{e}\,n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2\sqrt{\frac{ex^2}{d}+1}}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d*n*Sqrt[d + e*x^2])/x) - (b*e*n*x*Sqrt[d + e*x^2])/4 + (3*b*Sqrt[d]*S
qrt[e]*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(4*Sqrt[1 + (e*x^2)/
d]) + (3*b*Sqrt[d]*Sqrt[e]*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2
)/(4*Sqrt[1 + (e*x^2)/d]) - (3*b*Sqrt[d]*Sqrt[e]*n*Sqrt[d + e*x^2]*ArcSinh[
(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqrt[1
 + (e*x^2)/d]) + (3*e*x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 - ((d + e*x^2
)^(3/2)*(a + b*Log[c*x^n]))/x + (3*Sqrt[d]*Sqrt[e]*Sqrt[d + e*x^2]*ArcSinh[
(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*Sqrt[1 + (e*x^2)/d]) - (3*b*Sqr
t[d]*Sqrt[e]*n*Sqrt[d + e*x^2]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]
)])/(4*Sqrt[1 + (e*x^2)/d])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
```

```
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \frac{\left(d\sqrt{d+ex^2}\right)\int \frac{\left(1+\frac{ex^2}{d}\right)^{3/2}(a+b\log(cx^n))}{x^2}\,dx}{\sqrt{1+\frac{ex^2}{d}}}$$

$$= \frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n)) - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x} + \frac{3\sqrt{\ldots}}{\ldots}$$

$$= \frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n)) - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x} + \frac{3\sqrt{\ldots}}{\ldots}$$

$$= \frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n)) - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x} + \frac{3\sqrt{\ldots}}{\ldots}$$

$$= \frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n)) - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x} + \frac{3\sqrt{\ldots}}{\ldots}$$

$$= -\frac{bdn\sqrt{d+ex^2}}{x} - \frac{1}{4}benx\sqrt{d+ex^2} + \frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n)\ldots$$

$$= -\frac{bdn\sqrt{d+ex^2}}{x} - \frac{1}{4}benx\sqrt{d+ex^2} + \frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\sinh^{-1}\ldots}{4\sqrt{1+\frac{ex^2}{d}}\ldots}$$

$$= -\frac{bdn\sqrt{d+ex^2}}{x} - \frac{1}{4}benx\sqrt{d+ex^2} + \frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\sinh^{-1}\ldots}{4\sqrt{1+\frac{ex^2}{d}}\ldots}$$

$$= -\frac{bdn\sqrt{d+ex^2}}{x} - \frac{1}{4}benx\sqrt{d+ex^2} + \frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\sinh^{-1}\ldots}{4\sqrt{1+\frac{ex^2}{d}}\ldots}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.64, size = 329, normalized size = 0.82

$$-\frac{b\sqrt{d}\,n\sqrt{d+ex^2}\left(\sqrt{d}\,{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)+\left(\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}-\sqrt{e}\,x\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\right)\log(x)\right)}{x\sqrt{1+\frac{ex^2}{d}}}+\frac{b\sqrt{e}\,n\sqrt{d+ex^2}\left(-2\sqrt{e}\,x\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right)+\left(\sqrt{e}\,x\sqrt{1+\frac{ex^2}{d}}+\sqrt{d}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\right)(-1+2\log(x))\right)}{4\sqrt{1+\frac{ex^2}{d}}}-\frac{(2d-ex^2)\sqrt{d+ex^2}\,(a-bn\log(x)+b\log(cx^n))}{2x}+\frac{3}{2}d\sqrt{e}\,(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*Sqrt[d]*n*Sqrt[d + e*x^2]*(Sqrt[d]*HypergeometricPFQ[{-1/2, -1/2, -1/2
}, {1/2, 1/2}, -((e*x^2)/d)] + (Sqrt[d]*Sqrt[1 + (e*x^2)/d] - Sqrt[e]*x*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]])*Log[x]))/(x*Sqrt[1 + (e*x^2)/d])) + (b*Sqrt[e]*n
*Sqrt[d + e*x^2]*(-2*Sqrt[e]*x*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2
}, -((e*x^2)/d)] + (Sqrt[e]*x*Sqrt[1 + (e*x^2)/d] + Sqrt[d]*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]])*(-1 + 2*Log[x])))/(4*Sqrt[1 + (e*x^2)/d]) - ((2*d - e*x^2)*S
qrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*x) + (3*d*Sqrt[e]*(a - b
*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/2
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*(3*d*arcsinh(x*e^(1/2)/sqrt(d))*e^(1/2) + 3*sqrt(x^2*e + d)*x*e - 2*(x^
2*e + d)^(3/2)/x)*a + b*integrate((x^2*e*log(c) + d*log(c) + (x^2*e + d)*lo
g(x^n))*sqrt(x^2*e + d)/x^2, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] integral(((b*x^2*e + b*d)*sqrt(x^2*e + d)*log(c*x^n) + (a*x^2*e + a*d)*sqrt
(x^2*e + d))/x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})\,(d + ex^2)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^2,x)
```

```
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^2, x)
```

3.271 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=400

$$-\frac{4ben\sqrt{d+ex^2}}{3x}-\frac{bn(d+ex^2)^{3/2}}{9x^3}+\frac{4be^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}+\frac{be^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}-$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/x^3-1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3-4/3*b*
e*n*(e*x^2+d)^(1/2)/x-e*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x+4/3*b*e^(3/2)*n*a
rcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+1/2*b*e
^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(
1/2)-b*e^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^
2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+e^(3/2)*arcsinh(x*
e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)-
1/2*b*e^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d
)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)
```

Rubi [A]
time = 0.30, antiderivative size = 400, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2386, 283, 221, 2392, 462, 5775, 3797, 2221, 2317, 2438}

$$-\frac{be^{3/2}n\sqrt{d+ex^2}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}\sqrt{\frac{ex^2}{d}+1}}+\frac{e^{3/2}\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}}-\frac{e\sqrt{d+ex^2}(a+b\log(cx^n))}{x}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3x^3}+\frac{be^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{d}\sqrt{\frac{ex^2}{d}+1}}+\frac{4be^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3\sqrt{d}\sqrt{\frac{ex^2}{d}+1}}-\frac{be^{3/2}n\sqrt{d+ex^2}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}}-\frac{4ben\sqrt{d+ex^2}}{3x}-\frac{bn(d+ex^2)^{3/2}}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] (-4*b*e*n*Sqrt[d + e*x^2])/(3*x) - (b*n*(d + e*x^2)^(3/2))/(9*x^3) + (4*b*e
^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(3*Sqrt[d]*Sqrt[1 +
(e*x^2)/d]) + (b*e^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/
(2*Sqrt[d]*Sqrt[1 + (e*x^2)/d]) - (b*e^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqr
t[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(Sqrt[d]*Sqrt
[1 + (e*x^2)/d]) - (e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x - ((d + e*x^2)^
(3/2)*(a + b*Log[c*x^n]))/(3*x^3) + (e^(3/2)*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[
e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*Sqrt[1 + (e*x^2)/d]) - (b*e^(3/
2)*n*Sqrt[d + e*x^2]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqr
t[d]*Sqrt[1 + (e*x^2)/d])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
```

```
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \frac{\left(d\sqrt{d+ex^2}\right)\int \frac{\left(1+\frac{ex^2}{d}\right)^{3/2}(a+b\log(cx^n))}{x^4}\,dx}{\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3x^3} + \frac{e^{3/2}}{}$$

$$= -\frac{e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3x^3} + \frac{e^{3/2}}{}$$

$$= -\frac{bn(d+ex^2)^{3/2}}{9x^3} - \frac{e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{x} - \frac{(d+ex^2)^{3/2}(a+b}{3x^3}$$

$$= -\frac{4ben\sqrt{d+ex^2}}{3x} - \frac{bn(d+ex^2)^{3/2}}{9x^3} + \frac{be^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right.}{2\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{4ben\sqrt{d+ex^2}}{3x} - \frac{bn(d+ex^2)^{3/2}}{9x^3} + \frac{4be^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}}{\sqrt{d}}\right.}{3\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{4ben\sqrt{d+ex^2}}{3x} - \frac{bn(d+ex^2)^{3/2}}{9x^3} + \frac{4be^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}}{\sqrt{d}}\right.}{3\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

$$= -\frac{4ben\sqrt{d+ex^2}}{3x} - \frac{bn(d+ex^2)^{3/2}}{9x^3} + \frac{4be^{3/2}n\sqrt{d+ex^2}\,\sinh^{-1}\left(\frac{\sqrt{e}}{\sqrt{d}}\right.}{3\sqrt{d}\,\sqrt{1+\frac{ex^2}{d}}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.50, size = 269, normalized size = 0.67

$$\frac{bdn\sqrt{d+ex^2}\left(-{}_2F_1\left(-\frac{3}{2},-\frac{3}{2};-\frac{1}{2};-\frac{ex^2}{d}\right)-3\left(1+\frac{ex^2}{d}\right)^{3/2}\log(x)\right)}{9x^3\sqrt{1+\frac{ex^2}{d}}}+\frac{ben\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)-\sqrt{1+\frac{ex^2}{d}}\log(x)+\frac{\sqrt{e}x\sinh^{-1}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)}{\sqrt{d}}\right)}{x\sqrt{1+\frac{ex^2}{d}}}-\frac{\sqrt{d+ex^2}\left(d+4ex^2\right)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)}{3x^3}+e^{3/2}(a-bn\log(x)+b\log\left(cx^n\right))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] (b*d*n*Sqrt[d + e*x^2]*(-Hypergeometric2F1[-3/2, -3/2, -1/2, -((e*x^2)/d)]
- 3*(1 + (e*x^2)/d)^(3/2)*Log[x]))/(9*x^3*Sqrt[1 + (e*x^2)/d]) + (b*e*n*Sqr
t[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -((e*x^2)/
d)] - Sqrt[1 + (e*x^2)/d]*Log[x] + (Sqrt[e]*x*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*
Log[x])/Sqrt[d]))/(x*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(d + 4*e*x^2)*
(a - b*n*Log[x] + b*Log[c*x^n]))/(3*x^3) + e^(3/2)*(a - b*n*Log[x] + b*Log[
c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^4,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^4,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] 1/3*(3*arcsinh(x*e^(1/2)/sqrt(d))*e^(3/2) + 3*sqrt(x^2*e + d)*x*e^2/d - 2*(
x^2*e + d)^(3/2)*e/(d*x) - (x^2*e + d)^(5/2)/(d*x^3))*a + b*integrate((x^2*
e*log(c) + d*log(c) + (x^2*e + d)*log(x^n))*sqrt(x^2*e + d)/x^4, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] integral(((b*x^2*e + b*d)*sqrt(x^2*e + d)*log(c*x^n) + (a*x^2*e + a*d)*sqrt
(x^2*e + d))/x^4, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})\,(d + ex^2)^{\frac{3}{2}}}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^4, x)
```

3.272 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=138

$$-\frac{be^2n\sqrt{d+ex^2}}{5dx}-\frac{ben(d+ex^2)^{3/2}}{15dx^3}-\frac{bn(d+ex^2)^{5/2}}{25dx^5}+\frac{be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{5d}-\frac{(d+ex^2)^{5/2}\,(a+b\log(c$$

```
[Out] -1/15*b*e*n*(e*x^2+d)^(3/2)/d/x^3-1/25*b*n*(e*x^2+d)^(5/2)/d/x^5+1/5*b*e^(5
/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d-1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^
n))/d/x^5-1/5*b*e^2*n*(e*x^2+d)^(1/2)/d/x
```

Rubi [A]

time = 0.08, antiderivative size = 138, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2373, 283, 223, 212}

$$-\frac{(d+ex^2)^{5/2}\,(a+b\log(cx^n))}{5dx^5}+\frac{be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{5d}-\frac{be^2n\sqrt{d+ex^2}}{5dx}-\frac{bn(d+ex^2)^{5/2}}{25dx^5}-\frac{ben(d+ex^2)^{3/2}}{15dx^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/5*(b*e^2*n*Sqrt[d + e*x^2])/(d*x) - (b*e*n*(d + e*x^2)^(3/2))/(15*d*x^3)
 - (b*n*(d + e*x^2)^(5/2))/(25*d*x^5) + (b*e^(5/2)*n*ArcTanh[(Sqrt[e]*x)/Sq
rt[d + e*x^2]])/(5*d) - ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*d*x^5)
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = -\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5} + \frac{(bn)\int \frac{(d+ex^2)^{5/2}}{x^6}\,dx}{5d}$$

$$= -\frac{bn(d+ex^2)^{5/2}}{25dx^5} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5} + \frac{(ben)\int \frac{(d+ex^2)^{3/2}}{x^4}}{5d}$$

$$= -\frac{ben(d+ex^2)^{3/2}}{15dx^3} - \frac{bn(d+ex^2)^{5/2}}{25dx^5} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5} +$$

$$= -\frac{be^2n\sqrt{d+ex^2}}{5dx} - \frac{ben(d+ex^2)^{3/2}}{15dx^3} - \frac{bn(d+ex^2)^{5/2}}{25dx^5} - \frac{(d+ex^2)^{5/2}}{}$$

$$= -\frac{be^2n\sqrt{d+ex^2}}{5dx} - \frac{ben(d+ex^2)^{3/2}}{15dx^3} - \frac{bn(d+ex^2)^{5/2}}{25dx^5} - \frac{(d+ex^2)^{5/2}}{}$$

$$= -\frac{be^2n\sqrt{d+ex^2}}{5dx} - \frac{ben(d+ex^2)^{3/2}}{15dx^3} - \frac{bn(d+ex^2)^{5/2}}{25dx^5} + \frac{be^{5/2}n\tanh^{-}}{}$$

Mathematica [A]
time = 0.12, size = 114, normalized size = 0.83

$$-\frac{\sqrt{d+ex^2}\left(15a(d+ex^2)^2+bn(3d^2+11dex^2+23e^2x^4)\right)+15b(d+ex^2)^{5/2}\log(cx^n)-15be^{5/2}nx^5\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{75dx^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/75*(Sqrt[d + e*x^2]*(15*a*(d + e*x^2)^2 + b*n*(3*d^2 + 11*d*e*x^2 + 23*e
^2*x^4)) + 15*b*(d + e*x^2)^(5/2)*Log[c*x^n] - 15*b*e^(5/2)*n*x^5*Log[e*x +
 Sqrt[e]*Sqrt[d + e*x^2]])/(d*x^5)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}(a+b\ln(c\,x^n))}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^6,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^6,x)
```

Maxima [A]
time = 0.29, size = 159, normalized size = 1.15

$$\frac{\left(15 \operatorname{arsinh}\left(\frac{xe^{\frac{1}{2}}}{\sqrt{d}}\right)e^{\frac{5}{2}} + \frac{10\,(x^2e+d)^{\frac{3}{2}}xe^3}{d^2} + \frac{15\,\sqrt{x^2e+d}\,xe^3}{d} - \frac{8\,(x^2e+d)^{\frac{5}{2}}e^2}{d^2x} - \frac{2\,(x^2e+d)^{\frac{7}{2}}e}{d^2x^3} - \frac{3\,(x^2e+d)^{\frac{7}{2}}}{dx^5}\right)bn}{75\,d} - \frac{(x^2e+d)^{\frac{5}{2}}b\log\left(cx^n\right)}{5\,dx^5} - \frac{(x^2e+d)^{\frac{5}{2}}a}{5\,dx^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] 1/75*(15*arcsinh(x*e^(1/2)/sqrt(d))*e^(5/2) + 10*(x^2*e + d)^(3/2)*x*e^3/d^
2 + 15*sqrt(x^2*e + d)*x*e^3/d - 8*(x^2*e + d)^(5/2)*e^2/(d^2*x) - 2*(x^2*e
 + d)^(7/2)*e/(d^2*x^3) - 3*(x^2*e + d)^(7/2)/(d*x^5))*b*n/d - 1/5*(x^2*e +
 d)^(5/2)*b*log(c*x^n)/(d*x^5) - 1/5*(x^2*e + d)^(5/2)*a/(d*x^5)
```

Fricas [A]
time = 0.40, size = 156, normalized size = 1.13

$$\frac{15\,bnx^5e^{\frac{5}{2}}\log\left(-2\,x^2e - 2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}} - d\right) - 2\left((23\,bn + 15\,a)x^4e^2 + 3\,bd^2n + (11\,bdn + 30\,ad)x^2e + 15\,ad^2 + 15\left(bx^4e^2 + 2\,bdx^2e + bd^2\right)\log\left(c\right) + 15\left(bnx^4e^2 + 2\,bdnx^2e + bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}}{150\,dx^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] 1/150*(15*b*n*x^5*e^(5/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) - d) -
 2*((23*b*n + 15*a)*x^4*e^2 + 3*b*d^2*n + (11*b*d*n + 30*a*d)*x^2*e + 15*a*
d^2 + 15*(b*x^4*e^2 + 2*b*d*x^2*e + b*d^2)*log(c) + 15*(b*n*x^4*e^2 + 2*b*d
*n*x^2*e + b*d^2*n)*log(x))*sqrt(x^2*e + d))/(d*x^5)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b\log\left(cx^n\right)\right)\left(d + ex^2\right)^{\frac{3}{2}}}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**6, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(e\,x^2+d\right)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^6,x)
```

```
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^6, x)
```

3.273 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$

Optimal. Leaf size=196

$$\frac{2be^3n\sqrt{d+ex^2}}{35d^2x}+\frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3}+\frac{2ben(d+ex^2)^{5/2}}{175d^2x^5}-\frac{bn(d+ex^2)^{7/2}}{49d^2x^7}-\frac{2be^{7/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{35d^2}-(d$$

```
[Out] 2/105*b*e^2*n*(e*x^2+d)^(3/2)/d^2/x^3+2/175*b*e*n*(e*x^2+d)^(5/2)/d^2/x^5-1
/49*b*n*(e*x^2+d)^(7/2)/d^2/x^7-2/35*b*e^(7/2)*n*arctanh(x*e^(1/2)/(e*x^2+d
)^(1/2))/d^2-1/7*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d/x^7+2/35*e*(e*x^2+d)^(5/
2)*(a+b*ln(c*x^n))/d^2/x^5+2/35*b*e^3*n*(e*x^2+d)^(1/2)/d^2/x
```

Rubi [A]
time = 0.12, antiderivative size = 196, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {277, 270, 2392, 12, 462, 283, 223, 212}

$$\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}-\frac{2be^{7/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{35d^2}+\frac{2be^3n\sqrt{d+ex^2}}{35d^2x}+\frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3}-\frac{bn(d+ex^2)^{7/2}}{49d^2x^7}+\frac{2ben(d+ex^2)^{5/2}}{175d^2x^5}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] (2*b*e^3*n*Sqrt[d + e*x^2])/(35*d^2*x) + (2*b*e^2*n*(d + e*x^2)^(3/2))/(105
*d^2*x^3) + (2*b*e*n*(d + e*x^2)^(5/2))/(175*d^2*x^5) - (b*n*(d + e*x^2)^(7
/2))/(49*d^2*x^7) - (2*b*e^(7/2)*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(3
5*d^2) - ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(7*d*x^7) + (2*e*(d + e*x^2
)^(5/2)*(a + b*Log[c*x^n]))/(35*d^2*x^5)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = -\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7} + \frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5} - (bn$$

$$= -\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7} + \frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5} - \frac{(bn}{}$$

$$= -\frac{bn(d+ex^2)^{7/2}}{49d^2x^7} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7} + \frac{2e(d+ex^2)^{5/2}(a+}{35d^2x^5}$$

$$= \frac{2ben(d+ex^2)^{5/2}}{175d^2x^5} - \frac{bn(d+ex^2)^{7/2}}{49d^2x^7} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7} + \frac{2}{}$$

$$= \frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3} + \frac{2ben(d+ex^2)^{5/2}}{175d^2x^5} - \frac{bn(d+ex^2)^{7/2}}{49d^2x^7} - \frac{(d+ex^2)^{5/2}}{}$$

$$= \frac{2be^3n\sqrt{d+ex^2}}{35d^2x} + \frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3} + \frac{2ben(d+ex^2)^{5/2}}{175d^2x^5} - \frac{bn(d+ex}{49d^2x}$$

$$= \frac{2be^3n\sqrt{d+ex^2}}{35d^2x} + \frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3} + \frac{2ben(d+ex^2)^{5/2}}{175d^2x^5} - \frac{bn(d+ex}{49d^2x}$$

$$= \frac{2be^3n\sqrt{d+ex^2}}{35d^2x} + \frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3} + \frac{2ben(d+ex^2)^{5/2}}{175d^2x^5} - \frac{bn(d+ex}{49d^2x}$$

Mathematica [A]
time = 0.15, size = 145, normalized size = 0.74

$$-\frac{\sqrt{d+ex^2}\left(105a(5d-2ex^2)(d+ex^2)^2+bn(75d^3+183d^2ex^2+71de^2x^4-247e^3x^6)\right)+105b(5d-2ex^2)(d+ex^2)^{5/2}\log(cx^n)+210be^{7/2}nx^7\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{3675d^2x^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/3675*(Sqrt[d + e*x^2]*(105*a*(5*d - 2*e*x^2)*(d + e*x^2)^2 + b*n*(75*d^3
 + 183*d^2*e*x^2 + 71*d*e^2*x^4 - 247*e^3*x^6)) + 105*b*(5*d - 2*e*x^2)*(d
+ e*x^2)^(5/2)*Log[c*x^n] + 210*b*e^(7/2)*n*x^7*Log[e*x + Sqrt[e]*Sqrt[d +
e*x^2]])/(d^2*x^7)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}(a+b\ln(c\,x^n))}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^8,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^8,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

```
[Out] 1/35*a*(2*(x^2*e + d)^(5/2)*e/(d^2*x^5) - 5*(x^2*e + d)^(5/2)/(d*x^7)) + b*
integrate((x^2*e*log(c) + d*log(c) + (x^2*e + d)*log(x^n))*sqrt(x^2*e + d)/
x^8, x)
```

Fricas [A]
time = 0.43, size = 204, normalized size = 1.04

$$\frac{105\,bnx^7e^{\frac{7}{2}}\log\left(-2\,x^2e+2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)+\left((247\,bn+210\,a)x^6e^3-(71\,bdn+105\,ad)x^4e^2-75\,bd^3n-525\,ad^3-3\,(61\,bd^2n+280\,ad^2)x^2e+105\,(2\,bx^6e^3-bdx^4e^2-8\,bd^2x^2e-5\,bd^3)\log\left(c\right)+105\,(2\,bnx^6e^3-bdnx^4e^2-8\,bd^2nx^2e-5\,bd^3n)\log\left(x\right)\right)\sqrt{x^2e+d}}{3675\,d^2x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

```
[Out] 1/3675*(105*b*n*x^7*e^(7/2)*log(-2*x^2*e + 2*sqrt(x^2*e + d)*x*e^(1/2) - d)
 + ((247*b*n + 210*a)*x^6*e^3 - (71*b*d*n + 105*a*d)*x^4*e^2 - 75*b*d^3*n -
 525*a*d^3 - 3*(61*b*d^2*n + 280*a*d^2)*x^2*e + 105*(2*b*x^6*e^3 - b*d*x^4*
e^2 - 8*b*d^2*x^2*e - 5*b*d^3)*log(c) + 105*(2*b*n*x^6*e^3 - b*d*n*x^4*e^2
- 8*b*d^2*n*x^2*e - 5*b*d^3*n)*log(x))*sqrt(x^2*e + d))/(d^2*x^7)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b\log\left(cx^{n}\right)\right)\left(d + ex^{2}\right)^{\frac{3}{2}}}{x^{8}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**8,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**8, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^8,x)
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^8, x)
```

3.274 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$

Optimal. Leaf size=256

$$-\frac{8be^4n\sqrt{d+ex^2}}{315d^3x}-\frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3}-\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}-\frac{bn(d+ex^2)^{7/2}}{81d^2x^9}+\frac{50ben(d+ex^2)^{7/2}}{3969d^3x^7}+\frac{8be^{9/2}n\,\mathrm{ta}}{}$$

```
[Out] -8/945*b*e^3*n*(e*x^2+d)^(3/2)/d^3/x^3-8/1575*b*e^2*n*(e*x^2+d)^(5/2)/d^3/x
^5-1/81*b*n*(e*x^2+d)^(7/2)/d^2/x^9+50/3969*b*e*n*(e*x^2+d)^(7/2)/d^3/x^7+8
/315*b*e^(9/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^3-1/9*(e*x^2+d)^(5/2)
*(a+b*ln(c*x^n))/d/x^9+4/63*e*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d^2/x^7-8/315
*e^2*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d^3/x^5-8/315*b*e^4*n*(e*x^2+d)^(1/2)/
d^3/x
```

Rubi [A]
time = 0.15, antiderivative size = 256, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {277, 270, 2392, 12, 1279, 462, 283, 223, 212}

$$-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}+\frac{8be^{9/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{315d^3}-\frac{8be^4n\sqrt{d+ex^2}}{315d^3x}-\frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3}-\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}+\frac{50ben(d+ex^2)^{7/2}}{3969d^3x^7}-\frac{bn(d+ex^2)^{7/2}}{81d^2x^9}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^10,x]
```

```
[Out] (-8*b*e^4*n*Sqrt[d + e*x^2])/(315*d^3*x) - (8*b*e^3*n*(d + e*x^2)^(3/2))/(9
45*d^3*x^3) - (8*b*e^2*n*(d + e*x^2)^(5/2))/(1575*d^3*x^5) - (b*n*(d + e*x^
2)^(7/2))/(81*d^2*x^9) + (50*b*e*n*(d + e*x^2)^(7/2))/(3969*d^3*x^7) + (8*b
*e^(9/2)*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(315*d^3) - ((d + e*x^2)^(
5/2)*(a + b*Log[c*x^n]))/(9*d*x^9) + (4*e*(d + e*x^2)^(5/2)*(a + b*Log[c*x^
n]))/(63*d^2*x^7) - (8*e^2*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(315*d^3*x
^5)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
```

```
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx &= -\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\cdots\\
&= -\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\cdots\\
&= -\frac{bn(d+ex^2)^{7/2}}{81d^2x^9}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}+\frac{4e(d+ex^2)^{5/2}(a\cdots}{63d^2x\cdots}\\
&= -\frac{bn(d+ex^2)^{7/2}}{81d^2x^9}+\frac{50ben(d+ex^2)^{7/2}}{3969d^3x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))\cdots}{9dx^9}\\
&= -\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}-\frac{bn(d+ex^2)^{7/2}}{81d^2x^9}+\frac{50ben(d+ex^2)^{7/2}}{3969d^3x^7}-\frac{(d+ex\cdots}{\cdots}\\
&= -\frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3}-\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}-\frac{bn(d+ex^2)^{7/2}}{81d^2x^9}+\frac{50ben(\cdots}{396\cdots}\\
&= -\frac{8be^4n\sqrt{d+ex^2}}{315d^3x}-\frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3}-\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}-\frac{bn(d\cdots}{81\cdots}\\
&= -\frac{8be^4n\sqrt{d+ex^2}}{315d^3x}-\frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3}-\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}-\frac{bn(d\cdots}{81\cdots}\\
&= -\frac{8be^4n\sqrt{d+ex^2}}{315d^3x}-\frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3}-\frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5}-\frac{bn(d\cdots}{81\cdots}
\end{aligned}$$

Mathematica [A]
time = 0.18, size = 178, normalized size = 0.70

$$-\frac{\sqrt{d+ex^2}\left(315a(d+ex^2)^2(35d^2-20dex^2+8e^2x^4)+bn(1225d^4+2425d^3ex^2+429d^2e^2x^4-677de^3x^6+2614e^4x^8)\right)+315b(d+ex^2)^{5/2}(35d^2-20dex^2+8e^2x^4)\log(cx^n)-2520be^{9/2}nx^9\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{99225d^3x^9}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^10,x]
```

```
[Out] -1/99225*(Sqrt[d + e*x^2]*(315*a*(d + e*x^2)^2*(35*d^2 - 20*d*e*x^2 + 8*e^2
*x^4) + b*n*(1225*d^4 + 2425*d^3*e*x^2 + 429*d^2*e^2*x^4 - 677*d*e^3*x^6 +
```

```
2614*e^4*x^8)) + 315*b*(d + e*x^2)^(5/2)*(35*d^2 - 20*d*e*x^2 + 8*e^2*x^4)*
Log[c*x^n] - 2520*b*e^(9/2)*n*x^9*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^3*
x^9)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{10}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^10,x)
```

```
[Out] int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^10,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

```
[Out] -1/315*a*(8*(x^2*e + d)^(5/2)*e^2/(d^3*x^5) - 20*(x^2*e + d)^(5/2)*e/(d^2*x
^7) + 35*(x^2*e + d)^(5/2)/(d*x^9)) + b*integrate((x^2*e*log(c) + d*log(c)
+ (x^2*e + d)*log(x^n))*sqrt(x^2*e + d)/x^10, x)
```

Fricas [A]
time = 0.51, size = 250, normalized size = 0.98

$$\frac{1260\,bnx^{9}e^{\frac{9}{2}}\log\left(-2\,x^{2}e-2\,\sqrt{x^{2}e+d}\,xe^{\frac{1}{2}}-d\right)-\left(2\,(1307\,bn+1260\,a)x^{8}e^{4}-(677\,bdn+1260\,ad)x^{6}e^{3}+1225\,bd^{4}n+3\,(143\,bd^{2}n+315\,ad^{2})x^{4}e^{2}+11025\,ad^{4}+25\,(97\,bd^{3}n+630\,ad^{3})x^{2}e+315\,(8\,bx^{8}e^{4}-4\,bdx^{6}e^{3}+3\,bd^{2}x^{4}e^{2}+50\,bd^{3}x^{2}e+35\,bd^{4})\log\left(c\right)+315\,(8\,bnx^{8}e^{4}-4\,bdnx^{6}e^{3}+3\,bd^{2}nx^{4}e^{2}+50\,bd^{3}nx^{2}e+35\,bd^{4}n)\log\left(x\right)\right)\sqrt{x^{2}e+d}}{99225\,d^{3}x^{9}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

```
[Out] 1/99225*(1260*b*n*x^9*e^(9/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) -
d) - (2*(1307*b*n + 1260*a)*x^8*e^4 - (677*b*d*n + 1260*a*d)*x^6*e^3 + 1225
*b*d^4*n + 3*(143*b*d^2*n + 315*a*d^2)*x^4*e^2 + 11025*a*d^4 + 25*(97*b*d^3
*n + 630*a*d^3)*x^2*e + 315*(8*b*x^8*e^4 - 4*b*d*x^6*e^3 + 3*b*d^2*x^4*e^2
+ 50*b*d^3*x^2*e + 35*b*d^4)*log(c) + 315*(8*b*n*x^8*e^4 - 4*b*d*n*x^6*e^3
+ 3*b*d^2*n*x^4*e^2 + 50*b*d^3*n*x^2*e + 35*b*d^4*n)*log(x))*sqrt(x^2*e + d
))/(d^3*x^9)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**10,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3061 deep
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

```
[Out] integrate((x^2*e + d)^(3/2)*(b*log(c*x^n) + a)/x^10, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{{\left(e\,x^2+d\right)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^{10}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^10,x)
```

```
[Out] int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^10, x)
```

3.275 $\int x\sqrt{4+x^2}\,\log(x)\,dx$

Optimal. Leaf size=60

$$-\frac{4}{3}\sqrt{4+x^2}-\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{8}{3}\tanh^{-1}\left(\frac{\sqrt{4+x^2}}{2}\right)+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)$$

```
[Out] -1/9*(x^2+4)^(3/2)+8/3*arctanh(1/2*(x^2+4)^(1/2))+1/3*(x^2+4)^(3/2)*ln(x)-4
/3*(x^2+4)^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 60, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used = {2376, 272, 52, 65, 213}

$$-\frac{1}{9}\left(x^2+4\right)^{3/2}-\frac{4\sqrt{x^2+4}}{3}+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)+\frac{8}{3}\tanh^{-1}\left(\frac{\sqrt{x^2+4}}{2}\right)$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[4 + x^2]*Log[x],x]
```

```
[Out] (-4*Sqrt[4 + x^2])/3 - (4 + x^2)^(3/2)/9 + (8*ArcTanh[Sqrt[4 + x^2]/2])/3 +
 ((4 + x^2)^(3/2)*Log[x])/3
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 213

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(-(Rt[-a, 2]*Rt[b, 2])^(-
1))*ArcTanh[Rt[b, 2]*(x/Rt[-a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] &&
```

```
(LtQ[a, 0] || GtQ[b, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$
\begin{aligned}
\int x\sqrt{4+x^2}\,\log(x)\,dx &= \frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)-\frac{1}{3}\int\frac{\left(4+x^2\right)^{3/2}}{x}\,dx\\
&= \frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)-\frac{1}{6}\text{Subst}\left(\int\frac{(4+x)^{3/2}}{x}\,dx,x,x^2\right)\\
&= -\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)-\frac{2}{3}\text{Subst}\left(\int\frac{\sqrt{4+x}}{x}\,dx,x,x^2\right)\\
&= -\frac{4}{3}\sqrt{4+x^2}-\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)-\frac{8}{3}\text{Subst}\left(\int\frac{1}{x\sqrt{4+x}}\,dx,x\right.\\
&= -\frac{4}{3}\sqrt{4+x^2}-\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)-\frac{16}{3}\text{Subst}\left(\int\frac{1}{-4+x^2}\,dx,x\right.\\
&= -\frac{4}{3}\sqrt{4+x^2}-\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{8}{3}\tanh^{-1}\left(\frac{\sqrt{4+x^2}}{2}\right)+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)
\end{aligned}
$$

Mathematica [A]
time = 0.03, size = 53, normalized size = 0.88

$$\frac{1}{3}\left(-\frac{1}{3}\sqrt{4+x^2}\left(16+x^2\right)-8\log(x)+\left(4+x^2\right)^{3/2}\log(x)+8\log\left(2+\sqrt{4+x^2}\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sqrt[4 + x^2]*Log[x],x]
```

```
[Out] (-1/3*(Sqrt[4 + x^2]*(16 + x^2)) - 8*Log[x] + (4 + x^2)^(3/2)*Log[x] + 8*Lo
g[2 + Sqrt[4 + x^2]])/3
```

Maple [A]
time = 0.10, size = 75, normalized size = 1.25

method	result
meijerg	$\left(-\frac{2\sqrt{1+\frac{x^2}{4}}}{9}+\frac{2\ln(x)\sqrt{1+\frac{x^2}{4}}}{3}\right)x^2+\frac{32}{9}-\frac{32\sqrt{1+\frac{x^2}{4}}}{9}+\ln(x)\left(-\frac{8}{3}+\frac{8\sqrt{1+\frac{x^2}{4}}}{3}\right)+\frac{8\ln\left(\frac{1}{2}+\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(x)*(x^2+4)^(1/2),x,method=_RETURNVERBOSE)
```

```
[Out] (-2/9*(1+1/4*x^2)^(1/2)+2/3*ln(x)*(1+1/4*x^2)^(1/2))*x^2+32/9-32/9*(1+1/4*x
^2)^(1/2)+ln(x)*(-8/3+8/3*(1+1/4*x^2)^(1/2))+8/3*ln(1/2+1/2*(1+1/4*x^2)^(1/
2))
```

Maxima [A]
time = 0.51, size = 39, normalized size = 0.65

$$\frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}}\log\left(x\right)-\frac{1}{9}\left(x^2+4\right)^{\frac{3}{2}}-\frac{4}{3}\sqrt{x^2+4}+\frac{8}{3}\operatorname{arsinh}\left(\frac{2}{|x|}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x)*(x^2+4)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/3*(x^2 + 4)^(3/2)*log(x) - 1/9*(x^2 + 4)^(3/2) - 4/3*sqrt(x^2 + 4) + 8/3*
arcsinh(2/abs(x))
```

Fricas [A]
time = 0.43, size = 54, normalized size = 0.90

$$-\frac{1}{9}\left(x^2-3\left(x^2+4\right)\log\left(x\right)+16\right)\sqrt{x^2+4}+\frac{8}{3}\log\left(-x+\sqrt{x^2+4}+2\right)-\frac{8}{3}\log\left(-x+\sqrt{x^2+4}-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x)*(x^2+4)^(1/2),x, algorithm="fricas")
```

```
[Out] -1/9*(x^2 - 3*(x^2 + 4)*log(x) + 16)*sqrt(x^2 + 4) + 8/3*log(-x + sqrt(x^2
+ 4) + 2) - 8/3*log(-x + sqrt(x^2 + 4) - 2)
```

Sympy [A]
time = 14.58, size = 65, normalized size = 1.08

$$\frac{\left(x^2+4\right)^{\frac{3}{2}}\log\left(x\right)}{3}-\frac{\left(x^2+4\right)^{\frac{3}{2}}}{9}-\frac{4\sqrt{x^2+4}}{3}-\frac{4\log\left(\sqrt{x^2+4}-2\right)}{3}+\frac{4\log\left(\sqrt{x^2+4}+2\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(x)*(x**2+4)**(1/2),x)
```

```
[Out] (x**2 + 4)**(3/2)*log(x)/3 - (x**2 + 4)**(3/2)/9 - 4*sqrt(x**2 + 4)/3 - 4*l
og(sqrt(x**2 + 4) - 2)/3 + 4*log(sqrt(x**2 + 4) + 2)/3
```

Giac [A]
time = 3.05, size = 54, normalized size = 0.90

$$\frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}}\log\left(x\right)-\frac{1}{9}\left(x^2+4\right)^{\frac{3}{2}}-\frac{4}{3}\sqrt{x^2+4}+\frac{4}{3}\log\left(\sqrt{x^2+4}+2\right)-\frac{4}{3}\log\left(\sqrt{x^2+4}-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x)*(x^2+4)^(1/2),x, algorithm="giac")
```

```
[Out] 1/3*(x^2 + 4)^(3/2)*log(x) - 1/9*(x^2 + 4)^(3/2) - 4/3*sqrt(x^2 + 4) + 4/3*
log(sqrt(x^2 + 4) + 2) - 4/3*log(sqrt(x^2 + 4) - 2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x\,\ln\left(x\right)\,\sqrt{x^2+4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(x)*(x^2 + 4)^(1/2),x)
```

```
[Out] int(x*log(x)*(x^2 + 4)^(1/2), x)
```

3.276 $\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=182

$$-\frac{8bd^2n\sqrt{d+ex^2}}{15e^3}+\frac{7bdn(d+ex^2)^{3/2}}{45e^3}-\frac{bn(d+ex^2)^{5/2}}{25e^3}+\frac{8bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^3}+\frac{d^2\sqrt{d+ex^2}\,(a+b\,\mathrm{l}}{e^3}$$

```
[Out] 7/45*b*d*n*(e*x^2+d)^(3/2)/e^3-1/25*b*n*(e*x^2+d)^(5/2)/e^3+8/15*b*d^(5/2)*
n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3-2/3*d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)
)/e^3+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^3-8/15*b*d^2*n*(e*x^2+d)^(1/2)/
e^3+d^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^3
```

Rubi [A]

time = 0.16, antiderivative size = 182, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1265, 911, 1275, 214}

$$\frac{d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{8bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^3}-\frac{8bd^2n\sqrt{d+ex^2}}{15e^3}+\frac{7bdn(d+ex^2)^{3/2}}{45e^3}-\frac{bn(d+ex^2)^{5/2}}{25e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] (-8*b*d^2*n*Sqrt[d + e*x^2])/(15*e^3) + (7*b*d*n*(d + e*x^2)^(3/2))/(45*e^3
) - (b*n*(d + e*x^2)^(5/2))/(25*e^3) + (8*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x^
2]/Sqrt[d]])/(15*e^3) + (d^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^3 - (2*d
*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3) + ((d + e*x^2)^(5/2)*(a + b*
Log[c*x^n]))/(5*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1265

```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a +
 b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Inte
gerQ[(m - 1)/2]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a}{5}$$

$$= \frac{d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a}{5}$$

$$= \frac{d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a}{5}$$

$$= \frac{d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a}{5}$$

$$= \frac{d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a}{5}$$

$$= -\frac{8bd^2n\sqrt{d+ex^2}}{15e^3} + \frac{7bdn(d+ex^2)^{3/2}}{45e^3} - \frac{bn(d+ex^2)^{5/2}}{25e^3} + \frac{d^2\sqrt{d+ex^2}\,(a+b\log}{e^3}$$

$$= -\frac{8bd^2n\sqrt{d+ex^2}}{15e^3} + \frac{7bdn(d+ex^2)^{3/2}}{45e^3} - \frac{bn(d+ex^2)^{5/2}}{25e^3} + \frac{8bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d}}{}\right.}{15e^3}$$

Mathematica [A]
time = 0.12, size = 204, normalized size = 1.12

$$\frac{120ad^2\sqrt{d+ex^2} - 94bd^2n\sqrt{d+ex^2} - 60adex^2\sqrt{d+ex^2} + 17bdenx^2\sqrt{d+ex^2} + 45ae^2x^4\sqrt{d+ex^2} - 9be^2nx^4\sqrt{d+ex^2} - 120bd^{5/2}n\log(x) + 15b\sqrt{d+ex^2}\,(8d^2-4dex^2+3e^2x^4)\log(cx^n) + 120bd^{5/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{225e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] (120*a*d^2*Sqrt[d + e*x^2] - 94*b*d^2*n*Sqrt[d + e*x^2] - 60*a*d*e*x^2*Sqrt
[d + e*x^2] + 17*b*d*e*n*x^2*Sqrt[d + e*x^2] + 45*a*e^2*x^4*Sqrt[d + e*x^2]
 - 9*b*e^2*n*x^4*Sqrt[d + e*x^2] - 120*b*d^(5/2)*n*Log[x] + 15*b*Sqrt[d + e
*x^2]*(8*d^2 - 4*d*e*x^2 + 3*e^2*x^4)*Log[c*x^n] + 120*b*d^(5/2)*n*Log[d +
Sqrt[d]*Sqrt[d + e*x^2]])/(225*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^5(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.51, size = 209, normalized size = 1.15

$$-\frac{1}{225}\left(60\,d^{\frac{5}{2}}e^{(-3)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)+\left(9\,(x^2e+d)^{\frac{5}{2}}-35\,(x^2e+d)^{\frac{3}{2}}d+120\,\sqrt{x^2e+d}\,d^2\right)e^{(-3)}\right)bn+\frac{1}{15}\left(3\,\sqrt{x^2e+d}\,x^4e^{(-1)}-4\,\sqrt{x^2e+d}\,dx^2e^{(-2)}+8\,\sqrt{x^2e+d}\,d^2e^{(-3)}\right)b\log\left(cx^n\right)+\frac{1}{15}\left(3\,\sqrt{x^2e+d}\,x^4e^{(-1)}-4\,\sqrt{x^2e+d}\,dx^2e^{(-2)}+8\,\sqrt{x^2e+d}\,d^2e^{(-3)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -1/225*(60*d^(5/2)*e^(-3)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d)
+ sqrt(d))) + (9*(x^2*e + d)^(5/2) - 35*(x^2*e + d)^(3/2)*d + 120*sqrt(x^2*
e + d)*d^2)*e^(-3))*b*n + 1/15*(3*sqrt(x^2*e + d)*x^4*e^(-1) - 4*sqrt(x^2*e
 + d)*d*x^2*e^(-2) + 8*sqrt(x^2*e + d)*d^2*e^(-3))*b*log(c*x^n) + 1/15*(3*s
qrt(x^2*e + d)*x^4*e^(-1) - 4*sqrt(x^2*e + d)*d*x^2*e^(-2) + 8*sqrt(x^2*e +
 d)*d^2*e^(-3))*a
```

Fricas [A]
time = 0.41, size = 309, normalized size = 1.70

$$\left[\frac{1}{225}\left(60\,bd^{\frac{5}{2}}n\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-\left(9\,(bn-5\,a)x^4e^2+94\,bd^2n-(17\,bdn-60\,ad)x^2e-120\,ad^2-15\,(3\,bx^4e^2-4\,bdx^2e+8\,bd^2)\log\left(c\right)-15\,(3\,bnx^4e^2-4\,bdnx^2e+8\,bd^2n)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-3)},-\frac{1}{225}\left(120\,b\sqrt{-d}\,d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left(9\,(bn-5\,a)x^4e^2+94\,bd^2n-(17\,bdn-60\,ad)x^2e-120\,ad^2-15\,(3\,bx^4e^2-4\,bdx^2e+8\,bd^2)\log\left(c\right)-15\,(3\,bnx^4e^2-4\,bdnx^2e+8\,bd^2n)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [1/225*(60*b*d^(5/2)*n*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2)
- (9*(b*n - 5*a)*x^4*e^2 + 94*b*d^2*n - (17*b*d*n - 60*a*d)*x^2*e - 120*a*d
^2 - 15*(3*b*x^4*e^2 - 4*b*d*x^2*e + 8*b*d^2)*log(c) - 15*(3*b*n*x^4*e^2 -
4*b*d*n*x^2*e + 8*b*d^2*n)*log(x))*sqrt(x^2*e + d))*e^(-3), -1/225*(120*b*s
qrt(-d)*d^2*n*arctan(sqrt(-d)/sqrt(x^2*e + d)) + (9*(b*n - 5*a)*x^4*e^2 + 9
4*b*d^2*n - (17*b*d*n - 60*a*d)*x^2*e - 120*a*d^2 - 15*(3*b*x^4*e^2 - 4*b*d
*x^2*e + 8*b*d^2)*log(c) - 15*(3*b*n*x^4*e^2 - 4*b*d*n*x^2*e + 8*b*d^2*n)*l
og(x))*sqrt(x^2*e + d))*e^(-3)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{x^5(a+b\log\left(cx^n\right))}{\sqrt{d+ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral(x**5*(a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^5/sqrt(x^2*e + d), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.277 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=129

$$\frac{2bdn\sqrt{d+ex^2}}{3e^2}-\frac{bn(d+ex^2)^{3/2}}{9e^2}-\frac{2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^2}-\frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2}+\frac{(d+ex^2)^{3}}{}$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/e^2-2/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2
))/e^2+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^2+2/3*b*d*n*(e*x^2+d)^(1/2)/e^
2-d*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^2
```

Rubi [A]
time = 0.11, antiderivative size = 129, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 45, 2392, 12, 457, 81, 52, 65, 214}

$$-\frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2}+\frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e^2}-\frac{2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^2}+\frac{2bdn\sqrt{d+ex^2}}{3e^2}-\frac{bn(d+ex^2)^{3/2}}{9e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] (2*b*d*n*Sqrt[d + e*x^2])/(3*e^2) - (b*n*(d + e*x^2)^(3/2))/(9*e^2) - (2*b*
d^(3/2)*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*e^2) - (d*Sqrt[d + e*x^2]*(a
 + b*Log[c*x^n]))/e^2 + ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
```

```
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = -\frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2} - (bn)\int \frac{(-2d+\cdots}{\cdots}$$

$$= -\frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2} - \frac{(bn)\int \frac{(-2d+ex^2\cdots}{\cdots}}{3\cdots}$$

$$= -\frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2} - \frac{(bn)\text{Subst}\left(\int \cdots\right.}{\cdots}$$

$$= -\frac{bn(d+ex^2)^{3/2}}{9e^2} - \frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}\cdots$$

$$= \frac{2bdn\sqrt{d+ex^2}}{3e^2} - \frac{bn(d+ex^2)^{3/2}}{9e^2} - \frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/\cdots}}{\cdots}$$

$$= \frac{2bdn\sqrt{d+ex^2}}{3e^2} - \frac{bn(d+ex^2)^{3/2}}{9e^2} - \frac{d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/\cdots}}{\cdots}$$

$$= \frac{2bdn\sqrt{d+ex^2}}{3e^2} - \frac{bn(d+ex^2)^{3/2}}{9e^2} - \frac{2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^2} - \frac{d\sqrt{d+e\cdots}}{\cdots}$$

<u>**Mathematica**</u> [A]
time = 0.09, size = 145, normalized size = 1.12

$$\frac{-6ad\sqrt{d+ex^2}+5bdn\sqrt{d+ex^2}+3aex^2\sqrt{d+ex^2}-benx^2\sqrt{d+ex^2}+6bd^{3/2}n\log(x)+3b(-2d+ex^2)\sqrt{d+ex^2}\log(cx^n)-6bd^{3/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{9e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] (-6*a*d*Sqrt[d + e*x^2] + 5*b*d*n*Sqrt[d + e*x^2] + 3*a*e*x^2*Sqrt[d + e*x^
2] - b*e*n*x^2*Sqrt[d + e*x^2] + 6*b*d^(3/2)*n*Log[x] + 3*b*(-2*d + e*x^2)*
Sqrt[d + e*x^2]*Log[c*x^n] - 6*b*d^(3/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
)/(9*e^2)
```

<u>**Maple**</u> [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.50, size = 151, normalized size = 1.17

$$\frac{1}{9}\left(3\,d^{\frac{3}{2}}e^{(-2)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)-\left((x^2e+d)^{\frac{3}{2}}-6\,\sqrt{x^2e+d}\,d\right)e^{(-2)}\right)bn+\frac{1}{3}\left(\sqrt{x^2e+d}\,x^2e^{(-1)}-2\,\sqrt{x^2e+d}\,de^{(-2)}\right)b\log\left(cx^n\right)+\frac{1}{3}\left(\sqrt{x^2e+d}\,x^2e^{(-1)}-2\,\sqrt{x^2e+d}\,de^{(-2)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/9*(3*d^(3/2)*e^(-2)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) + sq
rt(d))) - ((x^2*e + d)^(3/2) - 6*sqrt(x^2*e + d)*d)*e^(-2))*b*n + 1/3*(sqrt
(x^2*e + d)*x^2*e^(-1) - 2*sqrt(x^2*e + d)*d*e^(-2))*b*log(c*x^n) + 1/3*(sq
rt(x^2*e + d)*x^2*e^(-1) - 2*sqrt(x^2*e + d)*d*e^(-2))*a
```

Fricas [A]
time = 0.42, size = 214, normalized size = 1.66

$$\left[\frac{1}{9}\left(3\,bd^{\frac{3}{2}}n\log\left(-\frac{x^2e-2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-\left((bn-3\,a)x^2e-5\,bdn+6\,ad-3\,\left(bx^2e-2\,bd\right)\log\left(c\right)-3\,\left(bnx^2e-2\,bdn\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-2)},\ \frac{1}{9}\left(6\,b\sqrt{-d}\,dn\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)-\left((bn-3\,a)x^2e-5\,bdn+6\,ad-3\,\left(bx^2e-2\,bd\right)\log\left(c\right)-3\,\left(bnx^2e-2\,bdn\right)\log\left(x\right)\right)\sqrt{x^2e+d}\right)e^{(-2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [1/9*(3*b*d^(3/2)*n*log(-(x^2*e - 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2) - (
(b*n - 3*a)*x^2*e - 5*b*d*n + 6*a*d - 3*(b*x^2*e - 2*b*d)*log(c) - 3*(b*n*x
^2*e - 2*b*d*n)*log(x))*sqrt(x^2*e + d))*e^(-2), 1/9*(6*b*sqrt(-d)*d*n*arct
an(sqrt(-d)/sqrt(x^2*e + d)) - ((b*n - 3*a)*x^2*e - 5*b*d*n + 6*a*d - 3*(b*
x^2*e - 2*b*d)*log(c) - 3*(b*n*x^2*e - 2*b*d*n)*log(x))*sqrt(x^2*e + d))*e^
(-2)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\log\left(cx^n\right))}{\sqrt{d+ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/sqrt(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.278 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=73

$$-\frac{bn\sqrt{d+ex^2}}{e}+\frac{b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e}+\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e}$$

```
[Out] b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*d^(1/2)/e-b*n*(e*x^2+d)^(1/2)/e+(a+b*l
n(c*x^n))*(e*x^2+d)^(1/2)/e
```

Rubi [A]
time = 0.05, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2376, 272, 52, 65, 214}

$$\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e}-\frac{bn\sqrt{d+ex^2}}{e}+\frac{b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] -((b*n*Sqrt[d + e*x^2])/e) + (b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
/e + (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e} - \frac{(bn)\int \frac{\sqrt{d+ex^2}}{x}\,dx}{e}$$

$$= \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e} - \frac{(bn)\mathrm{Subst}\left(\int \frac{\sqrt{d+ex}}{x}\,dx, x, x^2\right)}{2e}$$

$$= -\frac{bn\sqrt{d+ex^2}}{e} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e} - \frac{(bdn)\mathrm{Subst}\left(\int \frac{1}{x\sqrt{d+ex}}\,dx, x, \right.}{2e}$$

$$= -\frac{bn\sqrt{d+ex^2}}{e} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e} - \frac{(bdn)\mathrm{Subst}\left(\int \frac{1}{-\frac{d}{e}+\frac{x^2}{e}}\,dx, x, \sqrt{d}\right.}{e^2}$$

$$= -\frac{bn\sqrt{d+ex^2}}{e} + \frac{b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e}$$

Mathematica [A]
time = 0.05, size = 91, normalized size = 1.25

$$\frac{a\sqrt{d+ex^2} - bn\sqrt{d+ex^2} - b\sqrt{d}\,n\log(x) + b\sqrt{d+ex^2}\,\log(cx^n) + b\sqrt{d}\,n\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] (a*Sqrt[d + e*x^2] - b*n*Sqrt[d + e*x^2] - b*Sqrt[d]*n*Log[x] + b*Sqrt[d +
e*x^2]*Log[c*x^n] + b*Sqrt[d]*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/e
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.29, size = 68, normalized size = 0.93

$$\left(\sqrt{d}\,\operatorname{arsinh}\left(\frac{\sqrt{d}\,e^{\left(-\frac{1}{2}\right)}}{|x|}\right)-\sqrt{x^2e+d}\right)bne^{(-1)}+\sqrt{x^2e+d}\,be^{(-1)}\log\left(cx^n\right)+\sqrt{x^2e+d}\,ae^{(-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] (sqrt(d)*arcsinh(sqrt(d)*e^(-1/2)/abs(x)) - sqrt(x^2*e + d))*b*n*e^(-1) + s
qrt(x^2*e + d)*b*e^(-1)*log(c*x^n) + sqrt(x^2*e + d)*a*e^(-1)
```

Fricas [A]
time = 0.42, size = 127, normalized size = 1.74

$$\left[\frac{1}{2}\left(b\sqrt{d}\,n\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}\,+2\,d}{x^2}\right)+2\,\sqrt{x^2e+d}\,(bn\log\left(x\right)-bn+b\log\left(c\right)+a)\right)e^{(-1)},-\left(b\sqrt{-d}\,n\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)-\sqrt{x^2e+d}\,(bn\log\left(x\right)-bn+b\log\left(c\right)+a)\right)e^{(-1)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] [1/2*(b*sqrt(d)*n*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2) + 2*s
qrt(x^2*e + d)*(b*n*log(x) - b*n + b*log(c) + a))*e^(-1), -(b*sqrt(-d)*n*ar
ctan(sqrt(-d)/sqrt(x^2*e + d)) - sqrt(x^2*e + d)*(b*n*log(x) - b*n + b*log(
c) + a))*e^(-1)]
```

Sympy [A]
time = 2.67, size = 126, normalized size = 1.73

$$a\left(\begin{cases}\frac{x^2}{2\sqrt{d}} & \text{for}\: e=0\\ \frac{\sqrt{d+ex^2}}{e} & \text{otherwise}\end{cases}\right)-bn\left(\begin{cases}\frac{x^2}{4\sqrt{d}} & \text{for}\: e=0\\ -\frac{\sqrt{d}\,\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)}{e}+\frac{d}{e^{\frac{3}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{x}{\sqrt{e}\,\sqrt{\frac{d}{ex^2}+1}} & \text{otherwise}\end{cases}\right)+b\left(\begin{cases}\frac{x^2}{2\sqrt{d}} & \text{for}\: e=0\\ \frac{\sqrt{d+ex^2}}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

```
[Out] a*Piecewise((x**2/(2*sqrt(d)), Eq(e, 0)), (sqrt(d + e*x**2)/e, True)) - b*n
*Piecewise((x**2/(4*sqrt(d)), Eq(e, 0)), (-sqrt(d)*asinh(sqrt(d)/(sqrt(e)*x
))/e + d/(e**(3/2)*x*sqrt(d/(e*x**2) + 1)) + x/(sqrt(e)*sqrt(d/(e*x**2) + 1
)), True)) + b*Piecewise((x**2/(2*sqrt(d)), Eq(e, 0)), (sqrt(d + e*x**2)/e,
 True))*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/sqrt(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.279 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=166

$$\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d}\right.}}{\sqrt{d}}$$

```
[Out] 1/2*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(1/2)-arctanh((e*x^2+d)^(1/2)/
d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*
d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d
^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)
```

Rubi [A]

time = 0.18, antiderivative size = 166, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 65, 214, 2390, 12, 6131, 6055, 2449, 2352}

$$-\frac{bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2\sqrt{d}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}}-\frac{bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^2]),x]
```

```
[Out] (b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/(2*Sqrt[d]) - (ArcTanh[Sqrt[d + e*
x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] - (b*n*ArcTanh[Sqrt[d + e*x^2]/Sq
rt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/Sqrt[d] - (b*n*PolyLog
[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*Sqrt[d])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = -\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + (bn)\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}\,x}\,dx$$

$$= -\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + \frac{(bn)\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{x}\,dx}{\sqrt{d}}$$

$$= -\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + \frac{(bn)\text{Subst}\left(\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}\,dx, x, x^2\right.}{2\sqrt{d}}$$

$$= -\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} + \frac{(bn)\text{Subst}\left(\int \frac{x\tanh^{-1}\left(\frac{x}{\sqrt{d}}\right)}{-d+x^2}\,dx, x, \sqrt{d+\right.}{\sqrt{d}}$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{(bn)\text{Subst}\left(\int\right.}{}$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{bn\tanh^{-1}\left(\sqrt{\right.}{}$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{bn\tanh^{-1}\left(\sqrt{\right.}{}$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{bn\tanh^{-1}\left(\sqrt{\right.}{}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

time = 0.13, size = 162, normalized size = 0.98

$$\frac{bn\sqrt{1+\frac{d}{ex^2}}\left(-{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)-\frac{\sqrt{e}\,x\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)\log(x)}{\sqrt{d}}\right)}{\sqrt{d+ex^2}}-\frac{\log(x)\left(-a-b(-n\log(x)+\log\left(cx^n\right))\right)}{\sqrt{d}}+\frac{\left(-a-b(-n\log(x)+\log\left(cx^n\right))\right)\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^2]),x]
```

```
[Out] (b*n*Sqrt[1 + d/(e*x^2)]*(-HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -
(d/(e*x^2))] - (Sqrt[e]*x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)]*Log[x])/Sqrt[d]))/Sq
rt[d + e*x^2] - (Log[x]*(-a - b*(-(n*Log[x]) + Log[c*x^n])))/Sqrt[d] + ((-a
 - b*(-(n*Log[x]) + Log[c*x^n]))*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/Sqrt[d]
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] b*integrate((log(c) + log(x^n))/(sqrt(x^2*e + d)*x), x) - a*arcsinh(sqrt(d)
*e^(-1/2)/abs(x))/sqrt(d)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^3*e + d*x),
x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log{(cx^n)}}{x\sqrt{d+ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x^2*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^2)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^2)^(1/2)), x)
```

3.280 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=258

$$-\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tan\ldots}{\ldots}$$

```
[Out] -1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)-1/4*b*e*n*arctanh((e*x^
2+d)^(1/2)/d^(1/2))^2/d^(3/2)+1/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*l
n(c*x^n))/d^(3/2)+1/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(
d^(1/2)-(e*x^2+d)^(1/2)))/d^(3/2)+1/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-
(e*x^2+d)^(1/2)))/d^(3/2)-1/4*b*n*(e*x^2+d)^(1/2)/d/x^2-1/2*(a+b*ln(c*x^n))
*(e*x^2+d)^(1/2)/d/x^2
```

Rubi [A]
time = 0.27, antiderivative size = 258, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {272, 44, 65, 214, 2392, 12, 14, 43, 6131, 6055, 2449, 2352}

$$\frac{ben\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{3/2}}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}}+\frac{ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2d^{3/2}}-\frac{bn\sqrt{d+ex^2}}{4dx^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x^2]),x]
```

```
[Out] -1/4*(b*n*Sqrt[d + e*x^2])/(d*x^2) - (b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]
])/(4*d^(3/2)) - (b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/(4*d^(3/2)) - (
Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(2*d*x^2) + (e*ArcTanh[Sqrt[d + e*x^2]/
Sqrt[d]]*(a + b*Log[c*x^n]))/(2*d^(3/2)) + (b*e*n*ArcTanh[Sqrt[d + e*x^2]/S
qrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(3/2)) + (b*e*n*
PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(3/2))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-(bn)\int \frac{-}{}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{1}{2}(bn)\int$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{1}{2}(bn)\int$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}+\frac{(bn)\int \sqrt{}}{2}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}+\frac{(bn)\text{Subst}}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(c}{2d^{3/2}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2dx^2}+\frac{e\tanh}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+e}}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+e}}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4dx^2}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}}-\frac{ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}}-\frac{\sqrt{d+e}}{}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.73, size = 229, normalized size = 0.89

$$\frac{\frac{bn\sqrt{1+\frac{d}{ex^2}}\left(2d^{3/2}\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{d}{ex^2}\right)+9ex^2\left(-\sqrt{d}\sqrt{1+\frac{d}{ex^2}}+\sqrt{e}\,x\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)\right)(1+2\log(x))\right)}{x^2\sqrt{d+ex^2}}-\frac{18\sqrt{d}\sqrt{d+ex^2}\,(a-bn\log(x)+b\log(cx^n))}{x^2}-18e\log(x)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)+18e(a-bn\log(x)+b\log\left(cx^n\right))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{36d^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x^2]),x]
```

```
[Out] ((b*n*Sqrt[1 + d/(e*x^2)]*(2*d^(3/2)*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/
2, 5/2}, -(d/(e*x^2))] + 9*e*x^2*(-(Sqrt[d]*Sqrt[1 + d/(e*x^2)]) + Sqrt[e]*
x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)])*(1 + 2*Log[x])))/(x^2*Sqrt[d + e*x^2]) - (1
8*Sqrt[d]*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - 18*e*Log[x
]*(a - b*n*Log[x] + b*Log[c*x^n]) + 18*e*(a - b*n*Log[x] + b*Log[c*x^n])*Lo
g[d + Sqrt[d]*Sqrt[d + e*x^2]])/(36*d^(3/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{e\,x^{2}+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/2*a*(arcsinh(sqrt(d)*e^(-1/2)/abs(x))*e/d^(3/2) - sqrt(x^2*e + d)/(d*x^2)
) + b*integrate((log(c) + log(x^n))/(sqrt(x^2*e + d)*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^5*e + d*x^3)
, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log{(cx^n)}}{x^3\sqrt{d + ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(1/2),x)
[Out] Integral((a + b*log(c*x**n))/(x**3*sqrt(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x^2*e + d)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(1/2)),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(1/2)), x)
```

3.281 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=359

$$-\frac{bnx\sqrt{d+ex^2}}{4e}-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}}-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4e^{3/2}\sqrt{d+ex^2}}+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}}{}$$

```
[Out] -1/4*b*n*x*(e*x^2+d)^(1/2)/e+1/2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e-1/4*b*
d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1
/2)-1/4*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^(3/2)/
(e*x^2+d)^(1/2)+1/2*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/
d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)-1/2
*d^(3/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(3/
2)/(e*x^2+d)^(1/2)+1/4*b*d^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)
^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)
```

Rubi [A]
time = 0.29, antiderivative size = 359, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {2386, 327, 221, 2392, 12, 14, 201, 5775, 3797, 2221, 2317, 2438}

$$\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{4e^{3/2}\sqrt{d+ex^2}}-\frac{d^{3/2}\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}+\frac{x\sqrt{d+ex^2}(a+b\log(cx^n))}{2e}-\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4e^{3/2}\sqrt{d+ex^2}}-\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}}+\frac{bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2e^{3/2}\sqrt{d+ex^2}}-\frac{bnx\sqrt{d+ex^2}}{4e}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] -1/4*(b*n*x*Sqrt[d + e*x^2])/e - (b*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(
Sqrt[e]*x)/Sqrt[d]])/(4*e^(3/2)*Sqrt[d + e*x^2]) - (b*d^(3/2)*n*Sqrt[1 + (e
*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(4*e^(3/2)*Sqrt[d + e*x^2]) + (b*d
^(3/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcS
inh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(3/2)*Sqrt[d + e*x^2]) + (x*Sqrt[d + e*x^2
]*(a + b*Log[c*x^n]))/(2*e) - (d^(3/2)*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]
*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(3/2)*Sqrt[d + e*x^2]) + (b*d^(3/2)*n
*Sqrt[1 + (e*x^2)/d]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(4*e^(
3/2)*Sqrt[d + e*x^2])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{\sqrt{1+\frac{ex^2}{d}}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{1+\frac{ex^2}{d}}}\,dx}{\sqrt{d+ex^2}}$$

$$= \frac{x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e} - \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}$$

$$= \frac{x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e} - \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}$$

$$= \frac{x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e} - \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}$$

$$= \frac{x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e} - \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}$$

$$= -\frac{bnx\sqrt{d+ex^2}}{4e} + \frac{x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e} - \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right.}{2e^{3/2}\sqrt{d+ex}}$$

$$= -\frac{bnx\sqrt{d+ex^2}}{4e} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-}}{4e^{3/2}\sqrt{d+ex^2}}$$

$$= -\frac{bnx\sqrt{d+ex^2}}{4e} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-}}{4e^{3/2}\sqrt{d+ex^2}}$$

$$= -\frac{bnx\sqrt{d+ex^2}}{4e} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-}}{4e^{3/2}\sqrt{d+ex^2}}$$

$$= -\frac{bnx\sqrt{d+ex^2}}{4e} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-}}{4e^{3/2}\sqrt{d+ex^2}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.54, size = 205, normalized size = 0.57

$$\frac{\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(2e^2x^3\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9d\sqrt{e}\left(\sqrt{e}\,x\sqrt{1+\frac{ex^2}{d}}-\sqrt{d}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\right)(-1+2\log(x))\right)}{\sqrt{d+ex^2}}+18ex\sqrt{d+ex^2}\,(a-bn\log(x)+b\log(cx^n))-18d\sqrt{e}\,(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{36e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

```
[Out] ((b*n*Sqrt[1 + (e*x^2)/d]*(2*e^2*x^3*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/
2, 5/2}, -((e*x^2)/d)] + 9*d*Sqrt[e]*(Sqrt[e]*x*Sqrt[1 + (e*x^2)/d] - Sqrt[
d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])*(-1 + 2*Log[x])))/Sqrt[d + e*x^2] + 18*e*x
*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]) - 18*d*Sqrt[e]*(a - b*n*Lo
g[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(36*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^2 (a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -1/2*(d*arcsinh(x*e^(1/2)/sqrt(d))*e^(-3/2) - sqrt(x^2*e + d)*x*e^(-1))*a +
 b*integrate((x^2*log(c) + x^2*log(x^n))/sqrt(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*x^2*log(c*x^n) + sqrt(x^2*e + d)*a*x^2)/(x^2*e
+ d), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\log{(cx^n)})}{\sqrt{d+ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/sqrt(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.282 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=250

$$\frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{e}\,\sqrt{d+ex^2}}-\frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{\sqrt{e}\,\sqrt{d+ex^2}}+\frac{\sqrt{d}\,\sqrt{\cdots}}{\cdots}$$

```
[Out] 1/2*b*n*arcsinh(x*e^(1/2)/d^(1/2))^2*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x
^2+d)^(1/2)-b*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2
/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)+arcsinh(x*e
^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)
^(1/2)-1/2*b*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(
1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)
```

Rubi [A]

time = 0.10, antiderivative size = 250, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.318, Rules used = {2364, 2362, 5775, 3797, 2221, 2317, 2438}

$$-\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2\sqrt{e}\,\sqrt{d+ex^2}}+\frac{\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}\,\sqrt{d+ex^2}}+\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{e}\,\sqrt{d+ex^2}}-\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{\sqrt{e}\,\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/Sqrt[d + e*x^2],x]
```

```
[Out] (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*Sqrt[e]
*Sqrt[d + e*x^2]) - (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sq
rt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(Sqrt[e]*Sqrt[d + e*x^2
]) + (Sqrt[d]*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c
*x^n]))/(Sqrt[e]*Sqrt[d + e*x^2]) - (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*PolyLo
g[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqrt[e]*Sqrt[d + e*x^2])
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
```

```
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2362

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Dist[b*(n/Rt[e, 2]), Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

Rule 2364

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Dist[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2], Int[(a + b*Log[c*x^n])/Sqr
t[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx = \frac{\sqrt{1+\frac{ex^2}{d}}\int \frac{a+b\log(cx^n)}{\sqrt{1+\frac{ex^2}{d}}}\,dx}{\sqrt{d+ex^2}}$$

$$= \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}\sqrt{d+ex^2}} - \frac{\left(b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\right)\int \frac{\sinh^{-1}\left(\right.}{x}}{\sqrt{e}\sqrt{d+ex^2}}$$

$$= \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}\sqrt{d+ex^2}} - \frac{\left(b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\right)\text{Subst}\left(\int\right.}{\sqrt{e}\sqrt{}}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{e}\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx}{\sqrt{e}\sqrt{d+ex^2}}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e\right.}{\sqrt{e}\sqrt{d+ex^2}}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e\right.}{\sqrt{e}\sqrt{d+ex^2}}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e\right.}{\sqrt{e}\sqrt{d+ex^2}}$$

<u>Mathematica</u> [A]
time = 0.36, size = 186, normalized size = 0.74

$$\frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{\sqrt{e}} + \frac{bn\sqrt{1+\frac{ex^2}{d}}\left(-\sinh^{-1}\left(\sqrt{\frac{e}{d}}\,x\right)^2 - 2\sinh^{-1}\left(\sqrt{\frac{e}{d}}\,x\right)\log\left(1-e^{-2\sinh^{-1}\left(\sqrt{\frac{e}{d}}\,x\right)}\right) + 2\log(x)\log\left(\sqrt{\frac{e}{d}}\,x+\sqrt{1+\frac{ex^2}{d}}\right) + \text{Li}_2\left(e^{-2\sinh^{-1}\left(\sqrt{\frac{e}{d}}\,x\right)}\right)\right)}{2\sqrt{\frac{e}{d}}\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/Sqrt[d + e*x^2],x]
```

```
[Out] ((a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/Sqrt[e
] + (b*n*Sqrt[1 + (e*x^2)/d]*(-ArcSinh[Sqrt[e/d]*x]^2 - 2*ArcSinh[Sqrt[e/d]
*x]*Log[1 - E^(-2*ArcSinh[Sqrt[e/d]*x])] + 2*Log[x]*Log[Sqrt[e/d]*x + Sqrt[
```

```
1 + (e*x^2)/d]] + PolyLog[2, E^(-2*ArcSinh[Sqrt[e/d]*x])]))/(2*Sqrt[e/d]*Sq
rt[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\sqrt{e\,x^{2}+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
[Out] int((a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
[Out] a*arcsinh(x*e^(1/2)/sqrt(d))*e^(-1/2) + b*integrate((log(c) + log(x^n))/sqr
t(x^2*e + d), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^2*e + d), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{\sqrt{d+ex^{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
[Out] Integral((a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/sqrt(x^2*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^2)^(1/2),x)
[Out] int((a + b*log(c*x^n))/(d + e*x^2)^(1/2), x)
```

3.283 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=81

$$-\frac{bn\sqrt{d+ex^2}}{dx}+\frac{b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{dx}$$

```
[Out] b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))*e^(1/2)/d-b*n*(e*x^2+d)^(1/2)/d/x-(a
+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d/x
```

Rubi [A]
time = 0.06, antiderivative size = 81, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2373, 283, 223, 212}

$$-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{dx}-\frac{bn\sqrt{d+ex^2}}{dx}+\frac{b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x^2]),x]
```

```
[Out] -((b*n*Sqrt[d + e*x^2])/(d*x)) + (b*Sqrt[e]*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d +
e*x^2]])/d - (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(d*x)
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx &= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{dx}+\frac{(bn)\int\frac{\sqrt{d+ex^2}}{x^2}\,dx}{d}\\ &= -\frac{bn\sqrt{d+ex^2}}{dx}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{dx}+\frac{(ben)\int\frac{1}{\sqrt{d+ex^2}}\,dx}{d}\\ &= -\frac{bn\sqrt{d+ex^2}}{dx}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{dx}+\frac{(ben)\text{Subst}\left(\int\frac{1}{1-ex^2}\,dx,x,\frac{x}{\sqrt{d+ex^2}}\right)}{d}\\ &= -\frac{bn\sqrt{d+ex^2}}{dx}+\frac{b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{dx}\end{aligned}$$

Mathematica [**A**]
time = 0.06, size = 77, normalized size = 0.95

$$\frac{-\left((a+bn)\sqrt{d+ex^2}\right)-b\sqrt{d+ex^2}\,\log(cx^n)+b\sqrt{e}\,nx\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{dx}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x^2]),x]
[Out] (-((a + b*n)*Sqrt[d + e*x^2]) - b*Sqrt[d + e*x^2]*Log[c*x^n] + b*Sqrt[e]*n*
x*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d*x)
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^2\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
[Out] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
```

Maxima [A]
time = 0.28, size = 78, normalized size = 0.96

$$\frac{\left(\operatorname{arsinh}\left(\frac{xe^{\frac{1}{2}}}{\sqrt{d}}\right)e^{\frac{1}{2}}-\frac{\sqrt{x^2e+d}}{x}\right)bn}{d}-\frac{\sqrt{x^2e+d}\,b\log\left(cx^n\right)}{dx}-\frac{\sqrt{x^2e+d}\,a}{dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] (arcsinh(x*e^(1/2)/sqrt(d))*e^(1/2) - sqrt(x^2*e + d)/x)*b*n/d - sqrt(x^2*e
 + d)*b*log(c*x^n)/(d*x) - sqrt(x^2*e + d)*a/(d*x)
```

Fricas [A]
time = 0.39, size = 68, normalized size = 0.84

$$\frac{bnxe^{\frac{1}{2}}\log\left(-2\,x^2e-2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)-2\,\sqrt{x^2e+d}\,(bn\log\left(x\right)+bn+b\log\left(c\right)+a)}{2\,dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] 1/2*(b*n*x*e^(1/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) - d) - 2*sqrt
(x^2*e + d)*(b*n*log(x) + b*n + b*log(c) + a))/(d*x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{a+b\log\left(cx^n\right)}{x^2\sqrt{d+ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*sqrt(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x^2*e + d)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(1/2)),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(1/2)), x)
```

3.284 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=144

$$\frac{2ben\sqrt{d+ex^2}}{3d^2x}-\frac{bn(d+ex^2)^{3/2}}{9d^2x^3}-\frac{2be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^2}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3}+\frac{2e\sqrt{d+ex^2}\,(}{3}$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/d^2/x^3-2/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d
)^(1/2))/d^2+2/3*b*e*n*(e*x^2+d)^(1/2)/d^2/x-1/3*(a+b*ln(c*x^n))*(e*x^2+d)^
(1/2)/d/x^3+2/3*e*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d^2/x
```

Rubi [A]
time = 0.10, antiderivative size = 144, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {277, 270, 2392, 12, 462, 283, 223, 212}

$$\frac{2e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3}-\frac{2be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^2}+\frac{2ben\sqrt{d+ex^2}}{3d^2x}-\frac{bn(d+ex^2)^{3/2}}{9d^2x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*Sqrt[d + e*x^2]),x]
```

```
[Out] (2*b*e*n*Sqrt[d + e*x^2])/(3*d^2*x) - (b*n*(d + e*x^2)^(3/2))/(9*d^2*x^3) -
 (2*b*e^(3/2)*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(3*d^2) - (Sqrt[d + e
*x^2]*(a + b*Log[c*x^n]))/(3*d*x^3) + (2*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n
]))/(3*d^2*x)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3d^2x} - (bn)\int \frac{\sqrt{d+ex^2}\,(-}{3d^2x}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3d^2x} - \frac{(bn)\int \frac{\sqrt{d+ex^2}\,(-d}{x^4}}{3d^2}$$

$$= -\frac{bn(d+ex^2)^{3/2}}{9d^2x^3} - \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3d^2x} - \frac{(2b}{}$$

$$= \frac{2ben\sqrt{d+ex^2}}{3d^2x} - \frac{bn(d+ex^2)^{3/2}}{9d^2x^3} - \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}\,(a+b}{3d^2x}$$

$$= \frac{2ben\sqrt{d+ex^2}}{3d^2x} - \frac{bn(d+ex^2)^{3/2}}{9d^2x^3} - \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}\,(a+b}{3d^2x}$$

$$= \frac{2ben\sqrt{d+ex^2}}{3d^2x} - \frac{bn(d+ex^2)^{3/2}}{9d^2x^3} - \frac{2be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^2} - \frac{\sqrt{d+ex^2}\,(a+}{3dx^3}$$

Mathematica [A]
time = 0.09, size = 110, normalized size = 0.76

$$\frac{\sqrt{d+ex^2}\,(-3ad-bdn+6aex^2+5benx^2)-3b(d-2ex^2)\sqrt{d+ex^2}\,\log(cx^n)-6be^{3/2}nx^3\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{9d^2x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*Sqrt[d + e*x^2]),x]
```

```
[Out] (Sqrt[d + e*x^2]*(-3*a*d - b*d*n + 6*a*e*x^2 + 5*b*e*n*x^2) - 3*b*(d - 2*e*
x^2)*Sqrt[d + e*x^2]*Log[c*x^n] - 6*b*e^(3/2)*n*x^3*Log[e*x + Sqrt[e]*Sqrt[
d + e*x^2]])/(9*d^2*x^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^4\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] 1/3*a*(2*sqrt(x^2*e + d)*e/(d^2*x) - sqrt(x^2*e + d)/(d*x^3)) + b*integrate
((log(c) + log(x^n))/(sqrt(x^2*e + d)*x^4), x)
```

Fricas [A]
time = 0.38, size = 116, normalized size = 0.81

$$\frac{3\,bnx^3e^{\frac{3}{2}}\log\left(-2\,x^2e+2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)+((5\,bn+6\,a)x^2e-bdn-3\,ad+3\,(2\,bx^2e-bd)\log\left(c\right)+3\,(2\,bnx^2e-bdn)\log\left(x\right))\sqrt{x^2e+d}}{9\,d^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] 1/9*(3*b*n*x^3*e^(3/2)*log(-2*x^2*e + 2*sqrt(x^2*e + d)*x*e^(1/2) - d) + ((
5*b*n + 6*a)*x^2*e - b*d*n - 3*a*d + 3*(2*b*x^2*e - b*d)*log(c) + 3*(2*b*n*
x^2*e - b*d*n)*log(x))*sqrt(x^2*e + d))/(d^2*x^3)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\sqrt{d+ex^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**4*sqrt(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x^2*e + d)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(1/2)), x)
```

3.285 $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$

Optimal. Leaf size=204

$$-\frac{8be^2n\sqrt{d+ex^2}}{15d^3x}-\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}+\frac{8be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{15d^3}-\frac{\sqrt{d+ex^2}\,(a+b\log}{5dx^5}$$

```
[Out] -1/25*b*n*(e*x^2+d)^(3/2)/d^2/x^5+26/225*b*e*n*(e*x^2+d)^(3/2)/d^3/x^3+8/15
*b*e^(5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^3-8/15*b*e^2*n*(e*x^2+d)^
(1/2)/d^3/x-1/5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d/x^5+4/15*e*(a+b*ln(c*x^n)
)*(e*x^2+d)^(1/2)/d^2/x^3-8/15*e^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d^3/x
```

Rubi [A]
time = 0.12, antiderivative size = 204, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {277, 270, 2392, 12, 1279, 462, 283, 223, 212}

$$-\frac{8e^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{5dx^5}+\frac{8be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{15d^3}-\frac{8be^2n\sqrt{d+ex^2}}{15d^3x}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}-\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^6*Sqrt[d + e*x^2]),x]
```

```
[Out] (-8*b*e^2*n*Sqrt[d + e*x^2])/(15*d^3*x) - (b*n*(d + e*x^2)^(3/2))/(25*d^2*x
^5) + (26*b*e*n*(d + e*x^2)^(3/2))/(225*d^3*x^3) + (8*b*e^(5/2)*n*ArcTanh[(
Sqrt[e]*x)/Sqrt[d + e*x^2]])/(15*d^3) - (Sqrt[d + e*x^2]*(a + b*Log[c*x^n])
)/(5*d*x^5) + (4*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(15*d^2*x^3) - (8*e^
2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(15*d^3*x)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
```

```
InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{5dx^5}+\frac{4e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{15d^2x^3}-\frac{8e^2\sqrt{d+ex^2}\,(a+b\ldots}{15d^3x}$$

$$= -\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{5dx^5}+\frac{4e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{15d^2x^3}-\frac{8e^2\sqrt{d+ex^2}\,(a+b\ldots}{15d^3x}$$

$$= -\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{5dx^5}+\frac{4e\sqrt{d+ex^2}\,(a+b\log(cx^n))}{15d^2x^3}-\frac{8e^2\ldots}{\ldots}$$

$$= -\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{5dx^5}+\frac{4e\sqrt{d+ex^2}\,(\ldots}{15\ldots}$$

$$= -\frac{8be^2n\sqrt{d+ex^2}}{15d^3x}-\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^{\ldots}}{5dx^5}$$

$$= -\frac{8be^2n\sqrt{d+ex^2}}{15d^3x}-\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}-\frac{\sqrt{d+ex^2}\,(a+b\log(cx^{\ldots}}{5dx^5}$$

$$= -\frac{8be^2n\sqrt{d+ex^2}}{15d^3x}-\frac{bn(d+ex^2)^{3/2}}{25d^2x^5}+\frac{26ben(d+ex^2)^{3/2}}{225d^3x^3}+\frac{8be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,\ldots}{\sqrt{d+e\ldots}}\right.}{15d^3}$$

Mathematica [A]
time = 0.15, size = 147, normalized size = 0.72

$$-\frac{\sqrt{d+ex^2}\,(15a(3d^2-4dex^2+8e^2x^4)+bn(9d^2-17dex^2+94e^2x^4))+15b\sqrt{d+ex^2}\,(3d^2-4dex^2+8e^2x^4)\log(cx^n)-120be^{5/2}nx^5\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{225d^3x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^6*Sqrt[d + e*x^2]),x]
```

```
[Out] -1/225*(Sqrt[d + e*x^2]*(15*a*(3*d^2 - 4*d*e*x^2 + 8*e^2*x^4) + b*n*(9*d^2
- 17*d*e*x^2 + 94*e^2*x^4)) + 15*b*Sqrt[d + e*x^2]*(3*d^2 - 4*d*e*x^2 + 8*e
^2*x^4)*Log[c*x^n] - 120*b*e^(5/2)*n*x^5*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]
)/(d^3*x^5)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^6\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

```
[Out] -1/15*a*(8*sqrt(x^2*e + d)*e^2/(d^3*x) - 4*sqrt(x^2*e + d)*e/(d^2*x^3) + 3*
sqrt(x^2*e + d)/(d*x^5)) + b*integrate((log(c) + log(x^n))/(sqrt(x^2*e + d)
*x^6), x)
```

Fricas [A]
time = 0.42, size = 162, normalized size = 0.79

$$\frac{60\,bnx^5e^{\frac{5}{2}}\log\left(-2\,x^2e-2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)-\left(2\,(47\,bn+60\,a)x^4e^2+9\,bd^2n-(17\,bdn+60\,ad)x^2e+45\,ad^2+15\,(8\,bx^4e^2-4\,bdx^2e+3\,bd^2)\log(c)+15\,(8\,bnx^4e^2-4\,bdnx^2e+3\,bd^2n)\log(x)\right)\sqrt{x^2e+d}}{225\,d^3x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

```
[Out] 1/225*(60*b*n*x^5*e^(5/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) - d) -
 (2*(47*b*n + 60*a)*x^4*e^2 + 9*b*d^2*n - (17*b*d*n + 60*a*d)*x^2*e + 45*a*
d^2 + 15*(8*b*x^4*e^2 - 4*b*d*x^2*e + 3*b*d^2)*log(c) + 15*(8*b*n*x^4*e^2 -
 4*b*d*n*x^2*e + 3*b*d^2*n)*log(x))*sqrt(x^2*e + d))/(d^3*x^5)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log\left(cx^{n}\right)}{x^{6}\sqrt{d + ex^{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**6/(e*x**2+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**6*sqrt(d + e*x**2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x^2*e + d)*x^6), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^6\,\sqrt{e\,x^2+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(1/2)), x)
```

3.286 $\int \frac{x^7(a+b\log(cx^n))}{\left(d+ex^2\right)^{3/2}}\,dx$

Optimal. Leaf size=209

$$-\frac{11bd^2n\sqrt{d+ex^2}}{5e^4}+\frac{4bdn(d+ex^2)^{3/2}}{15e^4}-\frac{bn(d+ex^2)^{5/2}}{25e^4}+\frac{16bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e^4}+\frac{d^3(a+b\log(cx^n}{e^4\sqrt{d+ex^2}}$$

```
[Out] 4/15*b*d*n*(e*x^2+d)^(3/2)/e^4-1/25*b*n*(e*x^2+d)^(5/2)/e^4+16/5*b*d^(5/2)*
n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^4-d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^
4+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^4+d^3*(a+b*ln(c*x^n))/e^4/(e*x^2+d)
^(1/2)-11/5*b*d^2*n*(e*x^2+d)^(1/2)/e^4+3*d^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/
2)/e^4
```

Rubi [A]

time = 0.21, antiderivative size = 209, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1813, 1634, 65, 214}

$$\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{16bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e^4}-\frac{11bd^2n\sqrt{d+ex^2}}{5e^4}+\frac{4bdn(d+ex^2)^{3/2}}{15e^4}-\frac{bn(d+ex^2)^{5/2}}{25e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] (-11*b*d^2*n*Sqrt[d + e*x^2])/(5*e^4) + (4*b*d*n*(d + e*x^2)^(3/2))/(15*e^4
) - (b*n*(d + e*x^2)^(5/2))/(25*e^4) + (16*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x
^2]/Sqrt[d]])/(5*e^4) + (d^3*(a + b*Log[c*x^n]))/(e^4*Sqrt[d + e*x^2]) + (3
*d^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^4 - (d*(d + e*x^2)^(3/2)*(a + b*
Log[c*x^n]))/e^4 + ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 1634

```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2]) && GtQ[E
xpon[Px, x], 2]
```

Rule 1813

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Dist[1/2, Su
bst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} - \frac{d(d+ex^2)^{3/2}\,(a+b\log(}{e^4}$$

$$= \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} - \frac{d(d+ex^2)^{3/2}\,(a+b\log(}{e^4}$$

$$= \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} - \frac{d(d+ex^2)^{3/2}\,(a+b\log(}{e^4}$$

$$= \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} - \frac{d(d+ex^2)^{3/2}\,(a+b\log(}{e^4}$$

$$= -\frac{11bd^2n\sqrt{d+ex^2}}{5e^4} + \frac{4bdn(d+ex^2)^{3/2}}{15e^4} - \frac{bn(d+ex^2)^{5/2}}{25e^4} + \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}$$

$$= -\frac{11bd^2n\sqrt{d+ex^2}}{5e^4} + \frac{4bdn(d+ex^2)^{3/2}}{15e^4} - \frac{bn(d+ex^2)^{5/2}}{25e^4} + \frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}$$

$$= -\frac{11bd^2n\sqrt{d+ex^2}}{5e^4} + \frac{4bdn(d+ex^2)^{3/2}}{15e^4} - \frac{bn(d+ex^2)^{5/2}}{25e^4} + \frac{16bd^{5/2}n\tanh^{-1}\Big(}{5e^4}$$

Mathematica [A]
time = 0.12, size = 195, normalized size = 0.93

$$\frac{240ad^3 - 148bd^3n + 120ad^2ex^2 - 134bd^2enx^2 - 30ade^2x^4 + 11bde^2nx^4 + 15ae^3x^6 - 3be^3nx^6 - 240bd^{5/2}n\sqrt{d+ex^2}\,\log(x) + 15b(16d^3 + 8d^2ex^2 - 2de^2x^4 + e^3x^6)\log(cx^n) + 240bd^{5/2}n\sqrt{d+ex^2}\,\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{75e^4\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] (240*a*d^3 - 148*b*d^3*n + 120*a*d^2*e*x^2 - 134*b*d^2*e*n*x^2 - 30*a*d*e^2
*x^4 + 11*b*d*e^2*n*x^4 + 15*a*e^3*x^6 - 3*b*e^3*n*x^6 - 240*b*d^(5/2)*n*Sq
rt[d + e*x^2]*Log[x] + 15*b*(16*d^3 + 8*d^2*e*x^2 - 2*d*e^2*x^4 + e^3*x^6)*
Log[c*x^n] + 240*b*d^(5/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2
]])/(75*e^4*Sqrt[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^7(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

```
[Out] int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Maxima [A]
time = 0.50, size = 247, normalized size = 1.18

$$-\frac{1}{75}\left(120\,d^{\frac{5}{2}}e^{(-4)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)+\left(3\left(x^2e+d\right)^{\frac{5}{2}}-20\left(x^2e+d\right)^{\frac{3}{2}}d+165\sqrt{x^2e+d}\,d^2\right)e^{(-4)}\right)bn+\frac{1}{5}\left(\frac{x^6e^{(-1)}}{\sqrt{x^2e+d}}-\frac{2\,dx^4e^{(-2)}}{\sqrt{x^2e+d}}+\frac{8\,d^2x^2e^{(-3)}}{\sqrt{x^2e+d}}+\frac{16\,d^3e^{(-4)}}{\sqrt{x^2e+d}}\right)b\log\left(cx^n\right)+\frac{1}{5}\left(\frac{x^6e^{(-1)}}{\sqrt{x^2e+d}}-\frac{2\,dx^4e^{(-2)}}{\sqrt{x^2e+d}}+\frac{8\,d^2x^2e^{(-3)}}{\sqrt{x^2e+d}}+\frac{16\,d^3e^{(-4)}}{\sqrt{x^2e+d}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -1/75*(120*d^(5/2)*e^(-4)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d)
+ sqrt(d))) + (3*(x^2*e + d)^(5/2) - 20*(x^2*e + d)^(3/2)*d + 165*sqrt(x^2*
e + d)*d^2)*e^(-4))*b*n + 1/5*(x^6*e^(-1)/sqrt(x^2*e + d) - 2*d*x^4*e^(-2)/
sqrt(x^2*e + d) + 8*d^2*x^2*e^(-3)/sqrt(x^2*e + d) + 16*d^3*e^(-4)/sqrt(x^2
*e + d))*b*log(c*x^n) + 1/5*(x^6*e^(-1)/sqrt(x^2*e + d) - 2*d*x^4*e^(-2)/sq
rt(x^2*e + d) + 8*d^2*x^2*e^(-3)/sqrt(x^2*e + d) + 16*d^3*e^(-4)/sqrt(x^2*e
 + d))*a
```

Fricas [A]
time = 0.44, size = 444, normalized size = 2.12

$$\left[\frac{120\left(bd^2nx^2e+bd^3n\right)\sqrt{d}\log\left(-\frac{x^2e+2\sqrt{x^2e+d}\sqrt{d}+2d}{x^2}\right)-\left(3\left(bn-5a\right)x^6e^3-\left(11\,bdn-30\,ad\right)x^4e^2+148\,bd^3n-240\,ad^3+2\left(67\,bd^2n-60\,ad^2\right)x^2e-15\left(bx^6e^3-2\,bdx^4e^2+8\,bd^2x^2e+16\,bd^3\right)\log\left(c\right)-15\left(bnx^6e^3-2\,bdnx^4e^2+8\,bd^2nx^2e+16\,bd^3n\right)\log\left(x\right)\right)\sqrt{x^2e+d}}{75\left(x^2e^5+de^4\right)},-\frac{240\left(bd^2nx^2e+bd^3n\right)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left(3\left(bn-5a\right)x^6e^3-\left(11\,bdn-30\,ad\right)x^4e^2+148\,bd^3n-240\,ad^3+2\left(67\,bd^2n-60\,ad^2\right)x^2e-15\left(bx^6e^3-2\,bdx^4e^2+8\,bd^2x^2e+16\,bd^3\right)\log\left(c\right)-15\left(bnx^6e^3-2\,bdnx^4e^2+8\,bd^2nx^2e+16\,bd^3n\right)\log\left(x\right)\right)\sqrt{x^2e+d}}{75\left(x^2e^5+de^4\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/75*(120*(b*d^2*n*x^2*e + b*d^3*n)*sqrt(d)*log(-(x^2*e + 2*sqrt(x^2*e + d
)*sqrt(d) + 2*d)/x^2) - (3*(b*n - 5*a)*x^6*e^3 - (11*b*d*n - 30*a*d)*x^4*e^
2 + 148*b*d^3*n - 240*a*d^3 + 2*(67*b*d^2*n - 60*a*d^2)*x^2*e - 15*(b*x^6*e
^3 - 2*b*d*x^4*e^2 + 8*b*d^2*x^2*e + 16*b*d^3)*log(c) - 15*(b*n*x^6*e^3 - 2
*b*d*n*x^4*e^2 + 8*b*d^2*n*x^2*e + 16*b*d^3*n)*log(x))*sqrt(x^2*e + d))/(x^
2*e^5 + d*e^4), -1/75*(240*(b*d^2*n*x^2*e + b*d^3*n)*sqrt(-d)*arctan(sqrt(-
d)/sqrt(x^2*e + d)) + (3*(b*n - 5*a)*x^6*e^3 - (11*b*d*n - 30*a*d)*x^4*e^2
+ 148*b*d^3*n - 240*a*d^3 + 2*(67*b*d^2*n - 60*a*d^2)*x^2*e - 15*(b*x^6*e^3
 - 2*b*d*x^4*e^2 + 8*b*d^2*x^2*e + 16*b*d^3)*log(c) - 15*(b*n*x^6*e^3 - 2*b
*d*n*x^4*e^2 + 8*b*d^2*n*x^2*e + 16*b*d^3*n)*log(x))*sqrt(x^2*e + d))/(x^2*
e^5 + d*e^4)]
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^7/(x^2*e + d)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^7\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

```
[Out] int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.287 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=158

$$\frac{5bdn\sqrt{d+ex^2}}{3e^3}-\frac{bn(d+ex^2)^{3/2}}{9e^3}-\frac{8bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}\,(a+b\log$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/e^3-8/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2
))/e^3+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^3-d^2*(a+b*ln(c*x^n))/e^3/(e*x
^2+d)^(1/2)+5/3*b*d*n*(e*x^2+d)^(1/2)/e^3-2*d*(a+b*ln(c*x^n))*(e*x^2+d)^(1/
2)/e^3
```

Rubi [A]
time = 0.15, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1265, 911, 1167, 214}

$$-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{8bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3}+\frac{5bdn\sqrt{d+ex^2}}{3e^3}-\frac{bn(d+ex^2)^{3/2}}{9e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] (5*b*d*n*Sqrt[d + e*x^2])/(3*e^3) - (b*n*(d + e*x^2)^(3/2))/(9*e^3) - (8*b*
d^(3/2)*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*e^3) - (d^2*(a + b*Log[c*x^n
]))/(e^3*Sqrt[d + e*x^2]) - (2*d*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^3 +
((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1167

```
Int[((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
 x_Symbol] :> Int[ExpandIntegrand[(d + e*x^2)^q*(a + b*x^2 + c*x^4)^p, x],
x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e
 + a*e^2, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 1265

```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a +
 b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Inte
gerQ[(m - 1)/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}\,(a+b\log(c\ldots}{3e^3}$$

$$= -\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}\,(a+b\log(c\ldots}{3e^3}$$

$$= -\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}\,(a+b\log(c\ldots}{3e^3}$$

$$= -\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}\,(a+b\log(c\ldots}{3e^3}$$

$$= -\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}\,(a+b\log(c\ldots}{3e^3}$$

$$= \frac{5bdn\sqrt{d+ex^2}}{3e^3} - \frac{bn(d+ex^2)^{3/2}}{9e^3} - \frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}\,(a+b\log\ldots}{e^3}$$

$$= \frac{5bdn\sqrt{d+ex^2}}{3e^3} - \frac{bn(d+ex^2)^{3/2}}{9e^3} - \frac{8bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3} - \frac{d^2(a+b\log\ldots}{e^3\sqrt{d+\ldots}}$$

Mathematica [A]
time = 0.10, size = 160, normalized size = 1.01

$$\frac{-24ad^2+14bd^2n-12adex^2+13bdenx^2+3ae^2x^4-be^2nx^4+24bd^{3/2}n\sqrt{d+ex^2}\,\log(x)-3b(8d^2+4dex^2-e^2x^4)\log(cx^n)-24bd^{3/2}n\sqrt{d+ex^2}\,\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{9e^3\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] (-24*a*d^2 + 14*b*d^2*n - 12*a*d*e*x^2 + 13*b*d*e*n*x^2 + 3*a*e^2*x^4 - b*e
^2*n*x^4 + 24*b*d^(3/2)*n*Sqrt[d + e*x^2]*Log[x] - 3*b*(8*d^2 + 4*d*e*x^2 -
 e^2*x^4)*Log[c*x^n] - 24*b*d^(3/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[
d + e*x^2]])/(9*e^3*Sqrt[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^5(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
[Out] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Maxima [A]
time = 0.50, size = 191, normalized size = 1.21

$$\frac{1}{9}\left(12\,d^{\frac{3}{2}}e^{(-3)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)-\left((x^2e+d)^{\frac{3}{2}}-15\,\sqrt{x^2e+d}\,d\right)e^{(-3)}\right)bn+\frac{1}{3}\left(\frac{x^4e^{(-1)}}{\sqrt{x^2e+d}}-\frac{4\,dx^2e^{(-2)}}{\sqrt{x^2e+d}}-\frac{8\,d^2e^{(-3)}}{\sqrt{x^2e+d}}\right)b\log\left(cx^n\right)+\frac{1}{3}\left(\frac{x^4e^{(-1)}}{\sqrt{x^2e+d}}-\frac{4\,dx^2e^{(-2)}}{\sqrt{x^2e+d}}-\frac{8\,d^2e^{(-3)}}{\sqrt{x^2e+d}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
[Out] 1/9*(12*d^(3/2)*e^(-3)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) + s
qrt(d))) - ((x^2*e + d)^(3/2) - 15*sqrt(x^2*e + d)*d)*e^(-3))*b*n + 1/3*(x^
4*e^(-1)/sqrt(x^2*e + d) - 4*d*x^2*e^(-2)/sqrt(x^2*e + d) - 8*d^2*e^(-3)/sq
rt(x^2*e + d))*b*log(c*x^n) + 1/3*(x^4*e^(-1)/sqrt(x^2*e + d) - 4*d*x^2*e^(
-2)/sqrt(x^2*e + d) - 8*d^2*e^(-3)/sqrt(x^2*e + d))*a
```

Fricas [A]
time = 0.44, size = 351, normalized size = 2.22

$$\left[\frac{12\,(bdnx^2e+bd^2n)\sqrt{d}\,\log\left(-\frac{x^2e-2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-((bn-3\,a)x^4e^2-14\,bd^2n-(13\,bdn-12\,ad)x^2e+24\,ad^2-3\,(bx^4e^2-4\,bdx^2e-8\,bd^2)\log(c)-3\,(bnx^4e^2-4\,bdnx^2e-8\,bd^2n)\log(x))\sqrt{x^2e+d}}{9\,(x^2e^4+de^3)},\ \frac{24\,(bdnx^2e+bd^2n)\sqrt{-d}\,\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)-((bn-3\,a)x^4e^2-14\,bd^2n-(13\,bdn-12\,ad)x^2e+24\,ad^2-3\,(bx^4e^2-4\,bdx^2e-8\,bd^2)\log(c)-3\,(bnx^4e^2-4\,bdnx^2e-8\,bd^2n)\log(x))\sqrt{x^2e+d}}{9\,(x^2e^4+de^3)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
[Out] [1/9*(12*(b*d*n*x^2*e + b*d^2*n)*sqrt(d)*log(-(x^2*e - 2*sqrt(x^2*e + d)*sq
rt(d) + 2*d)/x^2) - ((b*n - 3*a)*x^4*e^2 - 14*b*d^2*n - (13*b*d*n - 12*a*d)
*x^2*e + 24*a*d^2 - 3*(b*x^4*e^2 - 4*b*d*x^2*e - 8*b*d^2)*log(c) - 3*(b*n*x
^4*e^2 - 4*b*d*n*x^2*e - 8*b*d^2*n)*log(x))*sqrt(x^2*e + d))/(x^2*e^4 + d*e
^3), 1/9*(24*(b*d*n*x^2*e + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(x^2*e +
d)) - ((b*n - 3*a)*x^4*e^2 - 14*b*d^2*n - (13*b*d*n - 12*a*d)*x^2*e + 24*a*
d^2 - 3*(b*x^4*e^2 - 4*b*d*x^2*e - 8*b*d^2)*log(c) - 3*(b*n*x^4*e^2 - 4*b*d
*n*x^2*e - 8*b*d^2*n)*log(x))*sqrt(x^2*e + d))/(x^2*e^4 + d*e^3)]
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
[Out] Integral(x**5*(a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^5/(x^2*e + d)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.288 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=100

$$-\frac{bn\sqrt{d+ex^2}}{e^2}+\frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2}$$

```
[Out] 2*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*d^(1/2)/e^2+d*(a+b*ln(c*x^n))/e^2/(e
*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2)/e^2+(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^2
```

Rubi [A]
time = 0.11, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.320, Rules used = {272, 45, 2392, 12, 457, 81, 65, 214}

$$\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{e^2}+\frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] -((b*n*Sqrt[d + e*x^2])/e^2) + (2*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[
d]])/e^2 + (d*(a + b*Log[c*x^n]))/(e^2*Sqrt[d + e*x^2]) + (Sqrt[d + e*x^2]*
(a + b*Log[c*x^n]))/e^2
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
```

```
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} - (bn)\int \frac{2d+ex^2}{e^2x\sqrt{d+ex^2}}\,dx$$

$$= \frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} - \frac{(bn)\int \frac{2d+ex^2}{x\sqrt{d+ex^2}}\,dx}{e^2}$$

$$= \frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} - \frac{(bn)\text{Subst}\left(\int \frac{2d+ex}{x\sqrt{d+ex}}\,dx,\right.}{2e^2}$$

$$= -\frac{bn\sqrt{d+ex^2}}{e^2} + \frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} - \frac{(bdn)\text{Subs}}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{e^2} + \frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^2} - \frac{(2bdn)\text{Sub}}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{e^2} + \frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e^2} + \frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \sqrt{d+e}$$

Mathematica [A]
time = 0.08, size = 118, normalized size = 1.18

$$\frac{2ad-bdn+aex^2-benx^2-2b\sqrt{d}\,n\sqrt{d+ex^2}\,\log(x)+b(2d+ex^2)\log(cx^n)+2b\sqrt{d}\,n\sqrt{d+ex^2}\,\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{e^2\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] (2*a*d - b*d*n + a*e*x^2 - b*e*n*x^2 - 2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*Log[x]
 + b*(2*d + e*x^2)*Log[c*x^n] + 2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*Log[d + Sqrt[
d]*Sqrt[d + e*x^2]])/(e^2*Sqrt[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Maxima [A]
time = 0.49, size = 133, normalized size = 1.33

$$-\left(\sqrt{d}\,e^{(-2)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)+\sqrt{x^2e+d}\,e^{(-2)}\right)bn+\left(\frac{x^2e^{(-1)}}{\sqrt{x^2e+d}}+\frac{2\,de^{(-2)}}{\sqrt{x^2e+d}}\right)b\log\left(cx^n\right)+\left(\frac{x^2e^{(-1)}}{\sqrt{x^2e+d}}+\frac{2\,de^{(-2)}}{\sqrt{x^2e+d}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -(sqrt(d)*e^(-2)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) + sqrt(d)
)) + sqrt(x^2*e + d)*e^(-2))*b*n + (x^2*e^(-1)/sqrt(x^2*e + d) + 2*d*e^(-2)
/sqrt(x^2*e + d))*b*log(c*x^n) + (x^2*e^(-1)/sqrt(x^2*e + d) + 2*d*e^(-2)/s
qrt(x^2*e + d))*a
```

Fricas [A]
time = 0.42, size = 252, normalized size = 2.52

$$\left[\frac{(bnx^2e+bdn)\sqrt{d}\,\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-((bn-a)x^2e+bdn-2\,ad-(bx^2e+2\,bd)\log\left(c\right)-(bnx^2e+2\,bdn)\log\left(x\right))\sqrt{x^2e+d}}{x^2e^3+de^2},-\frac{2\,(bnx^2e+bdn)\sqrt{-d}\,\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+((bn-a)x^2e+bdn-2\,ad-(bx^2e+2\,bd)\log\left(c\right)-(bnx^2e+2\,bdn)\log\left(x\right))\sqrt{x^2e+d}}{x^2e^3+de^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [((b*n*x^2*e + b*d*n)*sqrt(d)*log(-(x^2*e + 2*sqrt(x^2*e + d)*sqrt(d) + 2*d
)/x^2) - ((b*n - a)*x^2*e + b*d*n - 2*a*d - (b*x^2*e + 2*b*d)*log(c) - (b*n
*x^2*e + 2*b*d*n)*log(x))*sqrt(x^2*e + d))/(x^2*e^3 + d*e^2), -(2*(b*n*x^2*
e + b*d*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(x^2*e + d)) + ((b*n - a)*x^2*e + b
*d*n - 2*a*d - (b*x^2*e + 2*b*d)*log(c) - (b*n*x^2*e + 2*b*d*n)*log(x))*sqr
t(x^2*e + d))/(x^2*e^3 + d*e^2)]
```

Sympy [A]
time = 24.83, size = 163, normalized size = 1.63

$$a\left(\begin{cases}\frac{x^4}{4d^{\frac{3}{2}}} & \text{for}\ e=0\\ \frac{d}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^2} & \text{otherwise}\end{cases}\right)-bn\left(\begin{cases}\frac{x^4}{16d^{\frac{3}{2}}} & \text{for}\ e=0\\ -\frac{2\sqrt{d}\,\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)}{e^2}+\frac{d}{e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{x}{e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}} & \text{otherwise}\end{cases}\right)+b\left(\begin{cases}\frac{x^4}{4d^{\frac{3}{2}}} & \text{for}\ e=0\\ \frac{d}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^2} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

```
[Out] a*Piecewise((x**4/(4*d**(3/2)), Eq(e, 0)), (d/(e**2*sqrt(d + e*x**2)) + sqr
t(d + e*x**2)/e**2, True)) - b*n*Piecewise((x**4/(16*d**(3/2)), Eq(e, 0)),
(-2*sqrt(d)*asinh(sqrt(d)/(sqrt(e)*x))/e**2 + d/(e**(5/2)*x*sqrt(d/(e*x**2)
 + 1)) + x/(e**(3/2)*sqrt(d/(e*x**2) + 1)), True)) + b*Piecewise((x**4/(4*d
**(3/2)), Eq(e, 0)), (d/(e**2*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**2, Tr
ue))*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x^3/(x^2*e + d)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.289 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}} dx$

Optimal. Leaf size=57

$$-\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}\,e}-\frac{a+b\log\left(cx^n\right)}{e\sqrt{d+ex^2}}$$

```
[Out] -b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e/d^(1/2)+(-a-b*ln(c*x^n))/e/(e*x^2+d
)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2376, 272, 65, 214}

$$-\frac{a+b\log\left(cx^n\right)}{e\sqrt{d+ex^2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}\,e}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] -((b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(Sqrt[d]*e)) - (a + b*Log[c*x^n])/
(e*Sqrt[d + e*x^2])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx &= -\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}+\frac{(bn)\int\frac{1}{x\sqrt{d+ex^2}}\,dx}{e}\\
&= -\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}+\frac{(bn)\mathrm{Subst}\left(\int\frac{1}{x\sqrt{d+ex}}\,dx,x,x^2\right)}{2e}\\
&= -\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}+\frac{(bn)\mathrm{Subst}\left(\int\frac{1}{-\frac{d}{e}+\frac{x^2}{e}}\,dx,x,\sqrt{d+ex^2}\right)}{e^2}\\
&= -\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}\,e}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}
\end{aligned}$$

Mathematica [**A**]
time = 0.09, size = 77, normalized size = 1.35

$$-\frac{\frac{a}{\sqrt{d+ex^2}}-\frac{bn\log(x)}{\sqrt{d}}+\frac{b\log(cx^n)}{\sqrt{d+ex^2}}+\frac{bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{\sqrt{d}}}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] -((a/Sqrt[d + e*x^2] - (b*n*Log[x])/Sqrt[d] + (b*Log[c*x^n])/Sqrt[d + e*x^2
] + (b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/Sqrt[d])/e)
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Maxima [A]
time = 0.28, size = 57, normalized size = 1.00

$$-\frac{bn \operatorname{arsinh}\left(\frac{\sqrt{d}\, e^{\left(-\frac{1}{2}\right)}}{|x|}\right) e^{(-1)}}{\sqrt{d}} - \frac{b e^{(-1)} \log\left(c x^{n}\right)}{\sqrt{x^{2} e + d}} - \frac{a e^{(-1)}}{\sqrt{x^{2} e + d}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -b*n*arcsinh(sqrt(d)*e^(-1/2)/abs(x))*e^(-1)/sqrt(d) - b*e^(-1)*log(c*x^n)/
sqrt(x^2*e + d) - a*e^(-1)/sqrt(x^2*e + d)
```

Fricas [A]
time = 0.39, size = 176, normalized size = 3.09

$$\left[\frac{\left(b n x^{2} e + b d n\right) \sqrt{d} \log\left(-\frac{x^{2} e - 2 \sqrt{x^{2} e + d} \sqrt{d} + 2 d}{x^{2}}\right) - 2 \left(b d n \log\left(x\right) + b d \log\left(c\right) + a d\right) \sqrt{x^{2} e + d}}{2 \left(d x^{2} e^{2} + d^{2} e\right)}, \frac{\left(b n x^{2} e + b d n\right) \sqrt{-d} \arctan\left(\frac{\sqrt{-d}}{\sqrt{x^{2} e + d}}\right) - \left(b d n \log\left(x\right) + b d \log\left(c\right) + a d\right) \sqrt{x^{2} e + d}}{d x^{2} e^{2} + d^{2} e}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/2*((b*n*x^2*e + b*d*n)*sqrt(d)*log(-(x^2*e - 2*sqrt(x^2*e + d)*sqrt(d) +
 2*d)/x^2) - 2*(b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(x^2*e + d))/(d*x^2*e^
2 + d^2*e), ((b*n*x^2*e + b*d*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(x^2*e + d))
- (b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(x^2*e + d))/(d*x^2*e^2 + d^2*e)]
```

Sympy [A]
time = 6.14, size = 80, normalized size = 1.40

$$-\frac{a}{e\sqrt{d + e x^{2}}} - bn \left(\begin{cases} \frac{x^{2}}{4 d^{\frac{3}{2}}} & \text{for}\: e = 0 \\ \frac{\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\, x}\right)}{\sqrt{d}\, e} & \text{otherwise} \end{cases}\right) + b \left(\begin{cases} \frac{x^{2}}{2 d^{\frac{3}{2}}} & \text{for}\: e = 0 \\ - \frac{1}{e \sqrt{d + e x^{2}}} & \text{otherwise} \end{cases}\right) \log\left(c x^{n}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

```
[Out] -a/(e*sqrt(d + e*x**2)) - b*n*Piecewise((x**2/(4*d**(3/2)), Eq(e, 0)), (asi
nh(sqrt(d)/(sqrt(e)*x))/(sqrt(d)*e), True)) + b*Piecewise((x**2/(2*d**(3/2)
), Eq(e, 0)), (-1/(e*sqrt(d + e*x**2)), True))*log(c*x**n)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)*x/(x^2*e + d)^(3/2), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.290 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=209

$$\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}}+\left(\frac{1}{d\sqrt{d+ex^2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(c$$

```
[Out] b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)+1/2*b*n*arctanh((e*x^2+d)^(1/2
)/d^(1/2))^2/d^(3/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(
1/2)-(e*x^2+d)^(1/2)))/d^(3/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^
2+d)^(1/2)))/d^(3/2)+(a+b*ln(c*x^n))*(-arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(
3/2)+1/d/(e*x^2+d)^(1/2))
```

Rubi [A]
time = 0.23, antiderivative size = 209, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 53, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{3/2}}+\left(\frac{1}{d\sqrt{d+ex^2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n))+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}-\frac{bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(3/2)),x]
```

```
[Out] (b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/d^(3/2) + (b*n*ArcTanh[Sqrt[d + e*x^
2]/Sqrt[d]]^2)/(2*d^(3/2)) + (1/(d*Sqrt[d + e*x^2]) - ArcTanh[Sqrt[d + e*x^
2]/Sqrt[d]]/d^(3/2))*(a + b*Log[c*x^n]) - (b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt
[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(3/2) - (b*n*PolyLog[2
, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(3/2))
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
```

```
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n)) - (bn)\int\left(\frac{1}{dx\sqrt{d+ex^2}}\right.$$

$$= \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n)) + \frac{(bn)\int\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{x}}{d^{3/2}}$$

$$= \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n)) + \frac{(bn)\text{Subst}\left(\int\frac{\tanh^{-1}\left(\right.}{}\right.}{2d^{3}}$$

$$= \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n)) + \frac{(bn)\text{Subst}\left(\int\frac{x\tanh^{-1}\left(\right.}{-d+}\right.}{d}$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}} + \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\right.}{}\right.$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}} + \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\right.}{}\right.$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}} + \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\right.}{}\right.$$

$$= \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}} + \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\tanh^{-1}\left(\right.}{}\right.$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.25, size = 241, normalized size = 1.15

$$\frac{-bd^{3/2}n\sqrt{1+\frac{d}{ex^2}}\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{d}{ex^2}\right)+9ex^2\left(-b\sqrt{e}\,n\sqrt{1+\frac{d}{ex^2}}\,x\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)\log(x)-bn\sqrt{d+ex^2}\,\log^2(x)+\sqrt{d+ex^2}\,\log(x)\left(a+b\log\left(cx^n\right)+bn\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)\right)+\left(a+b\log\left(cx^n\right)\right)\left(\sqrt{d}-\sqrt{d+ex^2}\,\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)\right)\right)}{9d^{3/2}ex^2\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(3/2)),x]
```

```
[Out] (-(b*d^(3/2)*n*Sqrt[1 + d/(e*x^2)]*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/2,
 5/2}, -(d/(e*x^2))]) + 9*e*x^2*(-(b*Sqrt[e]*n*Sqrt[1 + d/(e*x^2)]*x*ArcSin
h[Sqrt[d]/(Sqrt[e]*x)]*Log[x]) - b*n*Sqrt[d + e*x^2]*Log[x]^2 + Sqrt[d + e*
x^2]*Log[x]*(a + b*Log[c*x^n] + b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]) + (a
+ b*Log[c*x^n])*(Sqrt[d] - Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
)))/(9*d^(3/2)*e*x^2*Sqrt[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(e\,x^{2}+d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -a*(arcsinh(sqrt(d)*e^(-1/2)/abs(x))/d^(3/2) - 1/(sqrt(x^2*e + d)*d)) + b*i
ntegrate((log(c) + log(x^n))/((x^3*e + d*x)*sqrt(x^2*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^5*e^2 + 2*d*
x^3*e + d^2*x), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{2}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(3/2),x)
[Out] Integral((a + b*log(c*x**n))/(x*(d + e*x**2)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(3/2)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^{n}\right)}{x\,{\left(e\,x^{2}+d\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^2)^(3/2)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^2)^(3/2)), x)
```

3.291 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=287

$$-\frac{bn\sqrt{d+ex^2}}{4d^2x^2}-\frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}}-\frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}-\frac{a+b\log(c}{2dx^2\sqrt{d+}}$$

```
[Out] -5/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2)-3/4*b*e*n*arctanh((e*x^
2+d)^(1/2)/d^(1/2))^2/d^(5/2)+3/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*l
n(c*x^n))/d^(5/2)+3/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(
d^(1/2)-(e*x^2+d)^(1/2)))/d^(5/2)+3/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-
(e*x^2+d)^(1/2)))/d^(5/2)-3/2*e*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(1/2)+1/2*(-a
-b*ln(c*x^n))/d/x^2/(e*x^2+d)^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/d^2/x^2
```

Rubi [A]
time = 0.27, antiderivative size = 287, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 12, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {272, 44, 53, 65, 214, 2392, 457, 79, 6131, 6055, 2449, 2352}

$$\frac{3ben\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{5/2}}+\frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}-\frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}}-\frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}}+\frac{3ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2d^{5/2}}-\frac{bn\sqrt{d+ex^2}}{4d^2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(3/2)),x]
```

```
[Out] -1/4*(b*n*Sqrt[d + e*x^2])/(d^2*x^2) - (5*b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqr
t[d]])/(4*d^(5/2)) - (3*b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/(4*d^(5/2
)) - (3*e*(a + b*Log[c*x^n]))/(2*d^2*Sqrt[d + e*x^2]) - (a + b*Log[c*x^n])/
(2*d*x^2*Sqrt[d + e*x^2]) + (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Lo
g[c*x^n]))/(2*d^(5/2)) + (3*b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(2*S
qrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(5/2)) + (3*b*e*n*PolyLog[2, 1 -
 (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(5/2))
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
```

```
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 79

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/
(f*(p + 1)*(c*f - d*e))), x] - Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c
*f*(p + 1)))/(f*(p + 1)*(c*f - d*e)), Int[(c + d*x)^n*(e + f*x)^(p + 1), x]
, x] /; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || I
ntegerQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))
))
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \frac{a+b\log(cx^n)}{dx^2\sqrt{d+ex^2}} - \frac{3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^2x^2} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log}{2d^{5/2}}$$

$$= \frac{a+b\log(cx^n)}{dx^2\sqrt{d+ex^2}} - \frac{3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^2x^2} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log}{2d^{5/2}}$$

$$= \frac{a+b\log(cx^n)}{dx^2\sqrt{d+ex^2}} - \frac{3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^2x^2} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log}{2d^{5/2}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4d^2x^2} + \frac{a+b\log(cx^n)}{dx^2\sqrt{d+ex^2}} - \frac{3\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^2x^2} + \frac{3e\tanh^{-1}\left(\frac{\sqrt{d}}{}\right.}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4d^2x^2} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}} + \frac{a+b\log(cx^n)}{dx^2\sqrt{d+ex^2}} - \frac{3\sqrt{d+ex^2}\,(a+}{2d^2x}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4d^2x^2} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}} + \frac{a+}{dx^2}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4d^2x^2} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}} + \frac{a+}{dx^2}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4d^2x^2} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}} - \frac{3ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}} + \frac{a+}{dx^2}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

time = 0.21, size = 218, normalized size = 0.76

$$\frac{3bd^{5/2}n\sqrt{1+\frac{d}{ex^2}}\ {}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{d}{ex^2}\right)-5bd^{5/2}n\sqrt{1+\frac{d}{ex^2}}\ {}_2F_1\left(\frac{3}{2},\frac{5}{2};\frac{7}{2};-\frac{d}{ex^2}\right)(1+2\log(x))-25ex^2(a-bn\log(x)+b\log(cx^n))\left(\sqrt{d}\,(d+3ex^2)+3ex^2\sqrt{d+ex^2}\,\log(x)-3ex^2\sqrt{d+ex^2}\,\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)\right)}{50d^{5/2}ex^4\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(3/2)),x]
```

```
[Out] (3*b*d^(5/2)*n*Sqrt[1 + d/(e*x^2)]*HypergeometricPFQ[{5/2, 5/2, 5/2}, {7/2,
 7/2}, -(d/(e*x^2))] - 5*b*d^(5/2)*n*Sqrt[1 + d/(e*x^2)]*Hypergeometric2F1[
3/2, 5/2, 7/2, -(d/(e*x^2))]*(1 + 2*Log[x]) - 25*e*x^2*(a - b*n*Log[x] + b*
Log[c*x^n])*(Sqrt[d]*(d + 3*e*x^2) + 3*e*x^2*Sqrt[d + e*x^2]*Log[x] - 3*e*x
^2*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]))/(50*d^(5/2)*e*x^4*Sqr
t[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\left(e\,x^{2}+d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] 1/2*a*(3*arcsinh(sqrt(d)*e^(-1/2)/abs(x))*e/d^(5/2) - 3*e/(sqrt(x^2*e + d)*
d^2) - 1/(sqrt(x^2*e + d)*d*x^2)) + b*integrate((log(c) + log(x^n))/((x^5*e
 + d*x^3)*sqrt(x^2*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^7*e^2 + 2*d*
x^5*e + d^2*x^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{x^{3}\left(d + ex^{2}\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(3/2),x)
[Out] Integral((a + b*log(c*x**n))/(x**3*(d + e*x**2)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(3/2)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,{\left(e\,x^2+d\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(3/2)),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(3/2)), x)
```

3.292 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=328

$$\frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}}+\frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}}-\frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+e}}$$

```
[Out] -x*(a+b*ln(c*x^n))/e/(e*x^2+d)^(1/2)+b*n*arcsinh(x*e^(1/2)/d^(1/2))*d^(1/2)
*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)+1/2*b*n*arcsinh(x*e^(1/2)/d^(1/2
))^2*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)-b*n*arcsinh(x*e^(1/2
)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d
)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)+arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*
d^(1/2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)-1/2*b*n*polylog(2,(x*e^(1
/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+
d)^(1/2)
```

Rubi [A]
time = 0.33, antiderivative size = 328, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 11, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.440$, Rules used = {2386, 294, 221, 2392, 14, 21, 5775, 3797, 2221, 2317, 2438}

$$-\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2e^{3/2}\sqrt{d+ex^2}}+\frac{\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}}-\frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}}+\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}}+\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}}-\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{e^{3/2}\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(e^(3/2)*Sqr
t[d + e*x^2]) + (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d
]]^2)/(2*e^(3/2)*Sqrt[d + e*x^2]) - (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*ArcSin
h[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(e^(3/2
)*Sqrt[d + e*x^2]) - (x*(a + b*Log[c*x^n]))/(e*Sqrt[d + e*x^2]) + (Sqrt[d]*
Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(e^(3/
2)*Sqrt[d + e*x^2]) - (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*PolyLog[2, E^(2*ArcS
inh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(3/2)*Sqrt[d + e*x^2])
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 21

```
Int[(u_.)*((a_) + (b_.)*(v_))^(m_.)*((c_) + (d_.)*(v_))^(n_.), x_Symbol] :>
 Dist[(b/d)^m, Int[u*(c + d*v)^(m + n), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && EqQ[b*c - a*d, 0] && IntegerQ[m] && ( !IntegerQ[n] || SimplerQ[c + d*x,
 a + b*x])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
```

```
InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{\sqrt{1+\frac{ex^2}{d}}\int \frac{x^2(a+b\log(cx^n))}{\left(1+\frac{ex^2}{d}\right)^{3/2}}\,dx}{d\sqrt{d+ex^2}}$$

$$= -\frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}} - \frac{\Big(bn}{}$$

$$= -\frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}} - \frac{\Big(bn}{}$$

$$= -\frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}} - \frac{\Big(b\sqrt{}}{}$$

$$= -\frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}} - \frac{\Big(b\sqrt{}}{}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}} - \frac{x(a}{}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}} - \frac{b\sqrt{}}{}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}} - \frac{b\sqrt{}}{}$$

$$= \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}} - \frac{b\sqrt{}}{}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order

4 in optimal.
time = 0.31, size = 217, normalized size = 0.66

$$-\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(e^{3/2}x^3(d+ex^2)\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9d^2\sqrt{e}\,x\sqrt{1+\frac{ex^2}{d}}\,\log(x)-9d^{3/2}(d+ex^2)\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log(x)\right)}{9de^{3/2}\left(d+ex^2\right)^{3/2}}-\frac{x(a-bn\log(x)+b\log(cx^n))}{e\sqrt{d+ex^2}}+\frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{e^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

```
[Out] -1/9*(b*n*Sqrt[1 + (e*x^2)/d]*(e^(3/2)*x^3*(d + e*x^2)*HypergeometricPFQ[{3
/2, 3/2, 3/2}, {5/2, 5/2}, -((e*x^2)/d)] + 9*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^2)
/d]*Log[x] - 9*d^(3/2)*(d + e*x^2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[x]))/(d
*e^(3/2)*(d + e*x^2)^(3/2)) - (x*(a - b*n*Log[x] + b*Log[c*x^n]))/(e*Sqrt[d
 + e*x^2]) + ((a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*
x^2]])/e^(3/2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] (arcsinh(x*e^(1/2)/sqrt(d))*e^(-3/2) - x*e^(-1)/sqrt(x^2*e + d))*a + b*inte
grate((x^2*log(c) + x^2*log(x^n))/(x^2*e + d)^(3/2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*x^2*log(c*x^n) + sqrt(x^2*e + d)*a*x^2)/(x^4*e^
2 + 2*d*x^2*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^2*e + d)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^2\,\left(a + b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2 + d\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.293 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=58

$$-\frac{bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}+\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}$$

```
[Out] -b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d/e^(1/2)+x*(a+b*ln(c*x^n))/d/(e*x^
2+d)^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 58, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136, Rules used = {2351, 223, 212}

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^2)^(3/2),x]
```

```
[Out] -((b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(d*Sqrt[e])) + (x*(a + b*Log[c
*x^n]))/(d*Sqrt[d + e*x^2])
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}} - \frac{(bn)\int \frac{1}{\sqrt{d+ex^2}}\,dx}{d}$$

$$= \frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}} - \frac{(bn)\text{Subst}\left(\int \frac{1}{1-ex^2}\,dx, x, \frac{x}{\sqrt{d+ex^2}}\right)}{d}$$

$$= -\frac{bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}} + \frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}$$

Mathematica [A]
time = 0.06, size = 70, normalized size = 1.21

$$\frac{\frac{ax}{\sqrt{d+ex^2}} + \frac{bx\log(cx^n)}{\sqrt{d+ex^2}} - \frac{bn\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{\sqrt{e}}}{d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^(3/2),x]
```

```
[Out] ((a*x)/Sqrt[d + e*x^2] + (b*x*Log[c*x^n])/Sqrt[d + e*x^2] - (b*n*Log[e*x +
Sqrt[e]*Sqrt[d + e*x^2]])/Sqrt[e])/d
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

Maxima [A]
time = 0.28, size = 56, normalized size = 0.97

$$-\frac{bn\,\mathrm{arsinh}\left(\frac{xe^{\frac{1}{2}}}{\sqrt{d}}\right)e^{\left(-\frac{1}{2}\right)}}{d} + \frac{bx\log(cx^n)}{\sqrt{x^2e+d}\,d} + \frac{ax}{\sqrt{x^2e+d}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -b*n*arcsinh(x*e^(1/2)/sqrt(d))*e^(-1/2)/d + b*x*log(c*x^n)/(sqrt(x^2*e + d
)*d) + a*x/(sqrt(x^2*e + d)*d)
```

Fricas [A]
time = 0.39, size = 95, normalized size = 1.64

$$\frac{(bnx^2e + bdn)e^{\frac{1}{2}}\log\left(-2\,x^2e + 2\,\sqrt{x^2e + d}\,xe^{\frac{1}{2}} - d\right) + 2\,(bnxe\log\left(x\right) + bxe\log\left(c\right) + axe)\sqrt{x^2e + d}}{2\,(dx^2e^2 + d^2e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/2*((b*n*x^2*e + b*d*n)*e^(1/2)*log(-2*x^2*e + 2*sqrt(x^2*e + d)*x*e^(1/2)
 - d) + 2*(b*n*x*e*log(x) + b*x*e*log(c) + a*x*e)*sqrt(x^2*e + d))/(d*x^2*e
^2 + d^2*e)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + ex^2\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^2*e + d)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a + b\,\ln\left(c\,x^n\right)}{{\left(e\,x^2 + d\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^2)^(3/2),x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^2)^(3/2), x)
```

3.294 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=110

$$-\frac{bn\sqrt{d+ex^2}}{d^2x}+\frac{2b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d^2}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}$$

```
[Out] 2*b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))*e^(1/2)/d^2+(-a-b*ln(c*x^n))/d/x/(
e*x^2+d)^(1/2)-2*e*x*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2
)/d^2/x
```

Rubi [A]
time = 0.09, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 7, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {277, 197, 2392, 12, 462, 223, 212}

$$-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{d^2x}+\frac{2b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(3/2)),x]
```

```
[Out] -((b*n*Sqrt[d + e*x^2])/(d^2*x)) + (2*b*Sqrt[e]*n*ArcTanh[(Sqrt[e]*x)/Sqrt[
d + e*x^2]])/d^2 - (a + b*Log[c*x^n])/(d*x*Sqrt[d + e*x^2]) - (2*e*x*(a + b
*Log[c*x^n]))/(d^2*Sqrt[d + e*x^2])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 197

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^(p + 1)
/a), x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p + 1, 0]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\log(cx^n)}{x^2\left(d+ex^2\right)^{3/2}}\,dx &= -\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}} - \frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}} - (bn)\int \frac{-d-2ex^2}{d^2x^2\sqrt{d+ex^2}}\,dx \\
&= -\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}} - \frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}} - \frac{(bn)\int \frac{-d-2ex^2}{x^2\sqrt{d+ex^2}}\,dx}{d^2} \\
&= -\frac{bn\sqrt{d+ex^2}}{d^2x} - \frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}} - \frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}} + \frac{(2ben)\int \frac{1}{\sqrt{d+ex^2}}\,dx}{d^2} \\
&= -\frac{bn\sqrt{d+ex^2}}{d^2x} - \frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}} - \frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}} + \frac{(2ben)\text{Subst}\left(\int \frac{1}{1-ex^2}\,dx \right.}{d^2} \\
&= -\frac{bn\sqrt{d+ex^2}}{d^2x} + \frac{2b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{d^2} - \frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}} - \frac{2ex(a+b\log}{d^2\sqrt{d+ex}}
\end{aligned}$$

Mathematica [A]
time = 0.08, size = 103, normalized size = 0.94

$$\frac{-ad-bdn-2aex^2-benx^2-b(d+2ex^2)\log(cx^n)+2b\sqrt{e}\,nx\sqrt{d+ex^2}\,\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{d^2x\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(3/2)),x]
```

```
[Out] (-(a*d) - b*d*n - 2*a*e*x^2 - b*e*n*x^2 - b*(d + 2*e*x^2)*Log[c*x^n] + 2*b*
Sqrt[e]*n*x*Sqrt[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^2*x*Sqrt
[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^2\left(e\,x^2+d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -a*(2*x*e/(sqrt(x^2*e + d)*d^2) + 1/(sqrt(x^2*e + d)*d*x)) + b*integrate((l
og(c) + log(x^n))/((x^4*e + d*x^2)*sqrt(x^2*e + d)), x)
```

Fricas [A]
time = 0.39, size = 128, normalized size = 1.16

$$\frac{(bnx^3e+bdnx)e^{\frac{1}{2}}\log\left(-2\,x^2e-2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)-((bn+2\,a)x^2e+bdn+ad+(2\,bx^2e+bd)\log\left(c\right)+(2\,bnx^2e+bdn)\log\left(x\right))\sqrt{x^2e+d}}{d^2x^3e+d^3x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] ((b*n*x^3*e + b*d*n*x)*e^(1/2)*log(-2*x^2*e - 2*sqrt(x^2*e + d)*x*e^(1/2) -
 d) - ((b*n + 2*a)*x^2*e + b*d*n + a*d + (2*b*x^2*e + b*d)*log(c) + (2*b*n*
x^2*e + b*d*n)*log(x))*sqrt(x^2*e + d))/(d^2*x^3*e + d^3*x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(3/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(3/2)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,{\left(e\,x^2+d\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(3/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(3/2)), x)
```

3.295 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=176

$$-\frac{bn\sqrt{d+ex^2}}{9d^2x^3}+\frac{14ben\sqrt{d+ex^2}}{9d^3x}-\frac{8be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^3}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}+\frac{8}{}$$

```
[Out] -8/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^3+1/3*(-a-b*ln(c*x^n)
)/d/x^3/(e*x^2+d)^(1/2)+4/3*e*(a+b*ln(c*x^n))/d^2/x/(e*x^2+d)^(1/2)+8/3*e^2
*x*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(1/2)-1/9*b*n*(e*x^2+d)^(1/2)/d^2/x^3+14/9
*b*e*n*(e*x^2+d)^(1/2)/d^3/x
```

Rubi [A]
time = 0.12, antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {277, 197, 2392, 12, 1279, 462, 223, 212}

$$\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}-\frac{8be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^3}+\frac{14ben\sqrt{d+ex^2}}{9d^3x}-\frac{bn\sqrt{d+ex^2}}{9d^2x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(3/2)),x]
```

```
[Out] -1/9*(b*n*Sqrt[d + e*x^2])/(d^2*x^3) + (14*b*e*n*Sqrt[d + e*x^2])/(9*d^3*x)
 - (8*b*e^(3/2)*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(3*d^3) - (a + b*Lo
g[c*x^n])/(3*d*x^3*Sqrt[d + e*x^2]) + (4*e*(a + b*Log[c*x^n]))/(3*d^2*x*Sqr
t[d + e*x^2]) + (8*e^2*x*(a + b*Log[c*x^n]))/(3*d^3*Sqrt[d + e*x^2])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 197

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^(p + 1)
/a), x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p + 1, 0]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = -\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}} + \frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}} + \frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}} - (bn)\int \frac{-d^2+4d}{3d^3x^4\sqrt{}}$$

$$= -\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}} + \frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}} + \frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}} - \frac{(bn)\int \frac{-d^2+4dex^2+}{x^4\sqrt{d+e}}}{3d^3}$$

$$= -\frac{bn\sqrt{d+ex^2}}{9d^2x^3} - \frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}} + \frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}} + \frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}} +$$

$$= -\frac{bn\sqrt{d+ex^2}}{9d^2x^3} + \frac{14ben\sqrt{d+ex^2}}{9d^3x} - \frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}} + \frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}} + \frac{8e^2x}{3}$$

$$= -\frac{bn\sqrt{d+ex^2}}{9d^2x^3} + \frac{14ben\sqrt{d+ex^2}}{9d^3x} - \frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}} + \frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}} + \frac{8e^2x}{3}$$

$$= -\frac{bn\sqrt{d+ex^2}}{9d^2x^3} + \frac{14ben\sqrt{d+ex^2}}{9d^3x} - \frac{8be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^3} - \frac{a+b\log(c}{3dx^3\sqrt{d+e}}$$

Mathematica [A]
time = 0.10, size = 144, normalized size = 0.82

$$\frac{-3ad^2-bd^2n+12adex^2+13bdenx^2+24ae^2x^4+14be^2nx^4-3b(d^2-4dex^2-8e^2x^4)\log(cx^n)-24be^{3/2}nx^3\sqrt{d+ex^2}\,\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{9d^3x^3\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(3/2)),x]
```

```
[Out] (-3*a*d^2 - b*d^2*n + 12*a*d*e*x^2 + 13*b*d*e*n*x^2 + 24*a*e^2*x^4 + 14*b*e
^2*n*x^4 - 3*b*(d^2 - 4*d*e*x^2 - 8*e^2*x^4)*Log[c*x^n] - 24*b*e^(3/2)*n*x^
3*Sqrt[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(9*d^3*x^3*Sqrt[d + e
*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^4\,(e\,x^2+d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] 1/3*a*(8*x*e^2/(sqrt(x^2*e + d)*d^3) + 4*e/(sqrt(x^2*e + d)*d^2*x) - 1/(sqr
t(x^2*e + d)*d*x^3)) + b*integrate((log(c) + log(x^n))/((x^6*e + d*x^4)*sqr
t(x^2*e + d)), x)
```

Fricas [A]
time = 0.45, size = 186, normalized size = 1.06

$$\frac{12\left(bnx^{5}e^{2}+bdnx^{3}e\right)e^{\frac{1}{2}}\log\left(-2\,x^{2}e+2\,\sqrt{x^{2}e+d}\,xe^{\frac{1}{2}}-d\right)+\left(2\left(7\,bn+12\,a\right)x^{4}e^{2}-bd^{2}n+\left(13\,bdn+12\,ad\right)x^{2}e-3\,ad^{2}+3\left(8\,bx^{4}e^{2}+4\,bdx^{2}e-bd^{2}\right)\log\left(c\right)+3\left(8\,bnx^{4}e^{2}+4\,bdnx^{2}e-bd^{2}n\right)\log\left(x\right)\right)\sqrt{x^{2}e+d}}{9\left(d^{3}x^{5}e+d^{4}x^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/9*(12*(b*n*x^5*e^2 + b*d*n*x^3*e)*e^(1/2)*log(-2*x^2*e + 2*sqrt(x^2*e + d
)*x*e^(1/2) - d) + (2*(7*b*n + 12*a)*x^4*e^2 - b*d^2*n + (13*b*d*n + 12*a*d
)*x^2*e - 3*a*d^2 + 3*(8*b*x^4*e^2 + 4*b*d*x^2*e - b*d^2)*log(c) + 3*(8*b*n
*x^4*e^2 + 4*b*d*n*x^2*e - b*d^2*n)*log(x))*sqrt(x^2*e + d))/(d^3*x^5*e + d
^4*x^3)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{4}\left(d+ex^{2}\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(3/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(3/2)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,{\left(e\,x^2+d\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(3/2)),x)
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(3/2)), x)
```

3.296 $\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$

Optimal. Leaf size=236

$$-\frac{bn\sqrt{d+ex^2}}{25d^2x^5}+\frac{14ben\sqrt{d+ex^2}}{75d^3x^3}-\frac{148be^2n\sqrt{d+ex^2}}{75d^4x}+\frac{16be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{5d^4}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}+2$$

```
[Out] 16/5*b*e^(5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^4+1/5*(-a-b*ln(c*x^n)
)/d/x^5/(e*x^2+d)^(1/2)+2/5*e*(a+b*ln(c*x^n))/d^2/x^3/(e*x^2+d)^(1/2)-8/5*e
^2*(a+b*ln(c*x^n))/d^3/x/(e*x^2+d)^(1/2)-16/5*e^3*x*(a+b*ln(c*x^n))/d^4/(e*
x^2+d)^(1/2)-1/25*b*n*(e*x^2+d)^(1/2)/d^2/x^5+14/75*b*e*n*(e*x^2+d)^(1/2)/d
^3/x^3-148/75*b*e^2*n*(e*x^2+d)^(1/2)/d^4/x
```

Rubi [A]
time = 0.19, antiderivative size = 236, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 10, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {277, 197, 2392, 12, 1821, 1599, 1279, 462, 223, 212}

$$-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}+\frac{16be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{5d^4}-\frac{148be^2n\sqrt{d+ex^2}}{75d^4x}+\frac{14ben\sqrt{d+ex^2}}{75d^3x^3}-\frac{bn\sqrt{d+ex^2}}{25d^2x^5}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^6*(d + e*x^2)^(3/2)),x]
```

```
[Out] -1/25*(b*n*Sqrt[d + e*x^2])/(d^2*x^5) + (14*b*e*n*Sqrt[d + e*x^2])/(75*d^3*
x^3) - (148*b*e^2*n*Sqrt[d + e*x^2])/(75*d^4*x) + (16*b*e^(5/2)*n*ArcTanh[(
Sqrt[e]*x)/Sqrt[d + e*x^2]])/(5*d^4) - (a + b*Log[c*x^n])/(5*d*x^5*Sqrt[d +
 e*x^2]) + (2*e*(a + b*Log[c*x^n]))/(5*d^2*x^3*Sqrt[d + e*x^2]) - (8*e^2*(a
 + b*Log[c*x^n]))/(5*d^3*x*Sqrt[d + e*x^2]) - (16*e^3*x*(a + b*Log[c*x^n]))
/(5*d^4*Sqrt[d + e*x^2])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 197

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^(p + 1)
/a), x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p + 1, 0]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
```

```
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 1599

```
Int[(u_.)*(x_)^(m_.)*((a_.)*(x_)^(p_.) + (b_.)*(x_)^(q_.) + (c_.)*(x_)^(r_.
))^(n_.), x_Symbol] :> Int[u*x^(m + n*p)*(a + b*x^(q - p) + c*x^(r - p))^n,
 x] /; FreeQ[{a, b, c, m, p, q, r}, x] && IntegerQ[n] && PosQ[q - p] && Pos
Q[r - p]
```

Rule 1821

```
Int[(Pq_)*((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{
Q = PolynomialQuotient[Pq, c*x, x], R = PolynomialRemainder[Pq, c*x, x]}, S
imp[R*(c*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*c*(m + 1))), x] + Dist[1/(a*c*(
m + 1)), Int[(c*x)^(m + 1)*(a + b*x^2)^p*ExpandToSum[a*c*(m + 1)*Q - b*R*(m
```

```
 + 2*p + 3)*x, x], x], x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && LtQ
[m, -1] && (IntegerQ[2*p] || NeQ[Expon[Pq, x], 1])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = -\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}} - \frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}} - \frac{16e^3x(a+b\log(cx^n \cdots}{5d^4\sqrt{d+ex^2}}$$

$$= -\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}} - \frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}} - \frac{16e^3x(a+b\log(cx^n \cdots}{5d^4\sqrt{d+ex^2}}$$

$$= -\frac{bn\sqrt{d+ex^2}}{25d^2x^5} - \frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}} - \frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}} - \frac{16e \cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex^2}}{25d^2x^5} - \frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}} - \frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}} - \frac{16e \cdots}{\cdots}$$

$$= -\frac{bn\sqrt{d+ex^2}}{25d^2x^5} + \frac{14ben\sqrt{d+ex^2}}{75d^3x^3} - \frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}} - \frac{8e^2(a \cdots}{5d^3 \cdots}$$

$$= -\frac{bn\sqrt{d+ex^2}}{25d^2x^5} + \frac{14ben\sqrt{d+ex^2}}{75d^3x^3} - \frac{148be^2n\sqrt{d+ex^2}}{75d^4x} - \frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a \cdots}{5d^2x \cdots}$$

$$= -\frac{bn\sqrt{d+ex^2}}{25d^2x^5} + \frac{14ben\sqrt{d+ex^2}}{75d^3x^3} - \frac{148be^2n\sqrt{d+ex^2}}{75d^4x} - \frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a \cdots}{5d^2x \cdots}$$

$$= -\frac{bn\sqrt{d+ex^2}}{25d^2x^5} + \frac{14ben\sqrt{d+ex^2}}{75d^3x^3} - \frac{148be^2n\sqrt{d+ex^2}}{75d^4x} + \frac{16be^{5/2}n\tanh^{-1}\left(\frac{\sqrt{e} \cdots}{\sqrt{d+ \cdots}}\right. \cdots}{5d^4}$$

Mathematica [A]
time = 0.12, size = 180, normalized size = 0.76

$$\frac{-15ad^3-3bd^3n+30ad^2ex^2+11bd^2enx^2-120ade^2x^4-134bde^2nx^4-240ae^3x^6-148be^3nx^6-15b(d^3-2d^2ex^2+8de^2x^4+16e^3x^6)\log(cx^n)+240be^{5/2}nx^5\sqrt{d+ex^2}\,\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{75d^4x^5\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^6*(d + e*x^2)^(3/2)),x]
```

```
[Out] (-15*a*d^3 - 3*b*d^3*n + 30*a*d^2*e*x^2 + 11*b*d^2*e*n*x^2 - 120*a*d*e^2*x^
4 - 134*b*d*e^2*n*x^4 - 240*a*e^3*x^6 - 148*b*e^3*n*x^6 - 15*b*(d^3 - 2*d^2
*e*x^2 + 8*d*e^2*x^4 + 16*e^3*x^6)*Log[c*x^n] + 240*b*e^(5/2)*n*x^5*Sqrt[d
+ e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(75*d^4*x^5*Sqrt[d + e*x^2])
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x^{6} \left(e\,x^{2}+d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

```
[Out] -1/5*a*(16*x*e^3/(sqrt(x^2*e + d)*d^4) + 8*e^2/(sqrt(x^2*e + d)*d^3*x) - 2*
e/(sqrt(x^2*e + d)*d^2*x^3) + 1/(sqrt(x^2*e + d)*d*x^5)) + b*integrate((log
(c) + log(x^n))/((x^8*e + d*x^6)*sqrt(x^2*e + d)), x)
```

Fricas [A]
time = 0.42, size = 230, normalized size = 0.97

$$\frac{120\,(bnx^7e^3+bdnx^5e^2)e^{\frac{1}{2}}\log\left(-2\,x^2e-2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)-(4\,(37\,bn+60\,a)x^6e^3+2\,(67\,bdn+60\,ad)x^4e^2+3\,bd^3n+15\,ad^3-(11\,bd^2n+30\,ad^2)x^2e+15\,(16\,bx^6e^3+8\,bdx^4e^2-2\,bd^2x^2e+bd^3)\log(c)+15\,(16\,bnx^6e^3+8\,bdnx^4e^2-2\,bd^2nx^2e+bd^3n)\log(x))\sqrt{x^2e+d}}{75\,(d^4x^7e+d^5x^5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/75*(120*(b*n*x^7*e^3 + b*d*n*x^5*e^2)*e^(1/2)*log(-2*x^2*e - 2*sqrt(x^2*e
 + d)*x*e^(1/2) - d) - (4*(37*b*n + 60*a)*x^6*e^3 + 2*(67*b*d*n + 60*a*d)*x
^4*e^2 + 3*b*d^3*n + 15*a*d^3 - (11*b*d^2*n + 30*a*d^2)*x^2*e + 15*(16*b*x^
6*e^3 + 8*b*d*x^4*e^2 - 2*b*d^2*x^2*e + b*d^3)*log(c) + 15*(16*b*n*x^6*e^3
+ 8*b*d*n*x^4*e^2 - 2*b*d^2*n*x^2*e + b*d^3*n)*log(x))*sqrt(x^2*e + d))/(d^
4*x^7*e + d^5*x^5)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log(cx^n)}{x^6 (d + ex^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**6/(e*x**2+d)**(3/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**6*(d + e*x**2)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(3/2)*x^6), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a + b\,\ln(c\,x^n)}{x^6\,(e\,x^2 + d)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(3/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(3/2)), x)
```

3.297 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=212

$$-\frac{bd^2n}{3e^4\sqrt{d+ex^2}}+\frac{8bdn\sqrt{d+ex^2}}{3e^4}-\frac{bn(d+ex^2)^{3/2}}{9e^4}-\frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-3$$

```
[Out] -1/9*b*n*(e*x^2+d)^(3/2)/e^4-16/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/
2))/e^4+1/3*d^3*(a+b*ln(c*x^n))/e^4/(e*x^2+d)^(3/2)+1/3*(e*x^2+d)^(3/2)*(a+
b*ln(c*x^n))/e^4-1/3*b*d^2*n/e^4/(e*x^2+d)^(1/2)-3*d^2*(a+b*ln(c*x^n))/e^4/
(e*x^2+d)^(1/2)+8/3*b*d*n*(e*x^2+d)^(1/2)/e^4-3*d*(a+b*ln(c*x^n))*(e*x^2+d)
^(1/2)/e^4
```

Rubi [A]

time = 0.23, antiderivative size = 212, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1813, 1633, 65, 214}

$$\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^4}-\frac{bd^2n}{3e^4\sqrt{d+ex^2}}+\frac{8bdn\sqrt{d+ex^2}}{3e^4}-\frac{bn(d+ex^2)^{3/2}}{9e^4}$$

Antiderivative was successfully verified.

```
[In] Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] -1/3*(b*d^2*n)/(e^4*Sqrt[d + e*x^2]) + (8*b*d*n*Sqrt[d + e*x^2])/(3*e^4) -
(b*n*(d + e*x^2)^(3/2))/(9*e^4) - (16*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x^2]/S
qrt[d]])/(3*e^4) + (d^3*(a + b*Log[c*x^n]))/(3*e^4*(d + e*x^2)^(3/2)) - (3*
d^2*(a + b*Log[c*x^n]))/(e^4*Sqrt[d + e*x^2]) - (3*d*Sqrt[d + e*x^2]*(a + b
*Log[c*x^n]))/e^4 + ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^4)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 1633

```
Int[((Px_)*((c_.) + (d_.)*(x_))^(n_.))/((a_.) + (b_.)*(x_)), x_Symbol] :> I
nt[ExpandIntegrand[1/Sqrt[c + d*x], Px*((c + d*x)^(n + 1/2)/(a + b*x)), x],
 x] /; FreeQ[{a, b, c, d, n}, x] && PolyQ[Px, x] && ILtQ[n + 1/2, 0] && GtQ
[Expon[Px, x], 2]
```

Rule 1813

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Dist[1/2, Su
bst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}} - \frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} - \frac{3d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} + \cdots$$

$$= \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}} - \frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} - \frac{3d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} + \cdots$$

$$= \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}} - \frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} - \frac{3d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} + \cdots$$

$$= \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}} - \frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} - \frac{3d\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^4} + \cdots$$

$$= -\frac{bd^2n}{3e^4\sqrt{d+ex^2}} + \frac{7bdn\sqrt{d+ex^2}}{3e^4} + \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}} - \frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} \cdots$$

$$= -\frac{bd^2n}{3e^4\sqrt{d+ex^2}} + \frac{7bdn\sqrt{d+ex^2}}{3e^4} + \frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}} - \frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} \cdots$$

$$= -\frac{bd^2n}{3e^4\sqrt{d+ex^2}} + \frac{8bdn\sqrt{d+ex^2}}{3e^4} - \frac{bn(d+ex^2)^{3/2}}{9e^4} - \frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+\cdots}}{\sqrt{\cdots}}\right)}{3e^4} \cdots$$

Mathematica [**A**]
time = 0.15, size = 240, normalized size = 1.13

$$\frac{-48ad^3+20bd^3n-72ad^2ex^2+42bd^2enx^2-18ade^2x^4+21bde^2nx^4+3ae^3x^6-be^3nx^6+48bd^{3/2}n(d+ex^2)^{3/2}\log(x)-3b(16d^3+24d^2ex^2+6de^2x^4-e^3x^6)\log(cx^n)-48bd^{5/2}n\sqrt{d+ex^2}\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)-48bd^{3/2}enx^2\sqrt{d+ex^2}\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{9e^4(d+ex^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (-48*a*d^3 + 20*b*d^3*n - 72*a*d^2*e*x^2 + 42*b*d^2*e*n*x^2 - 18*a*d*e^2*x^
4 + 21*b*d*e^2*n*x^4 + 3*a*e^3*x^6 - b*e^3*n*x^6 + 48*b*d^(3/2)*n*(d + e*x^
2)^(3/2)*Log[x] - 3*b*(16*d^3 + 24*d^2*e*x^2 + 6*d*e^2*x^4 - e^3*x^6)*Log[c
*x^n] - 48*b*d^(5/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]] - 4
8*b*d^(3/2)*e*n*x^2*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(9*e^
4*(d + e*x^2)^(3/2))
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^7(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [A]
time = 0.53, size = 248, normalized size = 1.17

$$\frac{1}{9}\left(24\,d^{\frac{3}{2}}e^{(-4)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)-\frac{3\,d^2e^{(-4)}}{\sqrt{x^2e+d}}-\left((x^2e+d)^{\frac{3}{2}}-24\,\sqrt{x^2e+d}\,d\right)e^{(-4)}\right)bn+\frac{1}{3}\left(\frac{x^6e^{(-1)}}{(x^2e+d)^{\frac{3}{2}}}-\frac{6\,dx^4e^{(-2)}}{(x^2e+d)^{\frac{3}{2}}}-\frac{24\,d^2x^2e^{(-3)}}{(x^2e+d)^{\frac{3}{2}}}-\frac{16\,d^3e^{(-4)}}{(x^2e+d)^{\frac{3}{2}}}\right)b\log\left(cx^n\right)+\frac{1}{3}\left(\frac{x^6e^{(-1)}}{(x^2e+d)^{\frac{3}{2}}}-\frac{6\,dx^4e^{(-2)}}{(x^2e+d)^{\frac{3}{2}}}-\frac{24\,d^2x^2e^{(-3)}}{(x^2e+d)^{\frac{3}{2}}}-\frac{16\,d^3e^{(-4)}}{(x^2e+d)^{\frac{3}{2}}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/9*(24*d^(3/2)*e^(-4)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) + s
qrt(d))) - 3*d^2*e^(-4)/sqrt(x^2*e + d) - ((x^2*e + d)^(3/2) - 24*sqrt(x^2*
e + d)*d)*e^(-4))*b*n + 1/3*(x^6*e^(-1)/(x^2*e + d)^(3/2) - 6*d*x^4*e^(-2)/
(x^2*e + d)^(3/2) - 24*d^2*x^2*e^(-3)/(x^2*e + d)^(3/2) - 16*d^3*e^(-4)/(x^
2*e + d)^(3/2))*b*log(c*x^n) + 1/3*(x^6*e^(-1)/(x^2*e + d)^(3/2) - 6*d*x^4*
e^(-2)/(x^2*e + d)^(3/2) - 24*d^2*x^2*e^(-3)/(x^2*e + d)^(3/2) - 16*d^3*e^(
-4)/(x^2*e + d)^(3/2))*a
```

Fricas [A]
time = 0.43, size = 483, normalized size = 2.28

$$\left[\frac{24\,(bdnx^4e^2+2\,bd^2nx^2e+bd^3n)\sqrt{d}\,\log\left(-\frac{x^2e-2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-((bn-3\,a)x^6e^3-3\,(7\,bdn-6\,ad)x^4e^2-20\,bd^3n+48\,ad^3-6\,(7\,bd^2n-12\,ad^2)x^2e-3\,(bx^6e^3-6\,bdx^4e^2-24\,bd^2x^2e-16\,bd^3)\log(c)-3\,(bnx^6e^3-6\,bdnx^4e^2-24\,bd^2nx^2e-16\,bd^3n)\log(x))\sqrt{x^2e+d}}{9\,(x^4e^6+2\,dx^2e^5+d^2e^4)},\ \frac{48\,(bdnx^4e^2+2\,bd^2nx^2e+bd^3n)\sqrt{-d}\,\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)-((bn-3\,a)x^6e^3-3\,(7\,bdn-6\,ad)x^4e^2-20\,bd^3n+48\,ad^3-6\,(7\,bd^2n-12\,ad^2)x^2e-3\,(bx^6e^3-6\,bdx^4e^2-24\,bd^2x^2e-16\,bd^3)\log(c)-3\,(bnx^6e^3-6\,bdnx^4e^2-24\,bd^2nx^2e-16\,bd^3n)\log(x))\sqrt{x^2e+d}}{9\,(x^4e^6+2\,dx^2e^5+d^2e^4)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/9*(24*(b*d*n*x^4*e^2 + 2*b*d^2*n*x^2*e + b*d^3*n)*sqrt(d)*log(-(x^2*e -
2*sqrt(x^2*e + d)*sqrt(d) + 2*d)/x^2) - ((b*n - 3*a)*x^6*e^3 - 3*(7*b*d*n -
 6*a*d)*x^4*e^2 - 20*b*d^3*n + 48*a*d^3 - 6*(7*b*d^2*n - 12*a*d^2)*x^2*e -
3*(b*x^6*e^3 - 6*b*d*x^4*e^2 - 24*b*d^2*x^2*e - 16*b*d^3)*log(c) - 3*(b*n*x
^6*e^3 - 6*b*d*n*x^4*e^2 - 24*b*d^2*n*x^2*e - 16*b*d^3*n)*log(x))*sqrt(x^2*
e + d))/(x^4*e^6 + 2*d*x^2*e^5 + d^2*e^4), 1/9*(48*(b*d*n*x^4*e^2 + 2*b*d^2
*n*x^2*e + b*d^3*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(x^2*e + d)) - ((b*n - 3*a
)*x^6*e^3 - 3*(7*b*d*n - 6*a*d)*x^4*e^2 - 20*b*d^3*n + 48*a*d^3 - 6*(7*b*d^
2*n - 12*a*d^2)*x^2*e - 3*(b*x^6*e^3 - 6*b*d*x^4*e^2 - 24*b*d^2*x^2*e - 16*
b*d^3)*log(c) - 3*(b*n*x^6*e^3 - 6*b*d*n*x^4*e^2 - 24*b*d^2*n*x^2*e - 16*b*
d^3*n)*log(x))*sqrt(x^2*e + d))/(x^4*e^6 + 2*d*x^2*e^5 + d^2*e^4)]
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**7*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^7/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^7\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.298 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=155

$$\frac{bdn}{3e^3\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{e^3}+\frac{8b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d}}{}$$

```
[Out] -1/3*d^2*(a+b*ln(c*x^n))/e^3/(e*x^2+d)^(3/2)+8/3*b*n*arctanh((e*x^2+d)^(1/2
)/d^(1/2))*d^(1/2)/e^3+1/3*b*d*n/e^3/(e*x^2+d)^(1/2)+2*d*(a+b*ln(c*x^n))/e^
3/(e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2)/e^3+(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e
^3
```

Rubi [A]
time = 0.16, antiderivative size = 155, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {272, 45, 2392, 12, 1265, 911, 1275, 212}

$$-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3}+\frac{bdn}{3e^3\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{e^3}+\frac{8b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3}$$

Antiderivative was successfully verified.

```
[In] Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (b*d*n)/(3*e^3*Sqrt[d + e*x^2]) - (b*n*Sqrt[d + e*x^2])/e^3 + (8*b*Sqrt[d]*
n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*e^3) - (d^2*(a + b*Log[c*x^n]))/(3*e
^3*(d + e*x^2)^(3/2)) + (2*d*(a + b*Log[c*x^n]))/(e^3*Sqrt[d + e*x^2]) + (S
qrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^3
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
```

```
Q[a, 0] || LtQ[b, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1265

```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a +
 b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Inte
gerQ[(m - 1)/2]
```

Rule 1275

```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = -\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - (bn)$$

$$= -\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{(bn)}{}$$

$$= -\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{(bn)S}{}$$

$$= -\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{(bn)S}{}$$

$$= -\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \frac{\sqrt{d+ex^2}\,(a+b\log(cx^n))}{e^3} - \frac{(bn)S}{}$$

$$= \frac{bdn}{3e^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{e^3} - \frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}} + \frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} + \sqrt{d}$$

$$= \frac{bdn}{3e^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{e^3} + \frac{8b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3} - \frac{d^2(a+b\log(c}{3e^3(d+ex^2)}$$

Mathematica [A]
time = 0.13, size = 205, normalized size = 1.32

$$-\frac{8b\sqrt{d}\,n\log(x)}{3e^3} + \frac{bn(8d^2+12dex^2+3e^2x^4)\log(x)}{3e^3(d+ex^2)^{3/2}} + \sqrt{d+ex^2}\left(-\frac{d^2(a+b(-n\log(x)+\log(cx^n)))}{3e^3(d+ex^2)^2} + \frac{a-bn+b(-n\log(x)+\log(cx^n))}{e^3} + \frac{d(6a+bn+6b(-n\log(x)+\log(cx^n)))}{3e^3(d+ex^2)}\right) + \frac{8b\sqrt{d}\,n\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{3e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (-8*b*Sqrt[d]*n*Log[x])/(3*e^3) + (b*n*(8*d^2 + 12*d*e*x^2 + 3*e^2*x^4)*Log
[x])/(3*e^3*(d + e*x^2)^(3/2)) + Sqrt[d + e*x^2]*(-1/3*(d^2*(a + b*(-(n*Log
[x]) + Log[c*x^n])))/(e^3*(d + e*x^2)^2) + (a - b*n + b*(-(n*Log[x]) + Log[
c*x^n]))/e^3 + (d*(6*a + b*n + 6*b*(-(n*Log[x]) + Log[c*x^n])))/(3*e^3*(d +
 e*x^2))) + (8*b*Sqrt[d]*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(3*e^3)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^5(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [A]
time = 0.50, size = 194, normalized size = 1.25

$$-\frac{1}{3}\left(4\sqrt{d}\,e^{(-3)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)+3\sqrt{x^2e+d}\,e^{(-3)}-\frac{de^{(-3)}}{\sqrt{x^2e+d}}\right)bn+\frac{1}{3}\left(\frac{3\,x^4e^{(-1)}}{(x^2e+d)^{\frac{3}{2}}}+\frac{12\,dx^2e^{(-2)}}{(x^2e+d)^{\frac{3}{2}}}+\frac{8\,d^2e^{(-3)}}{(x^2e+d)^{\frac{3}{2}}}\right)b\log\left(cx^n\right)+\frac{1}{3}\left(\frac{3\,x^4e^{(-1)}}{(x^2e+d)^{\frac{3}{2}}}+\frac{12\,dx^2e^{(-2)}}{(x^2e+d)^{\frac{3}{2}}}+\frac{8\,d^2e^{(-3)}}{(x^2e+d)^{\frac{3}{2}}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] -1/3*(4*sqrt(d)*e^(-3)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) + s
qrt(d))) + 3*sqrt(x^2*e + d)*e^(-3) - d*e^(-3)/sqrt(x^2*e + d))*b*n + 1/3*(
3*x^4*e^(-1)/(x^2*e + d)^(3/2) + 12*d*x^2*e^(-2)/(x^2*e + d)^(3/2) + 8*d^2*
e^(-3)/(x^2*e + d)^(3/2))*b*log(c*x^n) + 1/3*(3*x^4*e^(-1)/(x^2*e + d)^(3/2
) + 12*d*x^2*e^(-2)/(x^2*e + d)^(3/2) + 8*d^2*e^(-3)/(x^2*e + d)^(3/2))*a
```

Fricas [A]
time = 0.42, size = 392, normalized size = 2.53

$$\left[\frac{4\left(bnx^4e^2+2\,bdnx^2e+bd^2n\right)\sqrt{d}\,\log\left(-\frac{x^2e+2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-\left(3\,(bn-a)x^4e^2+2\,bd^2n+(5\,bdn-12\,ad)x^2e-8\,ad^2-\left(3\,bx^4e^2+12\,bdx^2e+8\,bd^2\right)\log\left(c\right)-\left(3\,bnx^4e^2+12\,bdnx^2e+8\,bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}}{3\left(x^4e^5+2\,dx^2e^4+d^2e^3\right)},\ -\frac{8\left(bnx^4e^2+2\,bdnx^2e+bd^2n\right)\sqrt{-d}\,\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)+\left(3\,(bn-a)x^4e^2+2\,bd^2n+(5\,bdn-12\,ad)x^2e-8\,ad^2-\left(3\,bx^4e^2+12\,bdx^2e+8\,bd^2\right)\log\left(c\right)-\left(3\,bnx^4e^2+12\,bdnx^2e+8\,bd^2n\right)\log\left(x\right)\right)\sqrt{x^2e+d}}{3\left(x^4e^5+2\,dx^2e^4+d^2e^3\right)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/3*(4*(b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*sqrt(d)*log(-(x^2*e + 2*sqr
t(x^2*e + d)*sqrt(d) + 2*d)/x^2) - (3*(b*n - a)*x^4*e^2 + 2*b*d^2*n + (5*b*
d*n - 12*a*d)*x^2*e - 8*a*d^2 - (3*b*x^4*e^2 + 12*b*d*x^2*e + 8*b*d^2)*log(
c) - (3*b*n*x^4*e^2 + 12*b*d*n*x^2*e + 8*b*d^2*n)*log(x))*sqrt(x^2*e + d))/
(x^4*e^5 + 2*d*x^2*e^4 + d^2*e^3), -1/3*(8*(b*n*x^4*e^2 + 2*b*d*n*x^2*e + b
*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(x^2*e + d)) + (3*(b*n - a)*x^4*e^2 +
2*b*d^2*n + (5*b*d*n - 12*a*d)*x^2*e - 8*a*d^2 - (3*b*x^4*e^2 + 12*b*d*x^2*
e + 8*b*d^2)*log(c) - (3*b*n*x^4*e^2 + 12*b*d*n*x^2*e + 8*b*d^2*n)*log(x))*
sqrt(x^2*e + d))/(x^4*e^5 + 2*d*x^2*e^4 + d^2*e^3)]
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^5/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^5\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.299 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=108

$$-\frac{bn}{3e^2\sqrt{d+ex^2}}-\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3\sqrt{d}\,e^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}$$

```
[Out] 1/3*d*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(3/2)-2/3*b*n*arctanh((e*x^2+d)^(1/2)/d
^(1/2))/e^2/d^(1/2)-1/3*b*n/e^2/(e*x^2+d)^(1/2)+(-a-b*ln(c*x^n))/e^2/(e*x^2
+d)^(1/2)
```

Rubi [A]
time = 0.12, antiderivative size = 108, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.320, Rules used = {272, 45, 2392, 12, 457, 79, 65, 214}

$$-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}-\frac{bn}{3e^2\sqrt{d+ex^2}}-\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3\sqrt{d}\,e^2}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] -1/3*(b*n)/(e^2*Sqrt[d + e*x^2]) - (2*b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
/(3*Sqrt[d]*e^2) + (d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x^2)^(3/2)) - (a +
b*Log[c*x^n])/(e^2*Sqrt[d + e*x^2])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
```

```
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 79

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/
(f*(p + 1)*(c*f - d*e))), x] - Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c
*f*(p + 1)))/(f*(p + 1)*(c*f - d*e)), Int[(c + d*x)^n*(e + f*x)^(p + 1), x]
, x] /; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || I
ntegerQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))
))
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}} - (bn)\int \frac{-2d-3ex^2}{3e^2x(d+ex^2)^{3/2}}\,dx$$
$$= \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}} - \frac{(bn)\int \frac{-2d-3ex^2}{x(d+ex^2)^{3/2}}\,dx}{3e^2}$$
$$= \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}} - \frac{(bn)\mathrm{Subst}\left(\int \frac{-2d-3ex}{x(d+ex)^{3/2}}\,dx, x, x^2\right)}{6e^2}$$
$$= -\frac{bn}{3e^2\sqrt{d+ex^2}} + \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}} + \frac{(bn)\mathrm{Subst}\left(\int \frac{1}{x\sqrt{d+e}}\right.}{3e^2}$$
$$= -\frac{bn}{3e^2\sqrt{d+ex^2}} + \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}} + \frac{(2bn)\mathrm{Subst}\left(\int \frac{1}{-\frac{d}{e}+\frac{x^2}{e}}\right.}{3e^3}$$
$$= -\frac{bn}{3e^2\sqrt{d+ex^2}} - \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3\sqrt{d}\,e^2} + \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(}{e^2\sqrt{d+e}}$$

Mathematica [A]
time = 0.17, size = 137, normalized size = 1.27

$$\frac{\frac{2bn\log(x)}{\sqrt{d}} - \frac{bn(2d+3ex^2)\log(x)}{(d+ex^2)^{3/2}} + \frac{d(a-bn\log(x)+b\log(cx^n))-(d+ex^2)(3a+bn-3bn\log(x)+3b\log(cx^n))}{(d+ex^2)^{3/2}} - \frac{2bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{\sqrt{d}}}{3e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] ((2*b*n*Log[x])/Sqrt[d] - (b*n*(2*d + 3*e*x^2)*Log[x])/(d + e*x^2)^(3/2) +
(d*(a - b*n*Log[x] + b*Log[c*x^n]) - (d + e*x^2)*(3*a + b*n - 3*b*n*Log[x]
+ 3*b*Log[c*x^n]))/(d + e*x^2)^(3/2) - (2*b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^
2]])/Sqrt[d])/(3*e^2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [A]
time = 0.51, size = 138, normalized size = 1.28

$$\frac{1}{3}\left(\frac{e^{(-2)}\log\left(\frac{\sqrt{x^2e+d}-\sqrt{d}}{\sqrt{x^2e+d}+\sqrt{d}}\right)}{\sqrt{d}}-\frac{e^{(-2)}}{\sqrt{x^2e+d}}\right)bn-\frac{1}{3}\left(\frac{3\,x^2e^{(-1)}}{(x^2e+d)^{\frac{3}{2}}}+\frac{2\,de^{(-2)}}{(x^2e+d)^{\frac{3}{2}}}\right)b\log\left(cx^n\right)-\frac{1}{3}\left(\frac{3\,x^2e^{(-1)}}{(x^2e+d)^{\frac{3}{2}}}+\frac{2\,de^{(-2)}}{(x^2e+d)^{\frac{3}{2}}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/3*(e^(-2)*log((sqrt(x^2*e + d) - sqrt(d))/(sqrt(x^2*e + d) + sqrt(d)))/sq
rt(d) - e^(-2)/sqrt(x^2*e + d))*b*n - 1/3*(3*x^2*e^(-1)/(x^2*e + d)^(3/2) +
 2*d*e^(-2)/(x^2*e + d)^(3/2))*b*log(c*x^n) - 1/3*(3*x^2*e^(-1)/(x^2*e + d)
^(3/2) + 2*d*e^(-2)/(x^2*e + d)^(3/2))*a
```

Fricas [A]
time = 0.49, size = 328, normalized size = 3.04

$$\left[\frac{(bnx^4e^2+2\,bdnx^2e+bd^2n)\sqrt{d}\,\log\left(-\frac{x^2e-2\,\sqrt{x^2e+d}\,\sqrt{d}+2\,d}{x^2}\right)-(bd^2n+(bdn+3\,ad)x^2e+2\,ad^2+(3\,bdx^2e+2\,bd^2)\log\left(c\right)+(3\,bdnx^2e+2\,bd^2n)\log\left(x\right))\sqrt{x^2e+d}}{3\,(dx^4e^4+2\,d^2x^2e^3+d^3e^2)},\ \frac{2\,(bnx^4e^2+2\,bdnx^2e+bd^2n)\sqrt{-d}\,\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^2e+d}}\right)-(bd^2n+(bdn+3\,ad)x^2e+2\,ad^2+(3\,bdx^2e+2\,bd^2)\log\left(c\right)+(3\,bdnx^2e+2\,bd^2n)\log\left(x\right))\sqrt{x^2e+d}}{3\,(dx^4e^4+2\,d^2x^2e^3+d^3e^2)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/3*((b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*sqrt(d)*log(-(x^2*e - 2*sqrt(
x^2*e + d)*sqrt(d) + 2*d)/x^2) - (b*d^2*n + (b*d*n + 3*a*d)*x^2*e + 2*a*d^2
 + (3*b*d*x^2*e + 2*b*d^2)*log(c) + (3*b*d*n*x^2*e + 2*b*d^2*n)*log(x))*sqr
t(x^2*e + d))/(d*x^4*e^4 + 2*d^2*x^2*e^3 + d^3*e^2), 1/3*(2*(b*n*x^4*e^2 +
2*b*d*n*x^2*e + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(x^2*e + d)) - (b*d^2
*n + (b*d*n + 3*a*d)*x^2*e + 2*a*d^2 + (3*b*d*x^2*e + 2*b*d^2)*log(c) + (3*
b*d*n*x^2*e + 2*b*d^2*n)*log(x))*sqrt(x^2*e + d))/(d*x^4*e^4 + 2*d^2*x^2*e^
3 + d^3*e^2)]
```

Sympy [A]
time = 30.87, size = 333, normalized size = 3.08

$$a\left(\begin{cases}\frac{x^4}{4d^{\frac{5}{2}}} & \text{for}\ e=0\\ \frac{d}{3e^2(d+ex^2)^{\frac{3}{2}}}-\frac{1}{e^2\sqrt{d+ex^2}} & \text{otherwise}\end{cases}\right)-bn\left(\begin{cases}\frac{x^4}{16d^{\frac{5}{2}}} & \text{for}\ e=0\\ \frac{2d^4\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{d^4\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}-\frac{2d^4\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{d^3x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}-\frac{2d^3x^2\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}+\frac{\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)}{\sqrt{d}\,e^2} & \text{otherwise}\end{cases}\right)+b\left(\begin{cases}\frac{x^4}{4d^{\frac{5}{2}}} & \text{for}\ e=0\\ \frac{d}{3e^2(d+ex^2)^{\frac{3}{2}}}-\frac{1}{e^2\sqrt{d+ex^2}} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] a*Piecewise((x**4/(4*d**(5/2)), Eq(e, 0)), (d/(3*e**2*(d + e*x**2)**(3/2))
- 1/(e**2*sqrt(d + e*x**2)), True)) - b*n*Piecewise((x**4/(16*d**(5/2)), Eq
(e, 0)), (2*d**4*sqrt(1 + e*x**2/d)/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2
```

```
) + d**4*log(e*x**2/d)/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) - 2*d**4*lo
g(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d**3*x
**2*log(e*x**2/d)/(6*d**(9/2)*e + 6*d**(7/2)*e**2*x**2) - 2*d**3*x**2*log(s
qrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e + 6*d**(7/2)*e**2*x**2) + asinh(sqrt(d
)/(sqrt(e)*x))/(sqrt(d)*e**2), True)) + b*Piecewise((x**4/(4*d**(5/2)), Eq(
e, 0)), (d/(3*e**2*(d + e*x**2)**(3/2)) - 1/(e**2*sqrt(d + e*x**2)), True))
*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.300 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=84

$$\frac{bn}{3de\sqrt{d+ex^2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{3/2}e}-\frac{a+b\log\left(cx^n\right)}{3e\left(d+ex^2\right)^{3/2}}$$

```
[Out] -1/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)/e+1/3*(-a-b*ln(c*x^n))/e/
(e*x^2+d)^(3/2)+1/3*b*n/d/e/(e*x^2+d)^(1/2)
```

Rubi [A]
time = 0.06, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2376, 272, 53, 65, 214}

$$-\frac{a+b\log\left(cx^n\right)}{3e\left(d+ex^2\right)^{3/2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{3/2}e}+\frac{bn}{3de\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (b*n)/(3*d*e*Sqrt[d + e*x^2]) - (b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*d
^(3/2)*e) - (a + b*Log[c*x^n])/(3*e*(d + e*x^2)^(3/2))
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx &= -\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}+\frac{(bn)\int \frac{1}{x(d+ex^2)^{3/2}}\,dx}{3e}\\
&= -\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}+\frac{(bn)\text{Subst}\left(\int \frac{1}{x(d+ex)^{3/2}}\,dx,x,x^2\right)}{6e}\\
&= \frac{bn}{3de\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}+\frac{(bn)\text{Subst}\left(\int \frac{1}{x\sqrt{d+ex}}\,dx,x,x^2\right)}{6de}\\
&= \frac{bn}{3de\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}+\frac{(bn)\text{Subst}\left(\int \frac{1}{-\frac{d}{e}+\frac{x^2}{e}}\,dx,x,\sqrt{d+ex^2}\right)}{3de^2}\\
&= \frac{bn}{3de\sqrt{d+ex^2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{3/2}e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}
\end{aligned}$$

Mathematica [A]
time = 0.15, size = 97, normalized size = 1.15

$$-\frac{\frac{a}{(d+ex^2)^{3/2}}-\frac{bn}{d\sqrt{d+ex^2}}-\frac{bn\log(x)}{d^{3/2}}+\frac{b\log(cx^n)}{(d+ex^2)^{3/2}}+\frac{bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{d^{3/2}}}{3e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] -1/3*(a/(d + e*x^2)^(3/2) - (b*n)/(d*Sqrt[d + e*x^2]) - (b*n*Log[x])/d^(3/2
) + (b*Log[c*x^n])/(d + e*x^2)^(3/2) + (b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]
])/d^(3/2))/e
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^{n}))}{(e\,x^{2}+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [A]
time = 0.30, size = 74, normalized size = 0.88

$$-\frac{1}{3}\,bn\left(\frac{\operatorname{arsinh}\left(\frac{\sqrt{d}\,e^{\left(-\frac{1}{2}\right)}}{|x|}\right)}{d^{\frac{3}{2}}}-\frac{1}{\sqrt{x^{2}e+d}\,d}\right)e^{(-1)}-\frac{be^{(-1)}\log\left(cx^{n}\right)}{3\,(x^{2}e+d)^{\frac{3}{2}}}-\frac{ae^{(-1)}}{3\,(x^{2}e+d)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] -1/3*b*n*(arcsinh(sqrt(d)*e^(-1/2)/abs(x))/d^(3/2) - 1/(sqrt(x^2*e + d)*d))
*e^(-1) - 1/3*b*e^(-1)*log(c*x^n)/(x^2*e + d)^(3/2) - 1/3*a*e^(-1)/(x^2*e +
 d)^(3/2)
```

Fricas [A]
time = 0.40, size = 272, normalized size = 3.24

$$\left[\frac{(bnx^{4}e^{2}+2\,bdnx^{2}e+bd^{2}n)\sqrt{d}\,\log\left(-\frac{x^{2}e-2\,\sqrt{x^{2}e+d}\,\sqrt{d}+2\,d}{x^{2}}\right)+2\,(bdnx^{2}e-bd^{2}n\log(x)+bd^{2}n-bd^{2}\log(c)-ad^{2})\sqrt{x^{2}e+d}}{6\,(d^{2}x^{4}e^{3}+2\,d^{3}x^{2}e^{2}+d^{4}e)},\ \frac{(bnx^{4}e^{2}+2\,bdnx^{2}e+bd^{2}n)\sqrt{-d}\,\arctan\left(\frac{\sqrt{-d}}{\sqrt{x^{2}e+d}}\right)+(bdnx^{2}e-bd^{2}n\log(x)+bd^{2}n-bd^{2}\log(c)-ad^{2})\sqrt{x^{2}e+d}}{3\,(d^{2}x^{4}e^{3}+2\,d^{3}x^{2}e^{2}+d^{4}e)}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/6*((b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*sqrt(d)*log(-(x^2*e - 2*sqrt(
x^2*e + d)*sqrt(d) + 2*d)/x^2) + 2*(b*d*n*x^2*e - b*d^2*n*log(x) + b*d^2*n
- b*d^2*log(c) - a*d^2)*sqrt(x^2*e + d))/(d^2*x^4*e^3 + 2*d^3*x^2*e^2 + d^4
*e), 1/3*((b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/
```

```
sqrt(x^2*e + d)) + (b*d*n*x^2*e - b*d^2*n*log(x) + b*d^2*n - b*d^2*log(c) -
 a*d^2)*sqrt(x^2*e + d))/(d^2*x^4*e^3 + 2*d^3*x^2*e^2 + d^4*e)]
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 245 vs. $2(73) = 146$.
time = 16.92, size = 245, normalized size = 2.92

$$-\frac{a}{3e\left(d+ex^2\right)^{\frac{3}{2}}}+\frac{2bd^3n\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}+\frac{bd^3n\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}-\frac{2bd^3n\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}+\frac{bd^2nx^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}+6d^{\frac{7}{2}}ex^2}-\frac{2bd^2nx^2\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}+6d^{\frac{7}{2}}ex^2}-\frac{b\log\left(cx^n\right)}{3e\left(d+ex^2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] -a/(3*e*(d + e*x**2)**(3/2)) + 2*b*d**3*n*sqrt(1 + e*x**2/d)/(6*d**(9/2)*e
+ 6*d**(7/2)*e**2*x**2) + b*d**3*n*log(e*x**2/d)/(6*d**(9/2)*e + 6*d**(7/2)
*e**2*x**2) - 2*b*d**3*n*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e + 6*d**(
7/2)*e**2*x**2) + b*d**2*n*x**2*log(e*x**2/d)/(6*d**(9/2) + 6*d**(7/2)*e*x*
*2) - 2*b*d**2*n*x**2*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2) + 6*d**(7/2)*
e*x**2) - b*log(c*x**n)/(3*e*(d + e*x**2)**(3/2))
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.301 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=251

$$-\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}+\frac{1}{3}\left(\frac{1}{d\,(d+ex^2)^{3/2}}+\frac{3}{d^2\sqrt{d+ex^2}}\right.$$

```
[Out] 4/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2)+1/2*b*n*arctanh((e*x^2+d)^
(1/2)/d^(1/2))^2/d^(5/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/
(d^(1/2)-(e*x^2+d)^(1/2)))/d^(5/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(
e*x^2+d)^(1/2)))/d^(5/2)+1/3*(a+b*ln(c*x^n))*(1/d/(e*x^2+d)^(3/2)-3*arctanh
((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2)+3/d^2/(e*x^2+d)^(1/2))-1/3*b*n/d^2/(e*x^2
+d)^(1/2)
```

Rubi [A]
time = 0.29, antiderivative size = 251, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 53, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{5/2}}+\frac{1}{3}\left(-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{3}{d^2\sqrt{d+ex^2}}+\frac{1}{d\,(d+ex^2)^{3/2}}\right)(a+b\log(cx^n))+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}-\frac{bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}-\frac{bn}{3d^2\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(5/2)),x]
```

```
[Out] -1/3*(b*n)/(d^2*Sqrt[d + e*x^2]) + (4*b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
/(3*d^(5/2)) + (b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/(2*d^(5/2)) + ((1/(
d*(d + e*x^2)^(3/2)) + 3/(d^2*Sqrt[d + e*x^2]) - (3*ArcTanh[Sqrt[d + e*x^2]
/Sqrt[d]])/d^(5/2))*(a + b*Log[c*x^n]))/3 - (b*n*ArcTanh[Sqrt[d + e*x^2]/Sq
rt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(5/2) - (b*n*PolyLog
[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(5/2))
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
```

```
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{5/2}}\,dx = \frac{1}{3}\left(\frac{1}{d\left(d+ex^2\right)^{3/2}}+\frac{3}{d^2\sqrt{d+ex^2}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}\right)\left(a+b\log\left(cx^n\right)\right)-(\ldots$$

$$=\frac{1}{3}\left(\frac{1}{d\left(d+ex^2\right)^{3/2}}+\frac{3}{d^2\sqrt{d+ex^2}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}\right)\left(a+b\log\left(cx^n\right)\right)+\ldots$$

$$=\frac{1}{3}\left(\frac{1}{d\left(d+ex^2\right)^{3/2}}+\frac{3}{d^2\sqrt{d+ex^2}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}\right)\left(a+b\log\left(cx^n\right)\right)+\ldots$$

$$=-\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{1}{3}\left(\frac{1}{d\left(d+ex^2\right)^{3/2}}+\frac{3}{d^2\sqrt{d+ex^2}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}\right)(\ldots$$

$$=-\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}+\frac{1}{3}\left(\frac{\ldots}{d(\ldots}\right.$$

$$=-\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}+\frac{1}{3}\left(\frac{\ldots}{d(\ldots}\right.$$

$$=-\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}+\frac{1}{3}\left(\frac{\ldots}{d(\ldots}\right.$$

$$=-\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{bn\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}+\frac{1}{3}\left(\frac{\ldots}{d(\ldots}\right.$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.30, size = 273, normalized size = 1.09

$$\frac{bn\sqrt{1+\frac{d}{ex^2}}\left(-3d^{5/2}(d+ex^2)^2\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{d}{ex^2}\right)+25\sqrt{d}\,e^3\sqrt{1+\frac{d}{ex^2}}\,x^6(4d+3ex^2)\log(x)-75e^{5/2}x^5(d+ex^2)^2\sinh^{-1}\left(\frac{\sqrt{d}}{\sqrt{e}\,x}\right)\log(x)\right)}{75d^{5/2}e^2x^4\left(d+ex^2\right)^{5/2}}+\frac{(4d+3ex^2)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)}{3d^2\left(d+ex^2\right)^{3/2}}+\frac{\log(x)\left(a-bn\log(x)+b\log\left(cx^n\right)\right)}{d^{5/2}}-\frac{\left(a-bn\log(x)+b\log\left(cx^n\right)\right)\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{d^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(5/2)),x]
```

```
[Out] (b*n*Sqrt[1 + d/(e*x^2)]*(-3*d^(5/2)*(d + e*x^2)^2*HypergeometricPFQ[{5/2,
5/2, 5/2}, {7/2, 7/2}, -(d/(e*x^2))] + 25*Sqrt[d]*e^3*Sqrt[1 + d/(e*x^2)]*x
^6*(4*d + 3*e*x^2)*Log[x] - 75*e^(5/2)*x^5*(d + e*x^2)^2*ArcSinh[Sqrt[d]/(S
qrt[e]*x)]*Log[x]))/(75*d^(5/2)*e^2*x^4*(d + e*x^2)^(5/2)) + ((4*d + 3*e*x^
2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*d^2*(d + e*x^2)^(3/2)) + (Log[x]*(a
- b*n*Log[x] + b*Log[c*x^n]))/d^(5/2) - ((a - b*n*Log[x] + b*Log[c*x^n])*Lo
g[d + Sqrt[d]*Sqrt[d + e*x^2]])/d^(5/2)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(e\,x^{2}+d\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] -1/3*a*(3*arcsinh(sqrt(d)*e^(-1/2)/abs(x))/d^(5/2) - 3/(sqrt(x^2*e + d)*d^2
) - 1/((x^2*e + d)^(3/2)*d)) + b*integrate((log(c) + log(x^n))/((x^5*e^2 +
2*d*x^3*e + d^2*x)*sqrt(x^2*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^7*e^3 + 3*d*
x^5*e^2 + 3*d^2*x^3*e + d^3*x), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(5/2),x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(5/2)*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^2)^(5/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^2)^(5/2)), x)
```

3.302 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=337

$$\frac{ben}{3d^3\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{4d^3x^2}-\frac{31ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}}-\frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}}-\frac{5e(a+b\log(cx^n}{6d^2(d+ex^2)^{3/}}$$

```
[Out] -31/12*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(7/2)-5/4*b*e*n*arctanh((e*
x^2+d)^(1/2)/d^(1/2))^2/d^(7/2)-5/6*e*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(3/2)+1
/2*(-a-b*ln(c*x^n))/d/x^2/(e*x^2+d)^(3/2)+5/2*e*arctanh((e*x^2+d)^(1/2)/d^(
1/2))*(a+b*ln(c*x^n))/d^(7/2)+5/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln
(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(7/2)+5/4*b*e*n*polylog(2,1-2*d^(1/
2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(7/2)+1/3*b*e*n/d^3/(e*x^2+d)^(1/2)-5/2*e*(
a+b*ln(c*x^n))/d^3/(e*x^2+d)^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/d^3/x^2
```

Rubi [A]
time = 0.35, antiderivative size = 337, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 14, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.560$, Rules used = {272, 44, 53, 65, 214, 2392, 1265, 911, 1273, 464, 6131, 6055, 2449, 2352}

$$\frac{5ben\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{7/2}}+\frac{5e\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}}-\frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}}-\frac{5e(a+b\log(cx^n))}{6d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)^{3/2}}-\frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}}-\frac{31ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}}+\frac{5ben\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2d^{7/2}}-\frac{bn\sqrt{d+ex^2}}{4d^3x^2}+\frac{ben}{3d^3\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(5/2)),x]
```

```
[Out] (b*e*n)/(3*d^3*Sqrt[d + e*x^2]) - (b*n*Sqrt[d + e*x^2])/(4*d^3*x^2) - (31*b
*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(12*d^(7/2)) - (5*b*e*n*ArcTanh[Sqrt
[d + e*x^2]/Sqrt[d]]^2)/(4*d^(7/2)) - (5*e*(a + b*Log[c*x^n]))/(6*d^2*(d +
e*x^2)^(3/2)) - (a + b*Log[c*x^n])/(2*d*x^2*(d + e*x^2)^(3/2)) - (5*e*(a +
b*Log[c*x^n]))/(2*d^3*Sqrt[d + e*x^2]) + (5*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[
d]]*(a + b*Log[c*x^n]))/(2*d^(7/2)) + (5*b*e*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt
[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(7/2)) + (5*b*e*n*P
olyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(7/2))
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 464

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[(a*d*(m + 1) - b*c*(m + n*(p + 1) + 1))/(a*e^n*(m + 1)), Int[(e*
x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, d, e, p}, x] && NeQ[b*c
 - a*d, 0] && (IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (
LtQ[n, 0] && GtQ[m + n, -1])) &&  !ILtQ[p, -1]
```

Rule 911

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{q = Denominator[m]}, Dist[q/e, S
ubst[Int[x^(q*(m + 1) - 1)*((e*f - d*g)/e + g*(x^q/e))^n*((c*d^2 - b*d*e +
a*e^2)/e^2 - (2*c*d - b*e)*(x^q/e^2) + c*(x^(2*q)/e^2))^p, x], x, (d + e*x)
^(1/q)], x]] /; FreeQ[{a, b, c, d, e, f, g}, x] && NeQ[e*f - d*g, 0] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && IntegersQ[n, p] && Fra
ctionQ[m]
```

Rule 1265

```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a +
 b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Inte
gerQ[(m - 1)/2]
```

Rule 1273

```
Int[(x_)^(m_)*((d_) + (e_.)*(x_)^2)^(q_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^
4)^(p_.), x_Symbol] :> Simp[(-d)^(m/2 - 1)*(c*d^2 - b*d*e + a*e^2)^p*x*((d
+ e*x^2)^(q + 1)/(2*e^(2*p + m/2)*(q + 1))), x] + Dist[(-d)^(m/2 - 1)/(2*e^
(2*p)*(q + 1)), Int[x^m*(d + e*x^2)^(q + 1)*ExpandToSum[Together[(1/(d + e*
x^2))*(2*(-d)^(-m/2 + 1)*e^(2*p)*(q + 1)*(a + b*x^2 + c*x^4)^p - ((c*d^2 -
b*d*e + a*e^2)^p/(e^(m/2)*x^m))*(d + e*(2*q + 3)*x^2))], x], x], x] /; Free
Q[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && IGtQ[p, 0] && ILtQ[q, -1] &
& ILtQ[m/2, 0]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \frac{a+b\log(cx^n)}{3dx^2(d+ex^2)^{3/2}} + \frac{5(a+b\log(cx^n))}{3d^2x^2\sqrt{d+ex^2}} - \frac{5\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^3x^2} + \frac{5e\tanh^{-1}\Big(}{}$$

$$= \frac{a+b\log(cx^n)}{3dx^2(d+ex^2)^{3/2}} + \frac{5(a+b\log(cx^n))}{3d^2x^2\sqrt{d+ex^2}} - \frac{5\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^3x^2} + \frac{5e\tanh^{-1}\Big(}{}$$

$$= \frac{a+b\log(cx^n)}{3dx^2(d+ex^2)^{3/2}} + \frac{5(a+b\log(cx^n))}{3d^2x^2\sqrt{d+ex^2}} - \frac{5\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^3x^2} + \frac{5e\tanh^{-1}\Big(}{}$$

$$= \frac{a+b\log(cx^n)}{3dx^2(d+ex^2)^{3/2}} + \frac{5(a+b\log(cx^n))}{3d^2x^2\sqrt{d+ex^2}} - \frac{5\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2d^3x^2} + \frac{5e\tanh^{-1}\Big(}{}$$

$$= -\frac{bn\sqrt{d+ex^2}}{4d^3x^2} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}} + \frac{a+b\log(cx^n)}{3dx^2(d+ex^2)^{3/2}} + \frac{5(a+b\log(cx}{3d^2x^2\sqrt{d+ex}}$$

$$= \frac{ben}{3d^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{4d^3x^2} - \frac{5ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}} + \frac{a+b\log(cx^n)}{3dx^2(d+ex^2)^{3/2}} +$$

$$= \frac{ben}{3d^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{4d^3x^2} - \frac{31ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}} - \frac{5ben\tanh^{-1}\Big(\frac{\sqrt{d-}}{\sqrt{}}}{4d^{7/2}}$$

$$= \frac{ben}{3d^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{4d^3x^2} - \frac{31ben\tanh^{-1}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}} - \frac{5ben\tanh^{-1}\Big(\frac{\sqrt{d-}}{\sqrt{}}}{4d^{7/2}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

time = 0.18, size = 227, normalized size = 0.67

$$\frac{bn\sqrt{1+\frac{d}{ex^2}}\left(5\,{}_3F_2\left(\frac{7}{2},\frac{7}{2},\frac{7}{2};\frac{9}{2},\frac{9}{2};-\frac{d}{ex^2}\right)-7\,{}_2F_1\left(\frac{5}{2},\frac{7}{2};\frac{9}{2};-\frac{d}{ex^2}\right)(1+2\log(x))\right)}{98e^2x^6\sqrt{d+ex^2}}-\frac{(3d^2+20dex^2+15e^2x^4)\,(a-bn\log(x)+b\log(cx^n))}{6d^3x^2\,(d+ex^2)^{3/2}}-\frac{5e\log(x)\,(a-bn\log(x)+b\log(cx^n))}{2d^{7/2}}+\frac{5e(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\,\sqrt{d+ex^2}\right)}{2d^{7/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(5/2)),x]
```

```
[Out] (b*n*Sqrt[1 + d/(e*x^2)]*(5*HypergeometricPFQ[{7/2, 7/2, 7/2}, {9/2, 9/2},
-(d/(e*x^2))] - 7*Hypergeometric2F1[5/2, 7/2, 9/2, -(d/(e*x^2))]*(1 + 2*Log
[x])))/(98*e^2*x^6*Sqrt[d + e*x^2]) - ((3*d^2 + 20*d*e*x^2 + 15*e^2*x^4)*(a
 - b*n*Log[x] + b*Log[c*x^n]))/(6*d^3*x^2*(d + e*x^2)^(3/2)) - (5*e*Log[x]*
(a - b*n*Log[x] + b*Log[c*x^n]))/(2*d^(7/2)) + (5*e*(a - b*n*Log[x] + b*Log
[c*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(2*d^(7/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^3\,(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/6*a*(15*arcsinh(sqrt(d)*e^(-1/2)/abs(x))*e/d^(7/2) - 15*e/(sqrt(x^2*e + d
)*d^3) - 5*e/((x^2*e + d)^(3/2)*d^2) - 3/((x^2*e + d)^(3/2)*d*x^2)) + b*int
egrate((log(c) + log(x^n))/((x^7*e^2 + 2*d*x^5*e + d^2*x^3)*sqrt(x^2*e + d)
), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*log(c*x^n) + sqrt(x^2*e + d)*a)/(x^9*e^3 + 3*d*
x^7*e^2 + 3*d^2*x^5*e + d^3*x^3), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(5/2),x)
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(5/2)*x^3), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(5/2)),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(5/2)), x)
```

3.303 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=443

$$\frac{bdnx}{3e^3\sqrt{d+ex^2}}-\frac{bnx\sqrt{d+ex^2}}{4e^3}-\frac{31bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{12e^{7/2}\sqrt{d+ex^2}}-\frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4e^{7/2}\sqrt{d+ex^2}}$$

```
[Out] -1/3*x^5*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2)+5/6*b*d*n*x/e^3/(e*x^2+d)^(1/2)+
1/2*b*n*x^3/e^2/(e*x^2+d)^(1/2)-5/3*x^3*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(1/2)
-3/4*b*n*x*(e*x^2+d)^(1/2)/e^3+5/2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^3-31
/12*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2
+d)^(1/2)-5/4*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^
(7/2)/(e*x^2+d)^(1/2)-5*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*arctanh((x*e
^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2+d)^(1
/2)+5/2*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1+(x*e^(1/2)/d^(1/2)+(1+e
*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2+d)^(1/2)-5/2*d^(3/2)*arc
sinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2+d)
^(1/2)+5/4*b*d^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(
1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2+d)^(1/2)
```

Rubi [A]
time = 0.37, antiderivative size = 443, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 13, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.520$, Rules used = {2386, 294, 327, 221, 2392, 21, 1171, 396, 5775, 3797, 2221, 2317, 2438}

$$\frac{5bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{4e^{7/2}\sqrt{d+ex^2}}-\frac{5d^{3/2}\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}\sqrt{d+ex^2}}+\frac{5x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e^3}-\frac{5x^3(a+b\log(cx^n))}{3e^2\sqrt{d+ex^2}}-\frac{x^5(a+b\log(cx^n))}{3e\left(d+ex^2\right)^{3/2}}-\frac{5bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4e^{7/2}\sqrt{d+ex^2}}-\frac{31bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{12e^{7/2}\sqrt{d+ex^2}}+\frac{5bd^{3/2}n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2e^{7/2}\sqrt{d+ex^2}}-\frac{bnx\sqrt{d+ex^2}}{4e^3}+\frac{bdnx}{3e^3\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^6*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (b*d*n*x)/(3*e^3*Sqrt[d + e*x^2]) - (b*n*x*Sqrt[d + e*x^2])/(4*e^3) - (31*b
*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(12*e^(7/2)*Sq
rt[d + e*x^2]) - (5*b*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]]^2)/(4*e^(7/2)*Sqrt[d + e*x^2]) + (5*b*d^(3/2)*n*Sqrt[1 + (e*x^2)/d]*A
rcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2
*e^(7/2)*Sqrt[d + e*x^2]) - (x^5*(a + b*Log[c*x^n]))/(3*e*(d + e*x^2)^(3/2)
) - (5*x^3*(a + b*Log[c*x^n]))/(3*e^2*Sqrt[d + e*x^2]) + (5*x*Sqrt[d + e*x^
2]*(a + b*Log[c*x^n]))/(2*e^3) - (5*d^(3/2)*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sq
rt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(7/2)*Sqrt[d + e*x^2]) + (5*b*d^
(3/2)*n*Sqrt[1 + (e*x^2)/d]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])
/(4*e^(7/2)*Sqrt[d + e*x^2])
```

Rule 21

```
Int[(u_.)*((a_) + (b_.)*(v_))^(m_.)*((c_) + (d_.)*(v_))^(n_.), x_Symbol] :>
 Dist[(b/d)^m, Int[u*(c + d*v)^(m + n), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && EqQ[b*c - a*d, 0] && IntegerQ[m] && ( !IntegerQ[n] || SimplerQ[c + d*x,
 a + b*x])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 396

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_)*((c_) + (d_.)*(x_)^(n_)), x_Symbol] :> Si
mp[d*x*((a + b*x^n)^(p + 1)/(b*(n*(p + 1) + 1))), x] - Dist[(a*d - b*c*(n*(
p + 1) + 1))/(b*(n*(p + 1) + 1)), Int[(a + b*x^n)^p, x], x] /; FreeQ[{a, b,
 c, d, n}, x] && NeQ[b*c - a*d, 0] && NeQ[n*(p + 1) + 1, 0]
```

Rule 1171

```
Int[((d_) + (e_.)*(x_)^2)^(q_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 + c*x^4)^p, d + e*x^2
, x], R = Coeff[PolynomialRemainder[(a + b*x^2 + c*x^4)^p, d + e*x^2, x], x
, 0]}, Simp[(-R)*x*((d + e*x^2)^(q + 1)/(2*d*(q + 1))), x] + Dist[1/(2*d*(q
 + 1)), Int[(d + e*x^2)^(q + 1)*ExpandToSum[2*d*(q + 1)*Qx + R*(2*q + 3), x
], x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2
 - b*d*e + a*e^2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
```

```
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{\sqrt{1+\frac{ex^2}{d}}\int \frac{x^6(a+b\log(cx^n))}{\left(1+\frac{ex^2}{d}\right)^{5/2}}\,dx}{d^2\sqrt{d+ex^2}}$$

$$= -\frac{x^5(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{5x^3(a+b\log(cx^n))}{3e^2\sqrt{d+ex^2}} + \frac{5x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e^3} - \frac{5\ldots}{\ldots}$$

$$= -\frac{x^5(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{5x^3(a+b\log(cx^n))}{3e^2\sqrt{d+ex^2}} + \frac{5x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e^3} - \frac{5\ldots}{\ldots}$$

$$= -\frac{x^5(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{5x^3(a+b\log(cx^n))}{3e^2\sqrt{d+ex^2}} + \frac{5x\sqrt{d+ex^2}\,(a+b\log(cx^n))}{2e^3} - \frac{5\ldots}{\ldots}$$

$$= \frac{bdnx}{3e^3\sqrt{d+ex^2}} - \frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4e^{7/2}\sqrt{d+ex^2}} - \frac{x^5(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - 5x\ldots$$

$$= \frac{bdnx}{3e^3\sqrt{d+ex^2}} - \frac{bnx\sqrt{d+ex^2}}{4e^3} - \frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{4e^{7/2}\sqrt{d+ex^2}} + \frac{5bd^{3/2}\ldots}{\ldots}$$

$$= \frac{bdnx}{3e^3\sqrt{d+ex^2}} - \frac{bnx\sqrt{d+ex^2}}{4e^3} - \frac{31bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{12e^{7/2}\sqrt{d+ex^2}} - \frac{5bd^{3/2}\ldots}{\ldots}$$

$$= \frac{bdnx}{3e^3\sqrt{d+ex^2}} - \frac{bnx\sqrt{d+ex^2}}{4e^3} - \frac{31bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{12e^{7/2}\sqrt{d+ex^2}} - \frac{5bd^{3/2}\ldots}{\ldots}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

time = 0.16, size = 199, normalized size = 0.45

$$\frac{bnx^7\sqrt{1+\frac{ex^2}{d}}\left(5\,{}_3F_2\left(\frac{7}{2},\frac{7}{2},\frac{7}{2};\frac{9}{2},\frac{9}{2};-\frac{ex^2}{d}\right)+7\,{}_2F_1\left(\frac{5}{2},\frac{7}{2};\frac{9}{2};-\frac{ex^2}{d}\right)(-1+2\log(x))\right)}{98d^2\sqrt{d+ex^2}}+\frac{x(15d^2+20dex^2+3e^2x^4)\,(a-bn\log(x)+b\log(cx^n))}{6e^3\,(d+ex^2)^{3/2}}-\frac{5d(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{2e^{7/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^6*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (b*n*x^7*Sqrt[1 + (e*x^2)/d]*(5*HypergeometricPFQ[{7/2, 7/2, 7/2}, {9/2, 9/
2}, -((e*x^2)/d)] + 7*Hypergeometric2F1[5/2, 7/2, 9/2, -((e*x^2)/d)]*(-1 +
2*Log[x])))/(98*d^2*Sqrt[d + e*x^2]) + (x*(15*d^2 + 20*d*e*x^2 + 3*e^2*x^4)
*(a - b*n*Log[x] + b*Log[c*x^n]))/(6*e^3*(d + e*x^2)^(3/2)) - (5*d*(a - b*n
*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(2*e^(7/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^6(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^6*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x^6*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/6*(3*x^5*e^(-1)/(x^2*e + d)^(3/2) + 5*(3*x^2*e^(-1)/(x^2*e + d)^(3/2) + 2
*d*e^(-2)/(x^2*e + d)^(3/2))*d*x*e^(-1) - 15*d*arcsinh(x*e^(1/2)/sqrt(d))*e
^(-7/2) + 5*d*x*e^(-3)/sqrt(x^2*e + d))*a + b*integrate((x^6*log(c) + x^6*l
og(x^n))/((x^4*e^2 + 2*d*x^2*e + d^2)*sqrt(x^2*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*x^6*log(c*x^n) + sqrt(x^2*e + d)*a*x^6)/(x^6*e^
3 + 3*d*x^4*e^2 + 3*d^2*x^2*e + d^3), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^6/(x^2*e + d)^(5/2), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^6\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^6*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x^6*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.304 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=383

$$-\frac{bnx}{3e^2\sqrt{d+ex^2}}+\frac{4b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}}+\frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{5/2}\sqrt{d+ex^2}}-\frac{b\sqrt{d}\,n\sqrt{1+\cdots}}{\cdots}$$

```
[Out] -1/3*x^3*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2)-1/3*b*n*x/e^2/(e*x^2+d)^(1/2)-x*
(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(1/2)+4/3*b*n*arcsinh(x*e^(1/2)/d^(1/2))*d^(1
/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)+1/2*b*n*arcsinh(x*e^(1/2)/d^(
1/2))^2*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)-b*n*arcsinh(x*e^(
1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^
2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)+arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n
))*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)-1/2*b*n*polylog(2,(x*e
^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x
^2+d)^(1/2)
```

Rubi [A]

time = 0.38, antiderivative size = 383, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 11, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.440$, Rules used = {2386, 294, 221, 2392, 21, 393, 5775, 3797, 2221, 2317, 2438}

$$-\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\text{PolyLog}\left(2,e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{2e^{5/2}\sqrt{d+ex^2}}+\frac{\sqrt{d}\,\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}\sqrt{d+ex^2}}-\frac{x(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}}+\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{5/2}\sqrt{d+ex^2}}+\frac{4b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}}-\frac{b\sqrt{d}\,n\sqrt{\frac{ex^2}{d}+1}\,\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log\left(1-e^{2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}\right)}{e^{5/2}\sqrt{d+ex^2}}-\frac{bnx}{3e^2\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] -1/3*(b*n*x)/(e^2*Sqrt[d + e*x^2]) + (4*b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]])/(3*e^(5/2)*Sqrt[d + e*x^2]) + (b*Sqrt[d]*n*Sqrt[
1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*e^(5/2)*Sqrt[d + e*x^2])
- (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(
2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(e^(5/2)*Sqrt[d + e*x^2]) - (x^3*(a + b*L
og[c*x^n]))/(3*e*(d + e*x^2)^(3/2)) - (x*(a + b*Log[c*x^n]))/(e^2*Sqrt[d +
e*x^2]) + (Sqrt[d]*Sqrt[1 + (e*x^2)/d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*
Log[c*x^n]))/(e^(5/2)*Sqrt[d + e*x^2]) - (b*Sqrt[d]*n*Sqrt[1 + (e*x^2)/d]*P
olyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(5/2)*Sqrt[d + e*x^2])
```

Rule 21

```
Int[(u_.)*((a_) + (b_.)*(v_))^(m_.)*((c_) + (d_.)*(v_))^(n_.), x_Symbol] :>
 Dist[(b/d)^m, Int[u*(c + d*v)^(m + n), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && EqQ[b*c - a*d, 0] && IntegerQ[m] && ( !IntegerQ[n] || SimplerQ[c + d*x,
 a + b*x])
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSinh[Rt[b, 2]*(x/Sqrt
[a])]/Rt[b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && PosQ[b]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 393

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_)*((c_) + (d_.)*(x_)^(n_)), x_Symbol] :> Si
mp[(-(b*c - a*d))*x*((a + b*x^n)^(p + 1)/(a*b*n*(p + 1))), x] - Dist[(a*d -
 b*c*(n*(p + 1) + 1))/(a*b*n*(p + 1)), Int[(a + b*x^n)^(p + 1), x], x] /; F
reeQ[{a, b, c, d, n, p}, x] && NeQ[b*c - a*d, 0] && (LtQ[p, -1] || ILtQ[1/n
 + p, 0])
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2386

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Dist[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q]), Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ[
m + 2*q, -2] || GtQ[d, 0])
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
```

```
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3797

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Dist
[2*I, Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x)
)/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && Int
egerQ[4*k] && IGtQ[m, 0]
```

Rule 5775

```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Dist[1/b,
Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a,
 b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{\sqrt{1+\frac{ex^2}{d}}\int \frac{x^4(a+b\log(cx^n))}{\left(1+\frac{ex^2}{d}\right)^{5/2}}\,dx}{d^2\sqrt{d+ex^2}}$$

$$= -\frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{x(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+}{e^{5/2}\sqrt{d+ex^2}}$$

$$= -\frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{x(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+}{e^{5/2}\sqrt{d+ex^2}}$$

$$= -\frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{x(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)(a+}{e^{5/2}\sqrt{d+ex^2}}$$

$$= -\frac{bnx}{3e^2\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)^2}{2e^{5/2}\sqrt{d+ex^2}} - \frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{x}{}$$

$$= -\frac{bnx}{3e^2\sqrt{d+ex^2}} + \frac{4b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh}{2e^{5/2}\sqrt{d+ex}}$$

$$= -\frac{bnx}{3e^2\sqrt{d+ex^2}} + \frac{4b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh}{2e^{5/2}\sqrt{d+ex}}$$

$$= -\frac{bnx}{3e^2\sqrt{d+ex^2}} + \frac{4b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}\,n\sqrt{1+\frac{ex^2}{d}}\sinh}{2e^{5/2}\sqrt{d+ex}}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.57, size = 244, normalized size = 0.64

$$-\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(3e^{5/2}x^5(d+ex^2)^2\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)+25d^3\sqrt{e}\,x(3d+4ex^2)\sqrt{1+\frac{ex^2}{d}}\log(x)-75d^{5/2}(d+ex^2)^2\sinh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d}}\right)\log(x)\right)}{75d^2e^{5/2}(d+ex^2)^{5/2}} - \frac{x(3d+4ex^2)(a-bn\log(x)+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} + \frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{e^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] -1/75*(b*n*Sqrt[1 + (e*x^2)/d]*(3*e^(5/2)*x^5*(d + e*x^2)^2*HypergeometricP
FQ[{5/2, 5/2, 5/2}, {7/2, 7/2}, -((e*x^2)/d)] + 25*d^3*Sqrt[e]*x*(3*d + 4*e
*x^2)*Sqrt[1 + (e*x^2)/d]*Log[x] - 75*d^(5/2)*(d + e*x^2)^2*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]]*Log[x]))/(d^2*e^(5/2)*(d + e*x^2)^(5/2)) - (x*(3*d + 4*e*x^2)
*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*e^2*(d + e*x^2)^(3/2)) + ((a - b*n*Log
[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/e^(5/2)
```

Maple [**F**]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^4(a + b\ln(c\,x^n))}{(e\,x^2 + d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] -1/3*((3*x^2*e^(-1)/(x^2*e + d)^(3/2) + 2*d*e^(-2)/(x^2*e + d)^(3/2))*x - 3
*arcsinh(x*e^(1/2)/sqrt(d))*e^(-5/2) + x*e^(-2)/sqrt(x^2*e + d))*a + b*inte
grate((x^4*log(c) + x^4*log(x^n))/((x^4*e^2 + 2*d*x^2*e + d^2)*sqrt(x^2*e +
 d)), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((sqrt(x^2*e + d)*b*x^4*log(c*x^n) + sqrt(x^2*e + d)*a*x^4)/(x^6*e^
3 + 3*d*x^4*e^2 + 3*d^2*x^2*e + d^3), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^4(a + b\log(cx^n))}{(d + ex^2)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^4/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^4\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.305 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=89

$$\frac{bnx}{3de\sqrt{d+ex^2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3de^{3/2}}+\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}$$

```
[Out] -1/3*b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d/e^(3/2)+1/3*x^3*(a+b*ln(c*x^n
))/d/(e*x^2+d)^(3/2)+1/3*b*n*x/d/e/(e*x^2+d)^(1/2)
```

Rubi [A]
time = 0.07, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {2373, 294, 223, 212}

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3de^{3/2}}+\frac{bnx}{3de\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (b*n*x)/(3*d*e*Sqrt[d + e*x^2]) - (b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
)/(3*d*e^(3/2)) + (x^3*(a + b*Log[c*x^n]))/(3*d*(d + e*x^2)^(3/2))
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 294

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(
n - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*n*(p + 1))), x] - Dist[c^n
*((m - n + 1)/(b*n*(p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^(p + 1), x], x]
 /; FreeQ[{a, b, c}, x] && IGtQ[n, 0] && LtQ[p, -1] && GtQ[m + 1, n] &&  !I
LtQ[(m + n*(p + 1) + 1)/n, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}} - \frac{(bn)\int \frac{x^2}{(d+ex^2)^{3/2}}\,dx}{3d}$$

$$= \frac{bnx}{3de\sqrt{d+ex^2}} + \frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}} - \frac{(bn)\int \frac{1}{\sqrt{d+ex^2}}\,dx}{3de}$$

$$= \frac{bnx}{3de\sqrt{d+ex^2}} + \frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}} - \frac{(bn)\text{Subst}\left(\int \frac{1}{1-ex^2}\,dx, x, \frac{x}{\sqrt{d+ex^2}}\right)}{3de}$$

$$= \frac{bnx}{3de\sqrt{d+ex^2}} - \frac{bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3de^{3/2}} + \frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}$$

Mathematica [A]
time = 0.09, size = 101, normalized size = 1.13

$$\frac{\sqrt{e}\,x(aex^2+bn(d+ex^2)) + be^{3/2}x^3\log(cx^n) - bn(d+ex^2)^{3/2}\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{3de^{3/2}(d+ex^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

```
[Out] (Sqrt[e]*x*(a*e*x^2 + b*n*(d + e*x^2)) + b*e^(3/2)*x^3*Log[c*x^n] - b*n*(d
+ e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(3*d*e^(3/2)*(d + e*x^2)
^(3/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] -1/3*a*(x*e^(-1)/(x^2*e + d)^(3/2) - x*e^(-1)/(sqrt(x^2*e + d)*d)) + b*inte
grate((x^2*log(c) + x^2*log(x^n))/((x^4*e^2 + 2*d*x^2*e + d^2)*sqrt(x^2*e +
 d)), x)
```

Fricas [A]
time = 0.40, size = 134, normalized size = 1.51

$$\frac{(bnx^4e^2 + 2\,bdnx^2e + bd^2n)e^{\frac{1}{2}}\log\left(-2\,x^2e + 2\,\sqrt{x^2e + d}\,xe^{\frac{1}{2}} - d\right) + 2\,(bnx^3e^2\log\left(x\right) + bx^3e^2\log\left(c\right) + (bn + a)x^3e^2 + bdnxe)\sqrt{x^2e + d}}{6\,(dx^4e^4 + 2\,d^2x^2e^3 + d^3e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/6*((b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*e^(1/2)*log(-2*x^2*e + 2*sqrt(
x^2*e + d)*x*e^(1/2) - d) + 2*(b*n*x^3*e^2*log(x) + b*x^3*e^2*log(c) + (b*n
 + a)*x^3*e^2 + b*d*n*x*e)*sqrt(x^2*e + d))/(d*x^4*e^4 + 2*d^2*x^2*e^3 + d^
3*e^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log\left(cx^n\right))}{\left(d + ex^2\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.306 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=113

$$-\frac{bnx}{3d^2\sqrt{d+ex^2}}-\frac{2bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^2\sqrt{e}}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}+\frac{2x(a+b\log(cx^n))}{3d^2\sqrt{d+ex^2}}$$

```
[Out] 1/3*x*(a+b*ln(c*x^n))/d/(e*x^2+d)^(3/2)-2/3*b*n*arctanh(x*e^(1/2)/(e*x^2+d)
^(1/2))/d^2/e^(1/2)-1/3*b*n*x/d^2/(e*x^2+d)^(1/2)+2/3*x*(a+b*ln(c*x^n))/d^2
/(e*x^2+d)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 113, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$, Rules used = {2360, 2351, 223, 212, 197}

$$\frac{2x(a+b\log(cx^n))}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}-\frac{2bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^2\sqrt{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^2)^(5/2),x]
```

```
[Out] -1/3*(b*n*x)/(d^2*Sqrt[d + e*x^2]) - (2*b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*
x^2]])/(3*d^2*Sqrt[e]) + (x*(a + b*Log[c*x^n]))/(3*d*(d + e*x^2)^(3/2)) + (
2*x*(a + b*Log[c*x^n]))/(3*d^2*Sqrt[d + e*x^2])
```

Rule 197

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^(p + 1)
/a), x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p + 1, 0]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2360

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Dist[(2*q + 3)/(2*d*(q + 1)), Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^n
]), x], x] + Dist[b*(n/(2*d*(q + 1))), Int[(d + e*x^2)^(q + 1), x], x]) /;
FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx &= \frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}+\frac{2\int\frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx}{3d}-\frac{(bn)\int\frac{1}{(d+ex^2)^{3/2}}\,dx}{3d}\\ &= -\frac{bnx}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}+\frac{2x(a+b\log(cx^n))}{3d^2\sqrt{d+ex^2}}-\frac{(2bn)\int\frac{1}{\sqrt{d+ex^2}}\,dx}{3d^2}\\ &= -\frac{bnx}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}+\frac{2x(a+b\log(cx^n))}{3d^2\sqrt{d+ex^2}}-\frac{(2bn)\text{Subst}\left(\int\frac{1}{1-ex^2}\,dx\right.}{3d^2}\\ &= -\frac{bnx}{3d^2\sqrt{d+ex^2}}-\frac{2bn\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^2\sqrt{e}}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}+\frac{2x(a+b\log(cx\right.}{3d^2\sqrt{d+ex^2}}\end{aligned}$$

Mathematica [A]
time = 0.08, size = 116, normalized size = 1.03

$$\frac{\sqrt{e}\,x(-bn(d+ex^2)+a(3d+2ex^2))+b\sqrt{e}\,x(3d+2ex^2)\log(cx^n)-2bn(d+ex^2)^{3/2}\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{3d^2\sqrt{e}\,(d+ex^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^(5/2),x]
```

```
[Out] (Sqrt[e]*x*(-(b*n*(d + e*x^2)) + a*(3*d + 2*e*x^2)) + b*Sqrt[e]*x*(3*d + 2*
e*x^2)*Log[c*x^n] - 2*b*n*(d + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^
2]])/(3*d^2*Sqrt[e]*(d + e*x^2)^(3/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(e\,x^{2}+d\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/3*a*(2*x/(sqrt(x^2*e + d)*d^2) + x/((x^2*e + d)^(3/2)*d)) + b*integrate((
log(c) + log(x^n))/((x^4*e^2 + 2*d*x^2*e + d^2)*sqrt(x^2*e + d)), x)
```

Fricas [A]
time = 0.38, size = 167, normalized size = 1.48

$$\frac{(bnx^4e^2+2\,bdnx^2e+bd^2n)e^{\frac{1}{2}}\log\left(-2\,x^2e+2\,\sqrt{x^2e+d}\,xe^{\frac{1}{2}}-d\right)-((bn-2\,a)x^3e^2+(bdn-3\,ad)xe-(2\,bx^3e^2+3\,bdxe)\log\left(c\right)-(2\,bnx^3e^2+3\,bdnxe)\log\left(x\right))\sqrt{x^2e+d}}{3\,(d^2x^4e^3+2\,d^3x^2e^2+d^4e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/3*((b*n*x^4*e^2 + 2*b*d*n*x^2*e + b*d^2*n)*e^(1/2)*log(-2*x^2*e + 2*sqrt(
x^2*e + d)*x*e^(1/2) - d) - ((b*n - 2*a)*x^3*e^2 + (b*d*n - 3*a*d)*x*e - (2
*b*x^3*e^2 + 3*b*d*x*e)*log(c) - (2*b*n*x^3*e^2 + 3*b*d*n*x*e)*log(x))*sqrt
(x^2*e + d))/(d^2*x^4*e^3 + 2*d^3*x^2*e^2 + d^4*e)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/(x^2*e + d)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{{\left(e\,x^2+d\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^2)^(5/2),x)
[Out] int((a + b*log(c*x^n))/(d + e*x^2)^(5/2), x)
```

3.307 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=166

$$-\frac{bn}{d^2x\sqrt{d+ex^2}}-\frac{2benx}{3d^3\sqrt{d+ex^2}}+\frac{8b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^3}-\frac{a+b\log(cx^n)}{dx\,(d+ex^2)^{3/2}}-\frac{4ex(a+b\log(cx^n))}{3d^2\,(d+ex^2)^{3/2}}-8$$

[Out] (-a-b*ln(c*x^n))/d/x/(e*x^2+d)^(3/2)-4/3*e*x*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(3/2)+8/3*b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))*e^(1/2)/d^3-b*n/d^2/x/(e*x^2+d)^(1/2)-2/3*b*e*n*x/d^3/(e*x^2+d)^(1/2)-8/3*e*x*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(1/2)

Rubi [A]
time = 0.11, antiderivative size = 166, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {277, 198, 197, 2392, 12, 1279, 393, 223, 212}

$$-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2\,(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx\,(d+ex^2)^{3/2}}-\frac{2benx}{3d^3\sqrt{d+ex^2}}+\frac{8b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^3}-\frac{bn}{d^2x\sqrt{d+ex^2}}$$

Antiderivative was successfully verified.

[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(5/2)),x]

[Out] -((b*n)/(d^2*x*Sqrt[d + e*x^2])) - (2*b*e*n*x)/(3*d^3*Sqrt[d + e*x^2]) + (8*b*Sqrt[e]*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(3*d^3) - (a + b*Log[c*x^n])/(d*x*(d + e*x^2)^(3/2)) - (4*e*x*(a + b*Log[c*x^n]))/(3*d^2*(d + e*x^2)^(3/2)) - (8*e*x*(a + b*Log[c*x^n]))/(3*d^3*Sqrt[d + e*x^2])

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 197

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^(p + 1)
/a), x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p + 1, 0]
```

Rule 198

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^n)^(p +
 1)/(a*n*(p + 1))), x] + Dist[(n*(p + 1) + 1)/(a*n*(p + 1)), Int[(a + b*x^n
)^(p + 1), x], x] /; FreeQ[{a, b, n, p}, x] && ILtQ[Simplify[1/n + p + 1],
0] && NeQ[p, -1]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 393

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_)*((c_) + (d_.)*(x_)^(n_)), x_Symbol] :> Si
mp[(-(b*c - a*d))*x*((a + b*x^n)^(p + 1)/(a*b*n*(p + 1))), x] - Dist[(a*d -
 b*c*(n*(p + 1) + 1))/(a*b*n*(p + 1)), Int[(a + b*x^n)^(p + 1), x], x] /; F
reeQ[{a, b, c, d, n, p}, x] && NeQ[b*c - a*d, 0] && (LtQ[p, -1] || ILtQ[1/n
 + p, 0])
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = -\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}} - \frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}} - \frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}} - (bn)\int \frac{-3d^2-1}{3d^3x^2}$$

$$= -\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}} - \frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}} - \frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}} - \frac{(bn)\int \frac{-3d^2-12dex}{x^2(d+ex}}{3d^3}$$

$$= -\frac{bn}{d^2x\sqrt{d+ex^2}} - \frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}} - \frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}} - \frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}} +$$

$$= -\frac{bn}{d^2x\sqrt{d+ex^2}} - \frac{2benx}{3d^3\sqrt{d+ex^2}} - \frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}} - \frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}} - \frac{8ex(}{3c}$$

$$= -\frac{bn}{d^2x\sqrt{d+ex^2}} - \frac{2benx}{3d^3\sqrt{d+ex^2}} - \frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}} - \frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}} - \frac{8ex(}{3c}$$

$$= -\frac{bn}{d^2x\sqrt{d+ex^2}} - \frac{2benx}{3d^3\sqrt{d+ex^2}} + \frac{8b\sqrt{e}\,n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^3} - \frac{a+b\log(cx}{dx(d+ex^2)^3}$$

Mathematica [A]
time = 0.11, size = 144, normalized size = 0.87

$$\frac{-3ad^2-3bd^2n-12adex^2-5bdenx^2-8ae^2x^4-2be^2nx^4-b(3d^2+12dex^2+8e^2x^4)\log(cx^n)+8b\sqrt{e}\,nx(d+ex^2)^{3/2}\log\left(ex+\sqrt{e}\,\sqrt{d+ex^2}\right)}{3d^3x(d+ex^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(5/2)),x]
```

```
[Out] (-3*a*d^2 - 3*b*d^2*n - 12*a*d*e*x^2 - 5*b*d*e*n*x^2 - 8*a*e^2*x^4 - 2*b*e^
2*n*x^4 - b*(3*d^2 + 12*d*e*x^2 + 8*e^2*x^4)*Log[c*x^n] + 8*b*Sqrt[e]*n*x*(
d + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(3*d^3*x*(d + e*x^2)^(
3/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^2(e\,x^2+d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] -1/3*a*(8*x*e/(sqrt(x^2*e + d)*d^3) + 4*x*e/((x^2*e + d)^(3/2)*d^2) + 3/((x
^2*e + d)^(3/2)*d*x)) + b*integrate((log(c) + log(x^n))/((x^6*e^2 + 2*d*x^4
*e + d^2*x^2)*sqrt(x^2*e + d)), x)
```

Fricas [A]
time = 0.40, size = 200, normalized size = 1.20

$$\frac{4\,(bnx^5e^2 + 2\,bdnx^3e + bd^2nx)e^{\frac{1}{2}}\log\left(-2\,x^2e - 2\,\sqrt{x^2e + d}\,xe^{\frac{1}{2}} - d\right) - (2\,(bn + 4\,a)x^4e^2 + 3\,bd^2n + (5\,bdn + 12\,ad)x^2e + 3\,ad^2 + (8\,bx^4e^2 + 12\,bdx^2e + 3\,bd^2)\log\left(c\right) + (8\,bnx^4e^2 + 12\,bdnx^2e + 3\,bd^2n)\log\left(x\right))\sqrt{x^2e + d}}{3\,(d^3x^5e^2 + 2\,d^4x^3e + d^5x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/3*(4*(b*n*x^5*e^2 + 2*b*d*n*x^3*e + b*d^2*n*x)*e^(1/2)*log(-2*x^2*e - 2*s
qrt(x^2*e + d)*x*e^(1/2) - d) - (2*(b*n + 4*a)*x^4*e^2 + 3*b*d^2*n + (5*b*d
*n + 12*a*d)*x^2*e + 3*a*d^2 + (8*b*x^4*e^2 + 12*b*d*x^2*e + 3*b*d^2)*log(c
) + (8*b*n*x^4*e^2 + 12*b*d*n*x^2*e + 3*b*d^2*n)*log(x))*sqrt(x^2*e + d))/(
d^3*x^5*e^2 + 2*d^4*x^3*e + d^5*x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(5/2),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(5/2)*x^2), x)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^2\,{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(5/2)),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(5/2)), x)
```

3.308 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$

Optimal. Leaf size=230

$$-\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}+\frac{23ben\sqrt{d+ex^2}}{9d^4x}-\frac{16be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^4}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a}{d^2x}$$

```
[Out] -16/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^4+1/3*(-a-b*ln(c*x^n
))/d/x^3/(e*x^2+d)^(3/2)+2*e*(a+b*ln(c*x^n))/d^2/x/(e*x^2+d)^(3/2)+8/3*e^2*
x*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(3/2)-1/3*b*e^2*n*x/d^4/(e*x^2+d)^(1/2)+16/
3*e^2*x*(a+b*ln(c*x^n))/d^4/(e*x^2+d)^(1/2)-1/9*b*n*(e*x^2+d)^(1/2)/d^3/x^3
+23/9*b*e*n*(e*x^2+d)^(1/2)/d^4/x
```

Rubi [A]
time = 0.17, antiderivative size = 230, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 10, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {277, 198, 197, 2392, 12, 1819, 1279, 462, 223, 212}

$$\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}-\frac{16be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right)}{3d^4}-\frac{be^2nx}{3d^4\sqrt{d+ex^2}}+\frac{23ben\sqrt{d+ex^2}}{9d^4x}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(5/2)),x]
```

```
[Out] -1/3*(b*e^2*n*x)/(d^4*Sqrt[d + e*x^2]) - (b*n*Sqrt[d + e*x^2])/(9*d^3*x^3)
+ (23*b*e*n*Sqrt[d + e*x^2])/(9*d^4*x) - (16*b*e^(3/2)*n*ArcTanh[(Sqrt[e]*x
)/Sqrt[d + e*x^2]])/(3*d^4) - (a + b*Log[c*x^n])/(3*d*x^3*(d + e*x^2)^(3/2)
) + (2*e*(a + b*Log[c*x^n]))/(d^2*x*(d + e*x^2)^(3/2)) + (8*e^2*x*(a + b*Lo
g[c*x^n]))/(3*d^3*(d + e*x^2)^(3/2)) + (16*e^2*x*(a + b*Log[c*x^n]))/(3*d^4
*Sqrt[d + e*x^2])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 197

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^(p + 1)
/a), x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p + 1, 0]
```

Rule 198

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^n)^(p +
 1)/(a*n*(p + 1))), x] + Dist[(n*(p + 1) + 1)/(a*n*(p + 1)), Int[(a + b*x^n
```

```
)^(p + 1), x], x] /; FreeQ[{a, b, n, p}, x] && ILtQ[Simplify[1/n + p + 1],
0] && NeQ[p, -1]
```

Rule 212

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 223

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 1279

```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Dist[1/(d*f
^2*(m + 1)), Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x)
 - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ
[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

Rule 1819

```
Int[(Pq_)*((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[
{Q = PolynomialQuotient[(c*x)^m*Pq, a + b*x^2, x], f = Coeff[PolynomialRema
inder[(c*x)^m*Pq, a + b*x^2, x], x, 0], g = Coeff[PolynomialRemainder[(c*x)
^m*Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b*f*x)*((a + b*x^2)^(p + 1)/(2*a*
```

```
b*(p + 1))), x] + Dist[1/(2*a*(p + 1)), Int[(c*x)^m*(a + b*x^2)^(p + 1)*Exp
andToSum[(2*a*(p + 1)*Q)/(c*x)^m + (f*(2*p + 3))/(c*x)^m, x], x], x]] /; Fr
eeQ[{a, b, c}, x] && PolyQ[Pq, x] && LtQ[p, -1] && ILtQ[m, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx = -\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+\frac{16e^2x(a+b\log(}{3d^4\sqrt{d+ex}}$$

$$= -\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+\frac{16e^2x(a+b\log(}{3d^4\sqrt{d+ex}}$$

$$= -\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+$$

$$= -\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}+\frac{8e^2x(a}{3d^3(}$$

$$= -\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}+\frac{23ben\sqrt{d+ex^2}}{9d^4x}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b}{d^2x(d-}$$

$$= -\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}+\frac{23ben\sqrt{d+ex^2}}{9d^4x}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b}{d^2x(d-}$$

$$= -\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}+\frac{23ben\sqrt{d+ex^2}}{9d^4x}-\frac{16be^{3/2}n\tanh^{-1}\left(\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right.}{3d^4}$$

Mathematica [A]
time = 0.14, size = 182, normalized size = 0.79

$$\frac{-3ad^3-bd^3n+18ad^2ex^2+21bd^2enx^2+72ade^2x^4+42bde^2nx^4+48ae^3x^6+20be^3nx^6+3b(-d^3+6d^2ex^2+24de^2x^4+16e^3x^6)\log\left(cx^n\right)-48be^{3/2}nx^3(d+ex^2)^{3/2}\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{9d^4x^3\left(d+ex^2\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(5/2)),x]
```

```
[Out] (-3*a*d^3 - b*d^3*n + 18*a*d^2*e*x^2 + 21*b*d^2*e*n*x^2 + 72*a*d*e^2*x^4 +
42*b*d*e^2*n*x^4 + 48*a*e^3*x^6 + 20*b*e^3*n*x^6 + 3*b*(-d^3 + 6*d^2*e*x^2
+ 24*d*e^2*x^4 + 16*e^3*x^6)*Log[c*x^n] - 48*b*e^(3/2)*n*x^3*(d + e*x^2)^(3
/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(9*d^4*x^3*(d + e*x^2)^(3/2))
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x^{4} \left(e\,x^{2}+d\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/3*a*(16*x*e^2/(sqrt(x^2*e + d)*d^4) + 8*x*e^2/((x^2*e + d)^(3/2)*d^3) + 6
*e/((x^2*e + d)^(3/2)*d^2*x) - 1/((x^2*e + d)^(3/2)*d*x^3)) + b*integrate((
log(c) + log(x^n))/((x^8*e^2 + 2*d*x^6*e + d^2*x^4)*sqrt(x^2*e + d)), x)
```

Fricas [A]
time = 0.43, size = 253, normalized size = 1.10

$$\frac{24 \left(bnx^{7}e^{3}+2\,bdnx^{5}e^{2}+bd^{2}nx^{3}e\right)e^{\frac{1}{2}}\log \left(-2\,x^{2}e+2\,\sqrt{x^{2}e+d}\,xe^{\frac{1}{2}}-d\right)+\left(4\left(5\,bn+12\,a\right)x^{6}e^{3}+6\left(7\,bdn+12\,ad\right)x^{4}e^{2}-bd^{3}n-3\,ad^{3}+3\left(7\,bd^{2}n+6\,ad^{2}\right)x^{2}e+3\left(16\,bx^{6}e^{3}+24\,bdx^{4}e^{2}+6\,bd^{2}x^{2}e-bd^{3}\right)\log \left(c\right)+3\left(16\,bnx^{6}e^{3}+24\,bdnx^{4}e^{2}+6\,bd^{2}nx^{2}e-bd^{3}n\right)\log \left(x\right)\right)\sqrt{x^{2}e+d}}{9\left(d^{4}x^{7}e^{2}+2\,d^{5}x^{5}e+d^{6}x^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/9*(24*(b*n*x^7*e^3 + 2*b*d*n*x^5*e^2 + b*d^2*n*x^3*e)*e^(1/2)*log(-2*x^2*
e + 2*sqrt(x^2*e + d)*x*e^(1/2) - d) + (4*(5*b*n + 12*a)*x^6*e^3 + 6*(7*b*d
*n + 12*a*d)*x^4*e^2 - b*d^3*n - 3*a*d^3 + 3*(7*b*d^2*n + 6*a*d^2)*x^2*e +
3*(16*b*x^6*e^3 + 24*b*d*x^4*e^2 + 6*b*d^2*x^2*e - b*d^3)*log(c) + 3*(16*b*
n*x^6*e^3 + 24*b*d*n*x^4*e^2 + 6*b*d^2*n*x^2*e - b*d^3*n)*log(x))*sqrt(x^2*
e + d))/(d^4*x^7*e^2 + 2*d^5*x^5*e + d^6*x^3)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(5/2),x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^2*e + d)^(5/2)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,{\left(e\,x^2+d\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(5/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(5/2)), x)
```

3.309 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal. Leaf size=251

$$\frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{2bd^4n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{3e^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{d^2(d^2-e^2x^2)}{e^4\sqrt{d-e}}$$

```
[Out] 2/3*b*d^2*n*(-e^2*x^2+d^2)/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/9*b*n*(-e^2*x
^2+d^2)^2/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-d^2*(-e^2*x^2+d^2)*(a+b*ln(c*x^n
))/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/3*(-e^2*x^2+d^2)^2*(a+b*ln(c*x^n))/e^
4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*b*d^4*n*arctanh((1-e^2*x^2/d^2)^(1/2))*(
1-e^2*x^2/d^2)^(1/2)/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]

time = 0.34, antiderivative size = 251, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 10, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.303$, Rules used = {2387, 272, 45, 2392, 12, 457, 81, 52, 65, 214}

$$-\frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}}+\frac{(d^2-e^2x^2)^2(a+b\log(cx^n))}{3e^4\sqrt{d-ex}\sqrt{d+ex}}+\frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{2bd^4n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{3e^4\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (2*b*d^2*n*(d^2 - e^2*x^2))/(3*e^4*Sqrt[d - e*x]*Sqrt[d + e*x]) - (b*n*(d^2
 - e^2*x^2)^2)/(9*e^4*Sqrt[d - e*x]*Sqrt[d + e*x]) - (2*b*d^4*n*Sqrt[1 - (e
^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]])/(3*e^4*Sqrt[d - e*x]*Sqrt[d
+ e*x]) - (d^2*(d^2 - e^2*x^2)*(a + b*Log[c*x^n]))/(e^4*Sqrt[d - e*x]*Sqrt[
d + e*x]) + ((d^2 - e^2*x^2)^2*(a + b*Log[c*x^n]))/(3*e^4*Sqrt[d - e*x]*Sqr
t[d + e*x])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 81

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_Symbol] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p +
 2))), x] + Dist[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(
n + p + 2)), Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f
, n, p}, x] && NeQ[n + p + 2, 0]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 457

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n_))^(q_.
), x_Symbol] :> Dist[1/n, Subst[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p
*(c + d*x)^q, x], x, x^n], x] /; FreeQ[{a, b, c, d, m, n, p, q}, x] && NeQ[
b*c - a*d, 0] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
```

```
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x^3(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}} + \frac{(d^2-e^2x^2)^2(a+b\log(cx^n))}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bn\sqrt{1-\frac{e}{}}\right.}{}$$

$$= -\frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}} + \frac{(d^2-e^2x^2)^2(a+b\log(cx^n))}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bd^2n\sqrt{1-}\right.}{}$$

$$= -\frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}} + \frac{(d^2-e^2x^2)^2(a+b\log(cx^n))}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bd^2n\sqrt{1-}\right.}{}$$

$$= -\frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}} + \frac{(d^2-e^2x^2)^2(a+b}{3e^4\sqrt{d-ex}\sqrt{c}}$$

$$= \frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{d^2(d^2-e^2x^2)(a+b\log(cx^n}{e^4\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{d^2(d^2-e^2x^2)(a+b\log(cx^n}{e^4\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{2bd^4n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\right.}{3e^4\sqrt{d-ex}\sqrt{d+}}$$

Mathematica [A]

time = 0.24, size = 163, normalized size = 0.65

$$-\frac{-6bd^3n\log(x)+3bn\sqrt{d-ex}\sqrt{d+ex}(2d^2+e^2x^2)\log(x)+\sqrt{d-ex}\sqrt{d+ex}\left(e^2x^2(3a-bn-3bn\log(x)+3b\log(cx^n))+d^2(6a-5bn-6bn\log(x)+6b\log(cx^n))\right)+6bd^3n\log\left(d+\sqrt{d-ex}\sqrt{d+ex}\right)}{9e^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] -1/9*(-6*b*d^3*n*Log[x] + 3*b*n*Sqrt[d - e*x]*Sqrt[d + e*x]*(2*d^2 + e^2*x^
2)*Log[x] + Sqrt[d - e*x]*Sqrt[d + e*x]*(e^2*x^2*(3*a - b*n - 3*b*n*Log[x]
+ 3*b*Log[c*x^n]) + d^2*(6*a - 5*b*n - 6*b*n*Log[x] + 6*b*Log[c*x^n])) + 6*
b*d^3*n*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/e^4
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{x^3 (a + b \ln (c\,x^n))}{\sqrt{-ex + d}\,\sqrt{ex + d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.55, size = 184, normalized size = 0.73

$$-\frac{1}{9}\left(3\,d^3 e^{(-4)} \log\left(d + \sqrt{-x^2e^2 + d^2}\right) - 3\,d^3 e^{(-4)} \log\left(-d + \sqrt{-x^2e^2 + d^2}\right) - \left(6\,\sqrt{-x^2e^2 + d^2}\,d^2 - \left(-x^2e^2 + d^2\right)^{\frac{3}{2}}\right)e^{(-4)}\right)bn - \frac{1}{3}\left(\sqrt{-x^2e^2 + d^2}\,x^2e^{(-2)} + 2\,\sqrt{-x^2e^2 + d^2}\,d^2e^{(-4)}\right)b\log\left(cx^n\right) - \frac{1}{3}\left(\sqrt{-x^2e^2 + d^2}\,x^2e^{(-2)} + 2\,\sqrt{-x^2e^2 + d^2}\,d^2e^{(-4)}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="m
axima")
```

```
[Out] -1/9*(3*d^3*e^(-4)*log(d + sqrt(-x^2*e^2 + d^2)) - 3*d^3*e^(-4)*log(-d + sq
rt(-x^2*e^2 + d^2)) - (6*sqrt(-x^2*e^2 + d^2)*d^2 - (-x^2*e^2 + d^2)^(3/2))
*e^(-4))*b*n - 1/3*(sqrt(-x^2*e^2 + d^2)*x^2*e^(-2) + 2*sqrt(-x^2*e^2 + d^2
)*d^2*e^(-4))*b*log(c*x^n) - 1/3*(sqrt(-x^2*e^2 + d^2)*x^2*e^(-2) + 2*sqrt(
-x^2*e^2 + d^2)*d^2*e^(-4))*a
```

Fricas [A]
time = 0.40, size = 122, normalized size = 0.49

$$\frac{1}{9}\left(6\,bd^3n\log\left(\frac{\sqrt{xe + d}\,\sqrt{-xe + d} - d}{x}\right) + \left(5\,bd^2n + (bn - 3\,a)x^2e^2 - 6\,ad^2 - 3\left(bx^2e^2 + 2\,bd^2\right)\log\left(c\right) - 3\left(bnx^2e^2 + 2\,bd^2n\right)\log\left(x\right)\right)\sqrt{xe + d}\,\sqrt{-xe + d}\right)e^{(-4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="f
ricas")
```

```
[Out] 1/9*(6*b*d^3*n*log((sqrt(x*e + d)*sqrt(-x*e + d) - d)/x) + (5*b*d^2*n + (b*
n - 3*a)*x^2*e^2 - 6*a*d^2 - 3*(b*x^2*e^2 + 2*b*d^2)*log(c) - 3*(b*n*x^2*e^
2 + 2*b*d^2*n)*log(x))*sqrt(x*e + d)*sqrt(-x*e + d))*e^(-4)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\log{(cx^n)})}{\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="g
iac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(sqrt(x*e + d)*sqrt(-x*e + d)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.310 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal. Leaf size=148

$$\frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{e^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}}$$

```
[Out] b*n*(-e^2*x^2+d^2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-(-e^2*x^2+d^2)*(a+b*ln(
c*x^n))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*d^2*n*arctanh((1-e^2*x^2/d^2)^(1
/2))*(1-e^2*x^2/d^2)^(1/2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]

time = 0.20, antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.194$, Rules used = {2387, 2376, 272, 52, 65, 214}

$$-\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{e^2\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (b*n*(d^2 - e^2*x^2))/(e^2*Sqrt[d - e*x]*Sqrt[d + e*x]) - (b*d^2*n*Sqrt[1 -
 (e^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]])/(e^2*Sqrt[d - e*x]*Sqrt[d
 + e*x]) - ((d^2 - e^2*x^2)*(a + b*Log[c*x^n]))/(e^2*Sqrt[d - e*x]*Sqrt[d +
 e*x])
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
```

```
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{\left(bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\right)\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\,dx}{e^2\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{\left(bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\right)\text{Subst}\left(\int \frac{\sqrt{1-\frac{e^2x}{d^2}}}{x}\,dx\right.}{2e^2\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{\left(bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\right)\text{S}}{2e^2\sqrt{d}}$$

$$= \frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bd^4n\sqrt{1-\frac{e^2x^2}{d^2}}\right)\text{S}}{e^4\sqrt{}}$$

$$= \frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x}{e^2\sqrt{d}}$$

Mathematica [A]
time = 0.10, size = 113, normalized size = 0.76

$$\frac{bdn\log(x)}{e^2} - \frac{bn\sqrt{d-ex}\sqrt{d+ex}\log(x)}{e^2} - \frac{\sqrt{d-ex}\sqrt{d+ex}(a-bn+b(-n\log(x)+\log(cx^n)))}{e^2} - \frac{bdn\log\left(d+\sqrt{d-ex}\sqrt{d+ex}\right)}{e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (b*d*n*Log[x])/e^2 - (b*n*Sqrt[d - e*x]*Sqrt[d + e*x]*Log[x])/e^2 - (Sqrt[d
 - e*x]*Sqrt[d + e*x]*(a - b*n + b*(-(n*Log[x]) + Log[c*x^n])))/e^2 - (b*d*
n*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/e^2
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
[Out] int(x*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.51, size = 98, normalized size = 0.66

$$-\left(d\log\left(\frac{2\,d^2}{|x|}+\frac{2\,\sqrt{-x^2e^2+d^2}\,d}{|x|}\right)-\sqrt{-x^2e^2+d^2}\right)bne^{(-2)}-\sqrt{-x^2e^2+d^2}\,be^{(-2)}\log\left(cx^n\right)-\sqrt{-x^2e^2+d^2}\,ae^{(-2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="max
ima")
[Out] -(d*log(2*d^2/abs(x) + 2*sqrt(-x^2*e^2 + d^2)*d/abs(x)) - sqrt(-x^2*e^2 + d
^2))*b*n*e^(-2) - sqrt(-x^2*e^2 + d^2)*b*e^(-2)*log(c*x^n) - sqrt(-x^2*e^2
+ d^2)*a*e^(-2)
```

Fricas [A]
time = 0.38, size = 69, normalized size = 0.47

$$\left(bdn\log\left(\frac{\sqrt{xe+d}\,\sqrt{-xe+d}-d}{x}\right)-\left(bn\log\left(x\right)-bn+b\log\left(c\right)+a\right)\sqrt{xe+d}\,\sqrt{-xe+d}\right)e^{(-2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fri
cas")
[Out] (b*d*n*log((sqrt(x*e + d)*sqrt(-x*e + d) - d)/x) - (b*n*log(x) - b*n + b*lo
g(c) + a)*sqrt(x*e + d)*sqrt(-x*e + d))*e^(-2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="gia
c")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(sqrt(x*e + d)*sqrt(-x*e + d)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.311 $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$

Optimal. Leaf size=301

$$\frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{bn\sqrt{1-\frac{e^2}{d}}\cdots}{\cdots}$$

```
[Out] 1/2*b*n*arctanh((1-e^2*x^2/d^2)^(1/2))^2*(1-e^2*x^2/d^2)^(1/2)/(-e*x+d)^(1/
2)/(e*x+d)^(1/2)-arctanh((1-e^2*x^2/d^2)^(1/2))*(a+b*ln(c*x^n))*(1-e^2*x^2/
d^2)^(1/2)/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*n*arctanh((1-e^2*x^2/d^2)^(1/2))*
ln(2/(1-(1-e^2*x^2/d^2)^(1/2)))*(1-e^2*x^2/d^2)^(1/2)/(-e*x+d)^(1/2)/(e*x+d
)^(1/2)-1/2*b*n*polylog(2,(-1-(1-e^2*x^2/d^2)^(1/2))/(1-(1-e^2*x^2/d^2)^(1/
2)))*(1-e^2*x^2/d^2)^(1/2)/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]

time = 0.40, antiderivative size = 301, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 9, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$, Rules used = {2387, 272, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{PolyLog}\left(2,-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}+1}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{2\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{\sqrt{d-ex}\,\sqrt{d+ex}}+\frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{\sqrt{d-ex}\,\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (b*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]^2)/(2*Sqrt[d
- e*x]*Sqrt[d + e*x]) - (Sqrt[1 - (e^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)
/d^2]]*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]) - (b*n*Sqrt[1 - (e
^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]*Log[2/(1 - Sqrt[1 - (e^2*x^2)
/d^2])])/(Sqrt[d - e*x]*Sqrt[d + e*x]) - (b*n*Sqrt[1 - (e^2*x^2)/d^2]*PolyL
og[2, -((1 + Sqrt[1 - (e^2*x^2)/d^2])/(1 - Sqrt[1 - (e^2*x^2)/d^2]))])/(2*S
qrt[d - e*x]*Sqrt[d + e*x])
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
```

```
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x\sqrt{d-ex}\,\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\int \frac{a+b\log(cx^n)}{x\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\,\sqrt{d+ex}}$$

$$= -\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\left(a+b\log\left(cx^n\right)\right)}{\sqrt{d-ex}\,\sqrt{d+ex}} + \frac{\left(bn\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{\sqrt{d-}}$$

$$= -\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\left(a+b\log\left(cx^n\right)\right)}{\sqrt{d-ex}\,\sqrt{d+ex}} + \frac{\left(bn\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{}$$

$$= -\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\left(a+b\log\left(cx^n\right)\right)}{\sqrt{d-ex}\,\sqrt{d+ex}} + \frac{\left(bn\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{}$$

$$= \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right.}{\sqrt{d-ex}\,\sqrt{d+e}}$$

$$= \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right.}{\sqrt{d-ex}\,\sqrt{d+e}}$$

$$= \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right.}{\sqrt{d-ex}\,\sqrt{d+e}}$$

$$= \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\,\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right.}{\sqrt{d-ex}\,\sqrt{d+e}}$$

Mathematica [A]

time = 1.18, size = 310, normalized size = 1.03

$$\frac{\log(x)\left(a-bn\log(x)+b\log\left(cx^{n}\right)\right)}{d}-\frac{\left(a-bn\log(x)+b\log\left(cx^{n}\right)\right)\log\left(d+\sqrt{d-ex}\,\sqrt{d+ex}\right)}{d}+\frac{bn\sqrt{-d^{2}+e^{2}x^{2}}\left(-\frac{4\tanh^{-1}\left(\frac{\sqrt{-d^{2}+e^{2}x^{2}}}{\sqrt{-d^{2}}}\right)\left(2\log(x)-\log\left(\frac{e^{2}x^{2}}{d^{2}}\right)\right)}{\sqrt{-d^{2}}}+\frac{\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}\left(\log^{2}\left(\frac{e^{2}x^{2}}{d^{2}}\right)-4\log\left(\frac{e^{2}x^{2}}{d^{2}}\right)\log\left(\frac{1}{2}\left(1+\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}\right)\right)+2\log^{2}\left(\frac{1}{2}\left(1+\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}\right)\right)-4\text{Li}_{2}\left(\frac{1}{2}-\frac{1}{2}\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}\right)\right)}{\sqrt{-d^{2}+e^{2}x^{2}}}\right)}{8\sqrt{d-ex}\,\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]))/d - ((a - b*n*Log[x] + b*Log[c*x^n
])*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/d + (b*n*Sqrt[-d^2 + e^2*x^2]*((-4
*ArcTanh[Sqrt[-d^2 + e^2*x^2]/Sqrt[-d^2]]*(2*Log[x] - Log[(e^2*x^2)/d^2]))/
Sqrt[-d^2] + (Sqrt[1 - (e^2*x^2)/d^2]*(Log[(e^2*x^2)/d^2]^2 - 4*Log[(e^2*x^
2)/d^2]*Log[(1 + Sqrt[1 - (e^2*x^2)/d^2])/2] + 2*Log[(1 + Sqrt[1 - (e^2*x^2
)/d^2])/2]^2 - 4*PolyLog[2, 1/2 - Sqrt[1 - (e^2*x^2)/d^2]/2]))/Sqrt[-d^2 +
e^2*x^2]))/(8*Sqrt[d - e*x]*Sqrt[d + e*x])
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="max
ima")
```

```
[Out] b*integrate((log(c) + log(x^n))/(sqrt(x*e + d)*sqrt(-x*e + d)*x), x) - a*lo
g(2*d^2/abs(x) + 2*sqrt(-x^2*e^2 + d^2)*d/abs(x))/d
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fri
cas")
```

```
[Out] integral(-(sqrt(x*e + d)*sqrt(-x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*sqrt(-
x*e + d)*a)/(x^3*e^2 - d^2*x), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(cx^{n} \right)}}{x\sqrt{d - ex}\,\sqrt{d + ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="gia
c")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*sqrt(-x*e + d)*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.312 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal. Leaf size=489

$$-\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right.}{4d^2\sqrt{d-ex}\sqrt{d+ex}}$$

```
[Out] -1/4*b*n*(-e^2*x^2+d^2)/d^2/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*(-e^2*x^2+
d^2)*(a+b*ln(c*x^n))/d^2/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*b*e^2*n*arcta
nh((1-e^2*x^2/d^2)^(1/2))*(1-e^2*x^2/d^2)^(1/2)/d^2/(-e*x+d)^(1/2)/(e*x+d)^
(1/2)+1/4*b*e^2*n*arctanh((1-e^2*x^2/d^2)^(1/2))^2*(1-e^2*x^2/d^2)^(1/2)/d^
2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*e^2*arctanh((1-e^2*x^2/d^2)^(1/2))*(a+b*
ln(c*x^n))*(1-e^2*x^2/d^2)^(1/2)/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*b*e^2
*n*arctanh((1-e^2*x^2/d^2)^(1/2))*ln(2/(1-(1-e^2*x^2/d^2)^(1/2)))*(1-e^2*x^
2/d^2)^(1/2)/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/4*b*e^2*n*polylog(2,(-1-(1-
e^2*x^2/d^2)^(1/2))/(1-(1-e^2*x^2/d^2)^(1/2)))*(1-e^2*x^2/d^2)^(1/2)/d^2/(-
e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]

time = 0.49, antiderivative size = 489, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 11, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2387, 272, 44, 65, 214, 2392, 43, 6131, 6055, 2449, 2352}

$$-\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{PolyLog}\left(2,-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}+1}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{4d^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}}-\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{2d^2\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] -1/4*(b*n*(d^2 - e^2*x^2))/(d^2*x^2*Sqrt[d - e*x]*Sqrt[d + e*x]) + (b*e^2*n
*Sqrt[1 - (e^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]])/(4*d^2*Sqrt[d -
e*x]*Sqrt[d + e*x]) + (b*e^2*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^
2*x^2)/d^2]]^2)/(4*d^2*Sqrt[d - e*x]*Sqrt[d + e*x]) - ((d^2 - e^2*x^2)*(a +
 b*Log[c*x^n]))/(2*d^2*x^2*Sqrt[d - e*x]*Sqrt[d + e*x]) - (e^2*Sqrt[1 - (e^
2*x^2)/d^2]*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]*(a + b*Log[c*x^n]))/(2*d^2*Sqr
t[d - e*x]*Sqrt[d + e*x]) - (b*e^2*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcTanh[Sqrt[1
 - (e^2*x^2)/d^2]]*Log[2/(1 - Sqrt[1 - (e^2*x^2)/d^2])])/(2*d^2*Sqrt[d - e*
x]*Sqrt[d + e*x]) - (b*e^2*n*Sqrt[1 - (e^2*x^2)/d^2]*PolyLog[2, -((1 + Sqrt
[1 - (e^2*x^2)/d^2])/(1 - Sqrt[1 - (e^2*x^2)/d^2]))])/(4*d^2*Sqrt[d - e*x]*
Sqrt[d + e*x])
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + 1))), x] - Dist[d*(n/(b*(m + 1))), I
nt[(a + b*x)^(m + 1)*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b, c, d, n}, x]
 && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !IntegerQ[n] && GtQ[n, 0]
```

Rule 44

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && ILtQ[m, -1] &&  !Int
egerQ[n] && LtQ[n, 0]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^3\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+}{2d^2\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+}{2d^2\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+}{2d^2\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}}{}$$

$$= -\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{4d^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(}{}$$

$$= -\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be}{}$$

$$= -\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be}{}$$

$$= -\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\tanh^{-1}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{be}{}$$

Mathematica [C] Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.
time = 0.59, size = 255, normalized size = 0.52

$$\frac{\frac{bn(-d^2+e^2x^2)\left(2d^3\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};\frac{d^2}{e^2x^2}\right)+9e^2x^2\left(d\sqrt{1-\frac{d^2}{e^2x^2}}-ex\sin^{-1}\left(\frac{d}{ex}\right)\right)(1+2\log(x))\right)}{e^2\sqrt{1-\frac{d^2}{e^2x^2}}\,x^4\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{18d\sqrt{d-ex}\,\sqrt{d+ex}\,(a-bn\log(x)+b\log(cx^n))}{x^2}+18e^2\log(x)\,(a-bn\log(x)+b\log(cx^n))-18e^2(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d-ex}\,\sqrt{d+ex}\right)}{36d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] ((b*n*(-d^2 + e^2*x^2)*(2*d^3*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/2, 5/2}
, d^2/(e^2*x^2)] + 9*e^2*x^2*(d*Sqrt[1 - d^2/(e^2*x^2)] - e*x*ArcSin[d/(e*x
)])*(1 + 2*Log[x])))/(e^2*Sqrt[1 - d^2/(e^2*x^2)]*x^4*Sqrt[d - e*x]*Sqrt[d
+ e*x]) - (18*d*Sqrt[d - e*x]*Sqrt[d + e*x]*(a - b*n*Log[x] + b*Log[c*x^n])
)/x^2 + 18*e^2*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) - 18*e^2*(a - b*n*Log
[x] + b*Log[c*x^n])*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/(36*d^3)
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="m
axima")
```

```
[Out] -1/2*a*(e^2*log(2*d^2/abs(x) + 2*sqrt(-x^2*e^2 + d^2)*d/abs(x))/d^3 + sqrt(
-x^2*e^2 + d^2)/(d^2*x^2)) + b*integrate((log(c) + log(x^n))/(sqrt(x*e + d)
*sqrt(-x*e + d)*x^3), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="f
ricas")
```

```
[Out] integral(-(sqrt(x*e + d)*sqrt(-x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*sqrt(-
x*e + d)*a)/(x^5*e^2 - d^2*x^3), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="g
iac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*sqrt(-x*e + d)*x^3), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.313 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal. Leaf size=406

$$\frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}}+\frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)^2}{4e^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}}{2e^3\sqrt{d-}}$$

```
[Out] 1/4*b*n*x*(-e^2*x^2+d^2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*x*(-e^2*x^2+d
^2)*(a+b*ln(c*x^n))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*b*d^3*n*arcsin(e*x
/d)*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*I*b*d^3*n*ar
csin(e*x/d)^2*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*b*
d^3*n*arcsin(e*x/d)*ln(1-(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^2/d^2)
^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/2*d^3*arcsin(e*x/d)*(a+b*ln(c*x^n
))*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*I*b*d^3*n*pol
ylog(2,(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d
)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]

time = 0.40, antiderivative size = 406, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 12, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$, Rules used = {2387, 327, 222, 2392, 12, 14, 201, 4721, 3798, 2221, 2317, 2438}

$$\frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{PolyLog}\left(2,e^{2i\text{ArcSin}\left(\frac{ex}{d}\right)}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}}+\frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}}+\frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)^2}{4e^3\sqrt{d-ex}\sqrt{d+ex}}+\frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)\log\left(1-e^{2i\text{ArcSin}\left(\frac{ex}{d}\right)}\right)}{2e^3\sqrt{d-ex}\sqrt{d+ex}}+\frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (b*n*x*(d^2 - e^2*x^2))/(4*e^2*Sqrt[d - e*x]*Sqrt[d + e*x]) + (b*d^3*n*Sqrt
[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d])/(4*e^3*Sqrt[d - e*x]*Sqrt[d + e*x]) +
((I/4)*b*d^3*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d]^2)/(e^3*Sqrt[d - e*x
]*Sqrt[d + e*x]) - (b*d^3*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d]*Log[1 -
 E^((2*I)*ArcSin[(e*x)/d])])/(2*e^3*Sqrt[d - e*x]*Sqrt[d + e*x]) - (x*(d^2
- e^2*x^2)*(a + b*Log[c*x^n]))/(2*e^2*Sqrt[d - e*x]*Sqrt[d + e*x]) + (d^3*S
qrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d]*(a + b*Log[c*x^n]))/(2*e^3*Sqrt[d -
e*x]*Sqrt[d + e*x]) + ((I/4)*b*d^3*n*Sqrt[1 - (e^2*x^2)/d^2]*PolyLog[2, E^(
(2*I)*ArcSin[(e*x)/d])])/(e^3*Sqrt[d - e*x]*Sqrt[d + e*x])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 201

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*((a + b*x^n)^p/(n*p
+ 1)), x] + Dist[a*n*(p/(n*p + 1)), Int[(a + b*x^n)^(p - 1), x], x] /; Free
Q[{a, b}, x] && IGtQ[n, 0] && GtQ[p, 0] && (IntegerQ[2*p] || (EqQ[n, 2] &&
IntegerQ[4*p]) || (EqQ[n, 2] && IntegerQ[3*p]) || LtQ[Denominator[p + 1/n],
 Denominator[p]])
```

Rule 222

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

Rule 327

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^(n
 - 1)*(c*x)^(m - n + 1)*((a + b*x^n)^(p + 1)/(b*(m + n*p + 1))), x] - Dist[
a*c^n*((m - n + 1)/(b*(m + n*p + 1))), Int[(c*x)^(m - n)*(a + b*x^n)^p, x],
 x] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && GtQ[m, n - 1] && NeQ[m + n*p
 + 1, 0] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3798

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[I*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Dist[2*I, Int[(c + d*x)^m
*E^(2*I*k*Pi)*(E^(2*I*(e + f*x))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x)))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 4721

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n*Cot[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}} -$$

$$= -\frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}} -$$

$$= -\frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}} -$$

$$= -\frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}} -$$

$$= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}}{2e^3\sqrt{d-e}}$$

$$= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}} + \frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-}}{4e^3\sqrt{d-ex}\sqrt{d+}}$$

$$= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}} + \frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-}}{4e^3\sqrt{d-ex}\sqrt{d+}}$$

$$= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}} + \frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-}}{4e^3\sqrt{d-ex}\sqrt{d+}}$$

$$= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}} + \frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-}}{4e^3\sqrt{d-ex}\sqrt{d+}}$$

Mathematica [A]
time = 1.89, size = 316, normalized size = 0.78

$$\frac{-2ex\sqrt{d-ex}\,\sqrt{d+ex}\,(a-bn\log(x)+b\log(cx^n))+2d^2\tan^{-1}\left(\frac{ex}{\sqrt{d-ex}\,\sqrt{d+ex}}\right)(a-bn\log(x)+b\log(cx^n))+\frac{bn\left(d^3\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)+ex(-d^2+e^2x^2)(-1+2\log(x))+\frac{e^3\sqrt{1-\frac{e^2x^2}{d^2}}\left(\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)^2+2\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)\log\left(1-e^{-2\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)}\right)-2\log(x)\log\left(\sqrt{-\frac{e^2}{d^2}}\,x+\sqrt{1-\frac{e^2x^2}{d^2}}\right)-\mathrm{Li}_2\left(e^{-2\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)}\right)\right)}{\left(-\frac{e^2}{d^2}\right)^{3/2}}\right)}{\sqrt{d-ex}\,\sqrt{d+ex}}}{4e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (-2*e*x*Sqrt[d - e*x]*Sqrt[d + e*x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 2*d^2
*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])]*(a - b*n*Log[x] + b*Log[c*x^n]
) + (b*n*(d^3*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d] + e*x*(-d^2 + e^2*x^2
)*(-1 + 2*Log[x]) + (e^3*Sqrt[1 - (e^2*x^2)/d^2]*(ArcSinh[Sqrt[-(e^2/d^2)]*
x]^2 + 2*ArcSinh[Sqrt[-(e^2/d^2)]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]
*x])] - 2*Log[x]*Log[Sqrt[-(e^2/d^2)]*x + Sqrt[1 - (e^2*x^2)/d^2]] - PolyLo
g[2, E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]*x])]))/(-(e^2/d^2))^(3/2)))/(Sqrt[d - e
*x]*Sqrt[d + e*x]))/(4*e^3)
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="m
axima")
```

```
[Out] 1/2*(d^2*arcsin(x*e/d)*e^(-3) - sqrt(-x^2*e^2 + d^2)*x*e^(-2))*a + b*integr
ate((x^2*log(c) + x^2*log(x^n))/(sqrt(x*e + d)*sqrt(-x*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="f
ricas")
```

```
[Out] integral(-(sqrt(x*e + d)*sqrt(-x*e + d)*b*x^2*log(c*x^n) + sqrt(x*e + d)*sq
rt(-x*e + d)*a*x^2)/(x^2*e^2 - d^2), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="g
iac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(sqrt(x*e + d)*sqrt(-x*e + d)), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.314 $\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal. Leaf size=248

$$\frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}}-\frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)\log\left(1-e^{2i\sin^{-1}\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}}+\frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a-}{e\sqrt{d-ex}\sqrt{d+e}}$$

```
[Out] 1/2*I*b*d*n*arcsin(e*x/d)^2*(1-e^2*x^2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/(e*x+d)^
(1/2)-b*d*n*arcsin(e*x/d)*ln(1-(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^
2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+d*arcsin(e*x/d)*(a+b*ln(c*x^n))
*(1-e^2*x^2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/2*I*b*d*n*polylog(2
,(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/
(e*x+d)^(1/2)
```

Rubi [A]
time = 0.15, antiderivative size = 248, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.233$, Rules used = {2365, 2363, 4721, 3798, 2221, 2317, 2438}

$$\frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{PolyLog}\left(2,e^{2i\text{ArcSin}\left(\frac{ex}{d}\right)}\right)}{2e\sqrt{d-ex}\sqrt{d+ex}}+\frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e\sqrt{d-ex}\sqrt{d+ex}}+\frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}}-\frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)\log\left(1-e^{2i\text{ArcSin}\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] ((I/2)*b*d*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d]^2)/(e*Sqrt[d - e*x]*Sq
rt[d + e*x]) - (b*d*n*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d]*Log[1 - E^((2
*I)*ArcSin[(e*x)/d])])/(e*Sqrt[d - e*x]*Sqrt[d + e*x]) + (d*Sqrt[1 - (e^2*x
^2)/d^2]*ArcSin[(e*x)/d]*(a + b*Log[c*x^n]))/(e*Sqrt[d - e*x]*Sqrt[d + e*x]
) + ((I/2)*b*d*n*Sqrt[1 - (e^2*x^2)/d^2]*PolyLog[2, E^((2*I)*ArcSin[(e*x)/d
])])/(e*Sqrt[d - e*x]*Sqrt[d + e*x])
```

Rule 2221

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Di
st[d*(m/(b*f*g*n*Log[F])), Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x)
))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2317

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
```

```
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2363

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSin[Rt[-e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[-e, 2]), x
] - Dist[b*(n/Rt[-e, 2]), Int[ArcSin[Rt[-e, 2]*(x/Sqrt[d])]/x, x], x] /; Fr
eeQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && NegQ[e]
```

Rule 2365

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(Sqrt[(d1_) + (e1_.)*(x_)]*Sqrt[(
d2_) + (e2_.)*(x_)]), x_Symbol] :> Dist[Sqrt[1 + e1*(e2/(d1*d2))*x^2]/(Sqrt
[d1 + e1*x]*Sqrt[d2 + e2*x]), Int[(a + b*Log[c*x^n])/Sqrt[1 + e1*(e2/(d1*d2
))*x^2], x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*e1 + d1
*e2, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 3798

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[I*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Dist[2*I, Int[(c + d*x)^m
*E^(2*I*k*Pi)*(E^(2*I*(e + f*x))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x)))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 4721

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n*Cot[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bdn\sqrt{1-\frac{e^2x^2}{d^2}}\right)\int \frac{\sin^{-1}\left(\frac{ex}{d}\right)}{x}\,dx}{e\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bdn\sqrt{1-\frac{e^2x^2}{d^2}}\right)\text{Subst}\left(\int x\cot(x\right.}{e\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}} + \frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e\sqrt{d-ex}\sqrt{d+ex}} + \frac{\left(2ib\right.}{}$$

$$= \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}} - \frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)\log\left(1-e^{2i\sin^{-1}\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}} - \frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)\log\left(1-e^{2i\sin^{-1}\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}}$$

$$= \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}} - \frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)\log\left(1-e^{2i\sin^{-1}\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}}$$

Mathematica [A]
time = 0.35, size = 217, normalized size = 0.88

$$\frac{\tan^{-1}\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)(a-bn\log(x)+b\log(cx^n))}{e} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\left(\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)^2+2\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)\log\left(1-e^{-2\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)}\right)-2\log(x)\log\left(\sqrt{-\frac{e^2}{d^2}}\,x+\sqrt{1-\frac{e^2x^2}{d^2}}\right)-\text{Li}_2\left(e^{-2\sinh^{-1}\left(\sqrt{-\frac{e^2}{d^2}}\,x\right)}\right)\right)}{2\sqrt{-\frac{e^2}{d^2}}\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])]*(a - b*n*Log[x] + b*Log[c*x^n]
))/e - (b*n*Sqrt[1 - (e^2*x^2)/d^2]*(ArcSinh[Sqrt[-(e^2/d^2)]*x]^2 + 2*ArcS
inh[Sqrt[-(e^2/d^2)]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]*x])] - 2*Log
[x]*Log[Sqrt[-(e^2/d^2)]*x + Sqrt[1 - (e^2*x^2)/d^2]] - PolyLog[2, E^(-2*Ar
```

```
cSinh[Sqrt[-(e^2/d^2)]*x])]))/(2*Sqrt[-(e^2/d^2)]*Sqrt[d - e*x]*Sqrt[d + e*
x])
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a + b\ln\left(c\,x^{n}\right)}{\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="maxim
a")
```

```
[Out] a*arcsin(x*e/d)*e^(-1) + b*integrate((log(c) + log(x^n))/(sqrt(x*e + d)*sqr
t(-x*e + d)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="frica
s")
```

```
[Out] integral(-(sqrt(x*e + d)*sqrt(-x*e + d)*b*log(c*x^n) + sqrt(x*e + d)*sqrt(-
x*e + d)*a)/(x^2*e^2 - d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="giac"
)
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*sqrt(-x*e + d)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.315 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$

Optimal. Leaf size=142

$$-\frac{bn(d^2-e^2x^2)}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{ben\sqrt{1-\frac{e^2x^2}{d^2}}\,\sin^{-1}\left(\frac{ex}{d}\right)}{d\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{(d^2-e^2x^2)\left(a+b\log\left(cx^n\right)\right)}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}}$$

```
[Out] -b*n*(-e^2*x^2+d^2)/d^2/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-(-e^2*x^2+d^2)*(a+b*
ln(c*x^n))/d^2/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*e*n*arcsin(e*x/d)*(1-e^2*x^
2/d^2)^(1/2)/d/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]
time = 0.26, antiderivative size = 142, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.121$, Rules used = {2387, 2373, 283, 222}

$$-\frac{(d^2-e^2x^2)\left(a+b\log\left(cx^n\right)\right)}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{ben\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)}{d\sqrt{d-ex}\,\sqrt{d+ex}}-\frac{bn(d^2-e^2x^2)}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] -((b*n*(d^2 - e^2*x^2))/(d^2*x*Sqrt[d - e*x]*Sqrt[d + e*x])) - (b*e*n*Sqrt[
1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d])/(d*Sqrt[d - e*x]*Sqrt[d + e*x]) - ((d^2
 - e^2*x^2)*(a + b*Log[c*x^n]))/(d^2*x*Sqrt[d - e*x]*Sqrt[d + e*x])
```

Rule 222

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
```

```
b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\,\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\,\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}} + \frac{\left(bn\sqrt{1-\frac{e^2x^2}{d^2}}\right)\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}\,dx}{\sqrt{d-ex}\,\sqrt{d+ex}}$$

$$= -\frac{bn(d^2-e^2x^2)}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{\left(be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\right.}{d^2\sqrt{d-e}}$$

$$= -\frac{bn(d^2-e^2x^2)}{d^2x\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{ben\sqrt{1-\frac{e^2x^2}{d^2}}\,\sin^{-1}\left(\frac{ex}{d}\right)}{d\sqrt{d-ex}\,\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log}{d^2x\sqrt{d-ex}\,\sqrt{d+}}$$

Mathematica [A]
time = 0.12, size = 70, normalized size = 0.49

$$-\frac{benx\tan^{-1}\left(\frac{ex}{\sqrt{d-ex}\,\sqrt{d+ex}}\right)+\sqrt{d-ex}\,\sqrt{d+ex}\,(a+bn+b\log(cx^n))}{d^2x}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] -((b*e*n*x*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])] + Sqrt[d - e*x]*Sqrt
[d + e*x]*(a + b*n + b*Log[c*x^n]))/(d^2*x))
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [A]
time = 0.51, size = 87, normalized size = 0.61

$$-\frac{\left(\arcsin\left(\frac{xe}{d}\right)e+\frac{\sqrt{-x^{2}e^{2}+d^{2}}}{x}\right)bn}{d^{2}}-\frac{\sqrt{-x^{2}e^{2}+d^{2}}\,b\log\left(cx^{n}\right)}{d^{2}x}-\frac{\sqrt{-x^{2}e^{2}+d^{2}}\,a}{d^{2}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="m
axima")
```

```
[Out] -(arcsin(x*e/d)*e + sqrt(-x^2*e^2 + d^2)/x)*b*n/d^2 - sqrt(-x^2*e^2 + d^2)*
b*log(c*x^n)/(d^2*x) - sqrt(-x^2*e^2 + d^2)*a/(d^2*x)
```

Fricas [A]
time = 0.35, size = 77, normalized size = 0.54

$$\frac{2\,bnx\arctan\left(\frac{\left(\sqrt{xe+d}\,\sqrt{-xe+d}-d\right)e^{(-1)}}{x}\right)e-\left(bn\log\left(x\right)+bn+b\log\left(c\right)+a\right)\sqrt{xe+d}\,\sqrt{-xe+d}}{d^{2}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="f
ricas")
```

```
[Out] (2*b*n*x*arctan((sqrt(x*e + d)*sqrt(-x*e + d) - d)*e^(-1)/x)*e - (b*n*log(x
) + b*n + b*log(c) + a)*sqrt(x*e + d)*sqrt(-x*e + d))/(d^2*x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="g
iac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*sqrt(-x*e + d)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.316 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$

Optimal. Leaf size=252

$$-\frac{2be^2n(d^2-e^2x^2)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}}-\frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{2be^3n\sqrt{1-\frac{e^2x^2}{d^2}}\sin^{-1}\left(\frac{ex}{d}\right)}{3d^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{(d^2-e^2x^2)\left(a+b\log\right.}{3d^2x^3\sqrt{d-ex}\sqrt{d+}}$$

```
[Out] -2/3*b*e^2*n*(-e^2*x^2+d^2)/d^4/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/9*b*n*(-e^
2*x^2+d^2)^2/d^4/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/3*(-e^2*x^2+d^2)*(a+b*l
n(c*x^n))/d^2/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*e^2*(-e^2*x^2+d^2)*(a+b*
ln(c*x^n))/d^4/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*b*e^3*n*arcsin(e*x/d)*(1-
e^2*x^2/d^2)^(1/2)/d^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

Rubi [A]
time = 0.31, antiderivative size = 252, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 8, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.242$, Rules used = {2387, 277, 270, 2392, 12, 462, 283, 222}

$$-\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{3d^2x^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{2e^2(d^2-e^2x^2)(a+b\log(cx^n))}{3d^4x\sqrt{d-ex}\sqrt{d+ex}}-\frac{2be^3n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcSin}\left(\frac{ex}{d}\right)}{3d^3\sqrt{d-ex}\sqrt{d+ex}}-\frac{2be^2n(d^2-e^2x^2)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}}-\frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x^4*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

```
[Out] (-2*b*e^2*n*(d^2 - e^2*x^2))/(3*d^4*x*Sqrt[d - e*x]*Sqrt[d + e*x]) - (b*n*(
d^2 - e^2*x^2)^2)/(9*d^4*x^3*Sqrt[d - e*x]*Sqrt[d + e*x]) - (2*b*e^3*n*Sqrt
[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d])/(3*d^3*Sqrt[d - e*x]*Sqrt[d + e*x]) -
((d^2 - e^2*x^2)*(a + b*Log[c*x^n]))/(3*d^2*x^3*Sqrt[d - e*x]*Sqrt[d + e*x]
) - (2*e^2*(d^2 - e^2*x^2)*(a + b*Log[c*x^n]))/(3*d^4*x*Sqrt[d - e*x]*Sqrt[
d + e*x])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 222

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

Rule 270

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*c*(m + 1))), x] /; FreeQ[{a, b, c, m, n,
```

```
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 277

```
Int[(x_)^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x^(m + 1)*((
a + b*x^n)^(p + 1)/(a*(m + 1))), x] - Dist[b*((m + n*(p + 1) + 1)/(a*(m + 1
))), Int[x^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, m, n, p}, x] && IL
tQ[Simplify[(m + 1)/n + p + 1], 0] && NeQ[m, -1]
```

Rule 283

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(c*
x)^(m + 1)*((a + b*x^n)^p/(c*(m + 1))), x] - Dist[b*n*(p/(c^n*(m + 1))), In
t[(c*x)^(m + n)*(a + b*x^n)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && IGtQ[
n, 0] && GtQ[p, 0] && LtQ[m, -1] &&  !ILtQ[(m + n*p + n + 1)/n, 0] && IntBi
nomialQ[a, b, c, n, m, p, x]
```

Rule 462

```
Int[((e_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.)*((c_) + (d_.)*(x_)^(n
_)), x_Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^n)^(p + 1)/(a*e*(m + 1))),
 x] + Dist[d/e^n, Int[(e*x)^(m + n)*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c
, d, e, m, n, p}, x] && NeQ[b*c - a*d, 0] && EqQ[m + n*(p + 1) + 1, 0] && (
IntegerQ[n] || GtQ[e, 0]) && ((GtQ[n, 0] && LtQ[m, -1]) || (LtQ[n, 0] && Gt
Q[m + n, -1]))
```

Rule 2387

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Dist[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q), Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a +
 b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*
e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^4\sqrt{1-\frac{e^2x^2}{d^2}}}\,dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{3d^2x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2e^2(d^2-e^2x^2)(a+b\log(cx^n))}{3d^4x\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bn\sqrt{1\right.}{}$$

$$= -\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{3d^2x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2e^2(d^2-e^2x^2)(a+b\log(cx^n))}{3d^4x\sqrt{d-ex}\sqrt{d+ex}} - \frac{\left(bn\sqrt{1\right.}{}$$

$$= -\frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{3d^2x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2e^2(d^2-e^2x^2)}{3d^4x\sqrt{d-}}$$

$$= -\frac{2be^2n(d^2-e^2x^2)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\,\mathrm{l}}{3d^2x^3\sqrt{d-ex}\sqrt{}}$$

$$= -\frac{2be^2n(d^2-e^2x^2)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2be^3n\sqrt{1-\frac{e^2x^2}{d^2}}\;\mathrm{s}}{3d^3\sqrt{d-ex}\sqrt{d}}$$

Mathematica [A]
time = 0.18, size = 116, normalized size = 0.46

$$-\frac{6be^3nx^3\tan^{-1}\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)+\sqrt{d-ex}\sqrt{d+ex}\,(3a(d^2+2e^2x^2)+bn(d^2+5e^2x^2)+3b(d^2+2e^2x^2)\log(cx^n))}{9d^4x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^4*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
[Out] -1/9*(6*b*e^3*n*x^3*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])] + Sqrt[d -
e*x]*Sqrt[d + e*x]*(3*a*(d^2 + 2*e^2*x^2) + b*n*(d^2 + 5*e^2*x^2) + 3*b*(d^
2 + 2*e^2*x^2)*Log[c*x^n]))/(d^4*x^3)
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^4\sqrt{-ex+d}\,\sqrt{ex+d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="m
axima")
```

```
[Out] -1/3*a*(2*sqrt(-x^2*e^2 + d^2)*e^2/(d^4*x) + sqrt(-x^2*e^2 + d^2)/(d^2*x^3)
) + b*integrate((log(c) + log(x^n))/(sqrt(x*e + d)*sqrt(-x*e + d)*x^4), x)
```

Fricas [A]
time = 0.38, size = 131, normalized size = 0.52

$$\frac{12\,bnx^3\arctan\left(\frac{\left(\sqrt{xe+d}\,\sqrt{-xe+d}-d\right)e^{(-1)}}{x}\right)e^3-(bd^2n+(5\,bn+6\,a)x^2e^2+3\,ad^2+3\,(2\,bx^2e^2+bd^2)\log(c)+3\,(2\,bnx^2e^2+bd^2n)\log(x))\sqrt{xe+d}\,\sqrt{-xe+d}}{9\,d^4x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="f
ricas")
```

```
[Out] 1/9*(12*b*n*x^3*arctan((sqrt(x*e + d)*sqrt(-x*e + d) - d)*e^(-1)/x)*e^3 - (
b*d^2*n + (5*b*n + 6*a)*x^2*e^2 + 3*a*d^2 + 3*(2*b*x^2*e^2 + b*d^2)*log(c)
+ 3*(2*b*n*x^2*e^2 + b*d^2*n)*log(x))*sqrt(x*e + d)*sqrt(-x*e + d))/(d^4*x^
3)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\,\sqrt{d+ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**4/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**4*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="g
iac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x*e + d)*sqrt(-x*e + d)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^4*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^4*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.317 $\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx$

Optimal. Leaf size=34

$$-\sqrt{-1+x^2} + \tan^{-1}\left(\sqrt{-1+x^2}\right) + \sqrt{-1+x^2}\log(x)$$

```
[Out] arctan((x^2-1)^(1/2))-(x^2-1)^(1/2)+ln(x)*(x^2-1)^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 34, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used = {2376, 272, 52, 65, 209}

$$\text{ArcTan}\left(\sqrt{x^2-1}\right) - \sqrt{x^2-1} + \sqrt{x^2-1}\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[(x*Log[x])/Sqrt[-1 + x^2],x]
```

```
[Out] -Sqrt[-1 + x^2] + ArcTan[Sqrt[-1 + x^2]] + Sqrt[-1 + x^2]*Log[x]
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 209

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[b, 2]))*A
rcTan[Rt[b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (GtQ[a
, 0] || GtQ[b, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx &= \sqrt{-1+x^2}\,\log(x)-\int \frac{\sqrt{-1+x^2}}{x}\,dx\\
&= \sqrt{-1+x^2}\,\log(x)-\frac{1}{2}\text{Subst}\left(\int \frac{\sqrt{-1+x}}{x}\,dx,x,x^2\right)\\
&= -\sqrt{-1+x^2}+\sqrt{-1+x^2}\,\log(x)+\frac{1}{2}\text{Subst}\left(\int \frac{1}{\sqrt{-1+x}\,x}\,dx,x,x^2\right)\\
&= -\sqrt{-1+x^2}+\sqrt{-1+x^2}\,\log(x)+\text{Subst}\left(\int \frac{1}{1+x^2}\,dx,x,\sqrt{-1+x^2}\right)\\
&= -\sqrt{-1+x^2}+\tan^{-1}\left(\sqrt{-1+x^2}\right)+\sqrt{-1+x^2}\,\log(x)
\end{aligned}
$$

Mathematica [**A**]
time = 0.02, size = 27, normalized size = 0.79

$$-\tan^{-1}\left(\frac{1}{\sqrt{-1+x^2}}\right)+\sqrt{-1+x^2}\,(-1+\log(x))$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*Log[x])/Sqrt[-1 + x^2],x]
[Out] -ArcTan[1/Sqrt[-1 + x^2]] + Sqrt[-1 + x^2]*(-1 + Log[x])
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 119, normalized size = 3.50

method	result

meijerg	$-\frac{\sqrt{-\mathrm{signum}\left(x^2-1\right)}\left(2-2\sqrt{-x^2+1}\right)}{4\sqrt{\mathrm{signum}\left(x^2-1\right)}}+\frac{\sqrt{-\mathrm{signum}\left(x^2-1\right)}\ln(x)\left(2-2\sqrt{-x^2+1}\right)}{2\sqrt{\mathrm{signum}\left(x^2-1\right)}}+\frac{\sqrt{-\mathrm{sign}}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(x)/(x^2-1)^(1/2),x,method=_RETURNVERBOSE)
```

```
[Out] -1/4/signum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*(2-2*(-x^2+1)^(1/2))+1/2/si
gnum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*ln(x)*(2-2*(-x^2+1)^(1/2))+1/32/si
gnum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*(-16+16*(-x^2+1)^(1/2)-32*ln(1/2+1
/2*(-x^2+1)^(1/2)))
```

Maxima [A]
time = 0.48, size = 27, normalized size = 0.79

$$\sqrt{x^2-1}\log\left(x\right)-\sqrt{x^2-1}-\arcsin\left(\frac{1}{|x|}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="maxima")
```

```
[Out] sqrt(x^2 - 1)*log(x) - sqrt(x^2 - 1) - arcsin(1/abs(x))
```

Fricas [A]
time = 0.37, size = 27, normalized size = 0.79

$$\sqrt{x^2-1}\left(\log\left(x\right)-1\right)+2\arctan\left(-x+\sqrt{x^2-1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="fricas")
```

```
[Out] sqrt(x^2 - 1)*(log(x) - 1) + 2*arctan(-x + sqrt(x^2 - 1))
```

Sympy [A]
time = 1.55, size = 29, normalized size = 0.85

$$\sqrt{x^2-1}\log\left(x\right)-\begin{cases}\sqrt{x^2-1}-\operatorname{acos}\left(\frac{1}{x}\right) & \text{for}\ x>-1\wedge x<1\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(x)/(x**2-1)**(1/2),x)
```

```
[Out] sqrt(x**2 - 1)*log(x) - Piecewise((sqrt(x**2 - 1) - acos(1/x), (x > -1) & (
x < 1)))
```

Giac [A]
time = 1.76, size = 28, normalized size = 0.82

$$\sqrt{x^2-1}\,\log\left(x\right)-\sqrt{x^2-1}+\arctan\left(\sqrt{x^2-1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="giac")
[Out] sqrt(x^2 - 1)*log(x) - sqrt(x^2 - 1) + arctan(sqrt(x^2 - 1))
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int\frac{x\,\ln\left(x\right)}{\sqrt{x^2-1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*log(x))/(x^2 - 1)^(1/2),x)
[Out] int((x*log(x))/(x^2 - 1)^(1/2), x)
```

3.318 $\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=211

$$-\frac{bd^3n(fx)^{1+m}}{f(1+m)^2}-\frac{3bd^2en(fx)^{3+m}}{f^3(3+m)^2}-\frac{3bde^2n(fx)^{5+m}}{f^5(5+m)^2}-\frac{be^3n(fx)^{7+m}}{f^7(7+m)^2}+\frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{3d^2e(fx)^{3+}}{f^3}$$

```
[Out] -b*d^3*n*(f*x)^(1+m)/f/(1+m)^2-3*b*d^2*e*n*(f*x)^(3+m)/f^3/(3+m)^2-3*b*d*e^
2*n*(f*x)^(5+m)/f^5/(5+m)^2-b*e^3*n*(f*x)^(7+m)/f^7/(7+m)^2+d^3*(f*x)^(1+m)
*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+3*d*
e^2*(f*x)^(5+m)*(a+b*ln(c*x^n))/f^5/(5+m)+e^3*(f*x)^(7+m)*(a+b*ln(c*x^n))/f
^7/(7+m)
```

Rubi [A]

time = 1.06, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {276, 2392, 14}

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log(cx^n))}{f^7(m+7)}-\frac{bd^3n(fx)^{m+1}}{f(m+1)^2}-\frac{3bd^2en(fx)^{m+3}}{f^3(m+3)^2}-\frac{3bde^2n(fx)^{m+5}}{f^5(m+5)^2}-\frac{be^3n(fx)^{m+7}}{f^7(m+7)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d^3*n*(f*x)^(1 + m))/(f*(1 + m)^2)) - (3*b*d^2*e*n*(f*x)^(3 + m))/(f^3
*(3 + m)^2) - (3*b*d*e^2*n*(f*x)^(5 + m))/(f^5*(5 + m)^2) - (b*e^3*n*(f*x)^
(7 + m))/(f^7*(7 + m)^2) + (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m
)) + (3*d^2*e*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m)) + (3*d*e^2*(f
*x)^(5 + m)*(a + b*Log[c*x^n]))/(f^5*(5 + m)) + (e^3*(f*x)^(7 + m)*(a + b*L
og[c*x^n]))/(f^7*(7 + m))
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
```

```
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{3d^2e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} + \ldots$$
$$= \frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{3d^2e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} + \ldots$$
$$= -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} - \frac{3bd^2en(fx)^{3+m}}{f^3(3+m)^2} - \frac{3bde^2n(fx)^{5+m}}{f^5(5+m)^2} - \frac{be^3n(fx)\ldots}{f^7(7+\ldots}$$

Mathematica [A]
time = 0.39, size = 235, normalized size = 1.11

$$(fx)^m\left(bnx\left(\frac{d^3}{1+m}+\frac{3d^2ex^2}{3+m}+\frac{3de^2x^4}{5+m}+\frac{e^3x^6}{7+m}\right)\log(x)+\frac{d^3x(a+am-bn-b(1+m)n\log(x)+b(1+m)\log(cx^n))}{(1+m)^2}+\frac{3d^2ex^3(3a+am-bn-b(3+m)n\log(x)+b(3+m)\log(cx^n))}{(3+m)^2}+\frac{3de^2x^5(5a+am-bn-b(5+m)n\log(x)+b(5+m)\log(cx^n))}{(5+m)^2}+\frac{e^3x^7(7a+am-bn-b(7+m)n\log(x)+b(7+m)\log(cx^n))}{(7+m)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (f*x)^m*(b*n*x*(d^3/(1 + m) + (3*d^2*e*x^2)/(3 + m) + (3*d*e^2*x^4)/(5 + m)
 + (e^3*x^6)/(7 + m))*Log[x] + (d^3*x*(a + a*m - b*n - b*(1 + m)*n*Log[x] +
 b*(1 + m)*Log[c*x^n]))/(1 + m)^2 + (3*d^2*e*x^3*(3*a + a*m - b*n - b*(3 +
m)*n*Log[x] + b*(3 + m)*Log[c*x^n]))/(3 + m)^2 + (3*d*e^2*x^5*(5*a + a*m -
b*n - b*(5 + m)*n*Log[x] + b*(5 + m)*Log[c*x^n]))/(5 + m)^2 + (e^3*x^7*(7*a
 + a*m - b*n - b*(7 + m)*n*Log[x] + b*(7 + m)*Log[c*x^n]))/(7 + m)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.45, size = 5139, normalized size = 24.36

method	result	size
risch	Expression too large to display	5139

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [A]
time = 0.30, size = 286, normalized size = 1.36

$$\frac{bf^mx^7e^{(m\log(x)+3)}\log(cx^n)}{m+7}+\frac{af^mx^7e^{(m\log(x)+3)}}{m+7}-\frac{bf^mnx^7e^{(m\log(x)+3)}}{(m+7)^2}+\frac{3\,bdf^mx^5e^{(m\log(x)+2)}\log(cx^n)}{m+5}+\frac{3\,adf^mx^5e^{(m\log(x)+2)}}{m+5}-\frac{3\,bdf^mnx^5e^{(m\log(x)+2)}}{(m+5)^2}+\frac{3\,bd^2f^mx^3e^{(m\log(x)+1)}\log(cx^n)}{m+3}+\frac{3\,ad^2f^mx^3e^{(m\log(x)+1)}}{m+3}-\frac{3\,bd^2f^mnx^3e^{(m\log(x)+1)}}{(m+3)^2}-\frac{bd^3f^mnxx^m}{(m+1)^2}+\frac{(fx)^{m+1}bd^3\log(cx^n)}{f(m+1)}+\frac{(fx)^{m+1}ad^3}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")

[Out] b*f^m*x^7*e^(m*log(x) + 3)*log(c*x^n)/(m + 7) + a*f^m*x^7*e^(m*log(x) + 3)/(m + 7) - b*f^m*n*x^7*e^(m*log(x) + 3)/(m + 7)^2 + 3*b*d*f^m*x^5*e^(m*log(x) + 2)*log(c*x^n)/(m + 5) + 3*a*d*f^m*x^5*e^(m*log(x) + 2)/(m + 5) - 3*b*d*f^m*n*x^5*e^(m*log(x) + 2)/(m + 5)^2 + 3*b*d^2*f^m*x^3*e^(m*log(x) + 1)*log(c*x^n)/(m + 3) + 3*a*d^2*f^m*x^3*e^(m*log(x) + 1)/(m + 3) - 3*b*d^2*f^m*n*x^3*e^(m*log(x) + 1)/(m + 3)^2 - b*d^3*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d^3*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 1023 vs. $2(209) = 418$.
time = 0.37, size = 1023, normalized size = 4.85

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")

[Out] ((a*m^7 + 25*a*m^6 + 253*a*m^5 + 1333*a*m^4 + 3907*a*m^3 + 6283*a*m^2 + 5055*a*m - (b*m^6 + 18*b*m^5 + 127*b*m^4 + 444*b*m^3 + 799*b*m^2 + 690*b*m + 225*b)*n + 1575*a)*x^7*e^3 + 3*(a*d*m^7 + 27*a*d*m^6 + 293*a*d*m^5 + 1639*a*d*m^4 + 5043*a*d*m^3 + 8417*a*d*m^2 + 6951*a*d*m + 2205*a*d - (b*d*m^6 + 22*b*d*m^5 + 183*b*d*m^4 + 724*b*d*m^3 + 1423*b*d*m^2 + 1302*b*d*m + 441*b*d)*n)*x^5*e^2 + 3*(a*d^2*m^7 + 29*a*d^2*m^6 + 341*a*d^2*m^5 + 2081*a*d^2*m^4 + 6995*a*d^2*m^3 + 12647*a*d^2*m^2 + 11095*a*d^2*m + 3675*a*d^2 - (b*d^2*m^6 + 26*b*d^2*m^5 + 263*b*d^2*m^4 + 1292*b*d^2*m^3 + 3119*b*d^2*m^2 + 3290*b*d^2*m + 1225*b*d^2)*n)*x^3*e + (a*d^3*m^7 + 31*a*d^3*m^6 + 397*a*d^3*m^5 + 2707*a*d^3*m^4 + 10531*a*d^3*m^3 + 23101*a*d^3*m^2 + 25935*a*d^3*m + 11025*a*d^3 - (b*d^3*m^6 + 30*b*d^3*m^5 + 367*b*d^3*m^4 + 2340*b*d^3*m^3 + 8191*b*d^3*m^2 + 14910*b*d^3*m + 11025*b*d^3)*n)*x + ((b*m^7 + 25*b*m^6 + 253*b*m^5 + 1333*b*m^4 + 3907*b*m^3 + 6283*b*m^2 + 5055*b*m + 1575*b)*x^7*e^3 + 3*(b*d*m^7 + 27*b*d*m^6 + 293*b*d*m^5 + 1639*b*d*m^4 + 5043*b*d*m^3 + 8417*b*d*m^2 + 6951*b*d*m + 2205*b*d)*x^5*e^2 + 3*(b*d^2*m^7 + 29*b*d^2*m^6 + 341*b*d^2*m^5 + 2081*b*d^2*m^4 + 6995*b*d^2*m^3 + 12647*b*d^2*m^2 + 11095*b*d^2*m + 3675*b*d^2)*x^3*e + (b*d^3*m^7 + 31*b*d^3*m^6 + 397*b*d^3*m^5 + 2707*b*d^3*m^4 + 10531*b*d^3*m^3 + 23101*b*d^3*m^2 + 25935*b*d^3*m + 11025*b*d^3)*x)*log(c) + ((b*m^7 + 25*b*m^6 + 253*b*m^5 + 1333*b*m^4 + 3907*b*m^3 + 6283*b*m^2 + 5055*b*m + 1575*b)*n*x^7*e^3 + 3*(b*d*m^7 + 27*b*d*m^6 + 293*b*d*m^5 + 1639*b*d*m^4 + 5043*b*d*m^3 + 8417*b*d*m^2 + 6951*b*d*m + 2205*b*d)*n*x^5*e^2 + 3*(b*d^2*m^7 + 29*b*d^2*m^6 + 341*b*d^2*m^5 + 2081*b*d^2*m^4 + 6995*b*d^2*m^3 + 12647*b*d^2*m^2 + 11095*b*d^2*m + 3675*b*d^2)*n*x^3*e + (b*d^3*m^7 + 31*b*d^3*m^6 + 397*b*d^3*m^5 + 2707*b*d^3*m^4 + 10531*b*d^3*m^3 + 23101*b*d^3*m^2 + 25935*b*d^3*m + 11025*b*d^3)*n*x)*log(x))*e^(m*log(f) +

```
 m*log(x))/(m^8 + 32*m^7 + 428*m^6 + 3104*m^5 + 13238*m^4 + 33632*m^3 + 490
36*m^2 + 36960*m + 11025)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 6217 vs. $2(206) = 412$.
time = 20.01, size = 6217, normalized size = 29.46

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((-a*d**3/(6*x**6) - 3*a*d**2*e/(4*x**4) - 3*a*d*e**2/(2*x**2) +
a*e**3*log(x) + b*d**3*(-n/(36*x**6) - log(c*x**n)/(6*x**6)) + 3*b*d**2*e*(
-n/(16*x**4) - log(c*x**n)/(4*x**4)) + 3*b*d*e**2*(-n/(4*x**2) - log(c*x**n
)/(2*x**2)) - b*e**3*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2
/(2*n), True)))/f**7, Eq(m, -7)), ((-a*d**3/(4*x**4) - 3*a*d**2*e/(2*x**2)
+ 3*a*d*e**2*log(c*x**n)/n + a*e**3*x**2/2 - b*d**3*n/(16*x**4) - b*d**3*lo
g(c*x**n)/(4*x**4) - 3*b*d**2*e*n/(4*x**2) - 3*b*d**2*e*log(c*x**n)/(2*x**2
) + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x
**n)/2)/f**5, Eq(m, -5)), ((-a*d**3/(2*x**2) + 3*a*d**2*e*log(c*x**n)/n + 3
*a*d*e**2*x**2/2 + a*e**3*x**4/4 - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(
2*x**2) + 3*b*d**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**
2*x**2*log(c*x**n)/2 - b*e**3*n*x**4/16 + b*e**3*x**4*log(c*x**n)/4)/f**3,
Eq(m, -3)), ((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**2/2 + 3*a*d*e**2*x**4/4
+ a*e**3*x**6/6 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x**2/4 + 3*b*d
**2*e*x**2*log(c*x**n)/2 - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**
n)/4 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6)/f, Eq(m, -1)), (a*d**3
*m**7*x*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 3363
2*m**3 + 49036*m**2 + 36960*m + 11025) + 31*a*d**3*m**6*x*(f*x)**m/(m**8 +
32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 369
60*m + 11025) + 397*a*d**3*m**5*x*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 310
4*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 2707*a*d
**3*m**4*x*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 3
3632*m**3 + 49036*m**2 + 36960*m + 11025) + 10531*a*d**3*m**3*x*(f*x)**m/(m
**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2
 + 36960*m + 11025) + 23101*a*d**3*m**2*x*(f*x)**m/(m**8 + 32*m**7 + 428*m*
*6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) +
25935*a*d**3*m*x*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m*
*4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 11025*a*d**3*x*(f*x)**m/(
m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**
2 + 36960*m + 11025) + 3*a*d**2*e*m**7*x**3*(f*x)**m/(m**8 + 32*m**7 + 428*
m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025)
+ 87*a*d**2*e*m**6*x**3*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 1
3238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 1023*a*d**2*e*m**5
```

```
*x**3*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*
m**3 + 49036*m**2 + 36960*m + 11025) + 6243*a*d**2*e*m**4*x**3*(f*x)**m/(m*
*8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2
+ 36960*m + 11025) + 20985*a*d**2*e*m**3*x**3*(f*x)**m/(m**8 + 32*m**7 + 42
8*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025
) + 37941*a*d**2*e*m**2*x**3*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**
5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 33285*a*d**2*
e*m*x**3*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 336
32*m**3 + 49036*m**2 + 36960*m + 11025) + 11025*a*d**2*e*x**3*(f*x)**m/(m**
8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 +
 36960*m + 11025) + 3*a*d*e**2*m**7*x**5*(f*x)**m/(m**8 + 32*m**7 + 428*m**
6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 8
1*a*d*e**2*m**6*x**5*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 1323
8*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 879*a*d*e**2*m**5*x**
5*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3
 + 49036*m**2 + 36960*m + 11025) + 4917*a*d*e**2*m**4*x**5*(f*x)**m/(m**8 +
 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36
960*m + 11025) + 15129*a*d*e**2*m**3*x**5*(f*x)**m/(m**8 + 32*m**7 + 428*m*
*6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) +
25251*a*d*e**2*m**2*x**5*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 +
13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 20853*a*d*e**2*m*
x**5*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m
**3 + 49036*m**2 + 36960*m + 11025) + 6615*a*d*e**2*x**5*(f*x)**m/(m**8 + 3
2*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 3696
0*m + 11025) + a*e**3*m**7*x**7*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*
m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 25*a*e**3*
m**6*x**7*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33
632*m**3 + 49036*m**2 + 36960*m + 11025) + 253*a*e**3*m**5*x**7*(f*x)**m/(m
**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2
 + 36960*m + 11025) + 1333*a*e**3*m**4*x**7*(f*x)**m/(m**8 + 32*m**7 + 428*
m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025)
+ 3907*a*e**3*m**3*x**7*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 1
3238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 6283*a*e**3*m**2*x
**7*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*...
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 553 vs. $2(209) = 418$.

time = 2.60, size = 553, normalized size = 2.62

$$\frac{bf^6 f^m x^7 x^m e^3 \log(c)}{f^6 m + 7 f^6} + \frac{af^6 f^m x^7 x^m e^3}{f^6 m + 7 f^6} + \frac{3 bdf^4 f^m x^5 x^m e^2 \log(c)}{f^4 m + 5 f^4} + \frac{3 adf^4 f^m x^5 x^m e^2}{f^4 m + 5 f^4} + \frac{bf^m mnx^7 x^m e^3 \log(x)}{m^2 + 14 m + 49} + \frac{7 bf^m nx^7 x^m e^3 \log(x)}{m^2 + 14 m + 49} + \frac{3 bdf^m mnx^5 x^m e^2 \log(x)}{m^2 + 10 m + 25} - \frac{bf^m nx^7 x^m e^3}{m^2 + 14 m + 49} + \frac{3 bd^2 f^2 f^m x^3 x^m e \log(c)}{f^2 m + 3 f^2} + \frac{15 bdf^m nx^5 x^m e^2 \log(x)}{m^2 + 10 m + 25} + \frac{3 bd^2 f^m mnx^3 x^m e \log(x)}{m^2 + 6 m + 9} - \frac{3 bdf^m nx^5 x^m e^2}{m^2 + 10 m + 25} + \frac{3 ad^2 f^2 f^m x^3 x^m e}{f^2 m + 3 f^2} + \frac{9 bd^2 f^m nx^3 x^m e \log(x)}{m^2 + 6 m + 9} - \frac{3 bd^2 f^m nx^3 x^m e}{m^2 + 6 m + 9} + \frac{bd^3 f^m mnx x^m \log(x)}{m^2 + 2 m + 1} + \frac{bd^3 f^m nx x^m \log(x)}{m^2 + 2 m + 1} - \frac{bd^3 f^m nx x^m}{m^2 + 2 m + 1} + \frac{(fx)^m bd^3 x \log(c)}{m + 1} + \frac{(fx)^m ad^3 x}{m + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^6*f^m*x^7*x^m*e^3*log(c)/(f^6*m + 7*f^6) + a*f^6*f^m*x^7*x^m*e^3/(f^6*m
 + 7*f^6) + 3*b*d*f^4*f^m*x^5*x^m*e^2*log(c)/(f^4*m + 5*f^4) + 3*a*d*f^4*f^
```

```
m*x^5*x^m*e^2/(f^4*m + 5*f^4) + b*f^m*m*n*x^7*x^m*e^3*log(x)/(m^2 + 14*m +
49) + 7*b*f^m*n*x^7*x^m*e^3*log(x)/(m^2 + 14*m + 49) + 3*b*d*f^m*m*n*x^5*x^
m*e^2*log(x)/(m^2 + 10*m + 25) - b*f^m*n*x^7*x^m*e^3/(m^2 + 14*m + 49) + 3*
b*d^2*f^2*f^m*x^3*x^m*e*log(c)/(f^2*m + 3*f^2) + 15*b*d*f^m*n*x^5*x^m*e^2*l
og(x)/(m^2 + 10*m + 25) + 3*b*d^2*f^m*m*n*x^3*x^m*e*log(x)/(m^2 + 6*m + 9)
- 3*b*d*f^m*n*x^5*x^m*e^2/(m^2 + 10*m + 25) + 3*a*d^2*f^2*f^m*x^3*x^m*e/(f^
2*m + 3*f^2) + 9*b*d^2*f^m*n*x^3*x^m*e*log(x)/(m^2 + 6*m + 9) - 3*b*d^2*f^m
*n*x^3*x^m*e/(m^2 + 6*m + 9) + b*d^3*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) +
 b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^3*f^m*n*x*x^m/(m^2 + 2*m +
1) + (f*x)^m*b*d^3*x*log(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^m\,{\left(e\,x^2+d\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(d + e*x^2)^3*(a + b*log(c*x^n)), x)
```

3.319 $\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n)) \, dx$

Optimal. Leaf size=153

$$-\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}-\frac{2bden(fx)^{3+m}}{f^3(3+m)^2}-\frac{be^2n(fx)^{5+m}}{f^5(5+m)^2}+\frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{2de(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}+$$

```
[Out] -b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*(f*x)^(3+m)/f^3/(3+m)^2-b*e^2*n*(f
*x)^(5+m)/f^5/(5+m)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+2*d*e*(f*x)^(
3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+e^2*(f*x)^(5+m)*(a+b*ln(c*x^n))/f^5/(5+m)
```

Rubi [A]
time = 0.13, antiderivative size = 153, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {276, 2392, 12, 14}

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}-\frac{bd^2n(fx)^{m+1}}{f(m+1)^2}-\frac{2bden(fx)^{m+3}}{f^3(m+3)^2}-\frac{be^2n(fx)^{m+5}}{f^5(m+5)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d^2*n*(f*x)^(1 + m))/(f*(1 + m)^2)) - (2*b*d*e*n*(f*x)^(3 + m))/(f^3*(
3 + m)^2) - (b*e^2*n*(f*x)^(5 + m))/(f^5*(5 + m)^2) + (d^2*(f*x)^(1 + m)*(a
 + b*Log[c*x^n]))/(f*(1 + m)) + (2*d*e*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f
^3*(3 + m)) + (e^2*(f*x)^(5 + m)*(a + b*Log[c*x^n]))/(f^5*(5 + m))
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
```

```
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\begin{aligned}
\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx &= \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{2de(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}+\frac{e^2\\
&= \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{2de(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}+\frac{e^2\\
&= \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{2de(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}+\frac{e^2\\
&= -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}-\frac{2bden(fx)^{3+m}}{f^3(3+m)^2}-\frac{be^2n(fx)^{5+m}}{f^5(5+m)^2}+\frac{d^2(fx)^{1+m}(}{f(1}
\end{aligned}$$

Mathematica [A]
time = 0.20, size = 172, normalized size = 1.12

$$(fx)^m\left(bnx\left(\frac{d^2}{1+m}+\frac{2dex^2}{3+m}+\frac{e^2x^4}{5+m}\right)\log(x)+\frac{d^2x(a+am-bn-b(1+m)n\log(x)+b(1+m)\log(cx^n))}{(1+m)^2}+\frac{2dex^3(3a+am-bn-b(3+m)n\log(x)+b(3+m)\log(cx^n))}{(3+m)^2}+\frac{e^2x^5(5a+am-bn-b(5+m)n\log(x)+b(5+m)\log(cx^n))}{(5+m)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (f*x)^m*(b*n*x*(d^2/(1 + m) + (2*d*e*x^2)/(3 + m) + (e^2*x^4)/(5 + m))*Log[
x] + (d^2*x*(a + a*m - b*n - b*(1 + m)*n*Log[x] + b*(1 + m)*Log[c*x^n]))/(1
 + m)^2 + (2*d*e*x^3*(3*a + a*m - b*n - b*(3 + m)*n*Log[x] + b*(3 + m)*Log[
c*x^n]))/(3 + m)^2 + (e^2*x^5*(5*a + a*m - b*n - b*(5 + m)*n*Log[x] + b*(5
+ m)*Log[c*x^n]))/(5 + m)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.28, size = 2790, normalized size = 18.24

method	result	size
risch	Expression too large to display	2790

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(e^2*m^2*x^4+4*e^2*m*x^4+2*d*e*m^2*x^2+3*e^2*x^4+12*d*e*m*x^2+d^2*m^2+1
0*d*e*x^2+8*d^2*m+15*d^2)/(1+m)/(3+m)/(5+m)*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+
```

I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*
csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/2*x*(90*x^4*a*e^2-4*b*d*e*m
^4*n*x^2-188*b*d^2*m^2*n-480*b*d^2*m*n-410*I*Pi*b*d*e*m*x^2*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+90*ln(c)*b*e^2*x^4-2*b*e^2*m^4*n*x^4+4*a*d*e*m^5*x^2-1
64*I*Pi*b*d*e*m^3*x^2*csgn(I*c*x^n)^3+450*d^2*b*ln(c)+34*a*d^2*m^4-450*b*d^
2*n+450*a*d^2-16*b*e^2*m^3*n*x^4+60*a*d*e*m^4*x^2+26*a*e^2*m^4*x^4+124*ln(c
)*b*e^2*m^3*x^4+268*ln(c)*b*e^2*m^2*x^4+258*ln(c)*b*e^2*m*x^4+2*ln(c)*b*e^2
*m^5*x^4+26*ln(c)*b*e^2*m^4*x^4-225*I*Pi*b*d^2*csgn(I*c*x^n)^3-13*I*Pi*b*e^
2*m^4*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b*d*e*m^5*x^2*csgn(I*c
)*csgn(I*c*x^n)^2+2*I*Pi*b*d*e*m^5*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+300*ln(c
)*b*d*e*x^2-2*I*Pi*b*d*e*m^5*x^2*csgn(I*c*x^n)^3+396*I*Pi*b*d*e*m^2*x^2*csg
n(I*c)*csgn(I*c*x^n)^2+396*I*Pi*b*d*e*m^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2+1
24*a*e^2*m^3*x^4+268*a*e^2*m^2*x^4+258*a*e^2*m*x^4+328*a*d*e*m^3*x^2+792*a*
d*e*m^2*x^2+820*a*d*e*m*x^2+2*a*e^2*m^5*x^4+410*I*Pi*b*d*e*m*x^2*csgn(I*x^n
)*csgn(I*c*x^n)^2+220*a*d^2*m^3+668*a*d^2*m^2+930*a*d^2*m-2*b*d^2*m^4*n-32*
b*d^2*m^3*n+2*ln(c)*b*d^2*m^5+34*ln(c)*b*d^2*m^4+220*ln(c)*b*d^2*m^3+668*ln
(c)*b*d^2*m^2+930*ln(c)*b*d^2*m+300*x^2*a*d*e-150*I*Pi*b*d*e*x^2*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+2*a*d^2*m^5+45*I*Pi*b*e^2*x^4*csgn(I*x^n)*csgn(I*
c*x^n)^2+110*I*Pi*b*d^2*m^3*csgn(I*c)*csgn(I*c*x^n)^2+110*I*Pi*b*d^2*m^3*cs
gn(I*x^n)*csgn(I*c*x^n)^2+334*I*Pi*b*d^2*m^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi
*b*e^2*m^5*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+334*I*Pi*b*d^2*m^2*csgn(I*x^n)*c
sgn(I*c*x^n)^2+410*I*Pi*b*d*e*m*x^2*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*e^2*m^
5*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-44*b*e^2*m^2*n*x^4-48*b*e^2*m*n*x
^4-I*Pi*b*e^2*m^5*x^4*csgn(I*c*x^n)^3-13*I*Pi*b*e^2*m^4*x^4*csgn(I*c*x^n)^3
+17*I*Pi*b*d^2*m^4*csgn(I*c)*csgn(I*c*x^n)^2-129*I*Pi*b*e^2*m*x^4*csgn(I*c*
x^n)^3+45*I*Pi*b*e^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*e^2*m^5*x^4*csgn(
I*c)*csgn(I*c*x^n)^2+17*I*Pi*b*d^2*m^4*csgn(I*x^n)*csgn(I*c*x^n)^2+150*I*Pi
*b*d*e*x^2*csgn(I*c)*csgn(I*c*x^n)^2-110*I*Pi*b*d^2*m^3*csgn(I*c*x^n)^3-334
*I*Pi*b*d^2*m^2*csgn(I*c*x^n)^3-465*I*Pi*b*d^2*m*csgn(I*c*x^n)^3-17*I*Pi*b*
d^2*m^4*csgn(I*c*x^n)^3+225*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+328*ln(c)*
b*d*e*m^3*x^2+792*ln(c)*b*d*e*m^2*x^2+820*ln(c)*b*d*e*m*x^2+60*ln(c)*b*d*e*
m^4*x^2+4*ln(c)*b*d*e*m^5*x^2-465*I*Pi*b*d^2*m*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+62*I*Pi*b*e^2*m^3*x^4*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d*e*m^5*x^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+129*I*Pi*b*e^2*m*x^4*csgn(I*c)*csgn(I
*c*x^n)^2+129*I*Pi*b*e^2*m*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-18*b*e^2*n*x^4-1
00*b*d*e*n*x^2+I*Pi*b*d^2*m^5*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d^2*m^5*csgn
(I*x^n)*csgn(I*c*x^n)^2+134*I*Pi*b*e^2*m^2*x^4*csgn(I*c)*csgn(I*c*x^n)^2-15
0*I*Pi*b*d*e*x^2*csgn(I*c*x^n)^3+30*I*Pi*b*d*e*m^4*x^2*csgn(I*c)*csgn(I*c*x
^n)^2+30*I*Pi*b*d*e*m^4*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-164*I*Pi*b*d*e*m^3*
x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-396*I*Pi*b*d*e*m^2*x^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)+134*I*Pi*b*e^2*m^2*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2+
465*I*Pi*b*d^2*m*csgn(I*c)*csgn(I*c*x^n)^2+465*I*Pi*b*d^2*m*csgn(I*x^n)*csg
n(I*c*x^n)^2+13*I*Pi*b*e^2*m^4*x^4*csgn(I*c)*csgn(I*c*x^n)^2+164*I*Pi*b*d*e
*m^3*x^2*csgn(I*c)*csgn(I*c*x^n)^2+164*I*Pi*b*d*e*m^3*x^2*csgn(I*x^n)*csgn(
I*c*x^n)^2-129*I*Pi*b*e^2*m*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-225*I*P

```
i*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-62*I*Pi*b*e^2*m^3*x^4*csgn(I*c*
x^n)^3-134*I*Pi*b*e^2*m^2*x^4*csgn(I*c*x^n)^3+13*I*Pi*b*e^2*m^4*x^4*csgn(I*
x^n)*csgn(I*c*x^n)^2-I*Pi*b*d^2*m^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+150
*I*Pi*b*d*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-30*I*Pi*b*d*e*m^4*x^2*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)-110*I*Pi*b*d^2*m^3*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)-410*I*Pi*b*d*e*m*x^2*csgn(I*c*x^n)^3-334*I*Pi*b*d^2*m^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)-30*I*Pi*b*d*e*m^4*x^2*csgn(I*c*x^n)^3-62*I*Pi*b*e^2
*m^3*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-134*I*Pi*b*e^2*m^2*x^4*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+62*I*Pi*b*e^2*m^3*x^4*csgn(I*x^n)*csgn(I*c*x^n
)^2-396*I*Pi*b*d*e*m^2*x^2*csgn(I*c*x^n)^3-45*I*Pi*b*e^2*x^4*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)-48*b*d*e*m^3*n*x^2-I*Pi*b*d^2*m^5*csgn(I*c*x^n)^3-17*
I*Pi*b*d^2*m^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+225*I*Pi*b*d^2*csgn(I*x^
n)*csgn(I*c*x^n)^2-45*I*Pi*b*e^2*x^4*csgn(I*c*x^n)^3-184*b*d*e*m^2*n*x^2-24
0*b*d*e*m*n*x^2)/(5+m)^2/(1+m)^2/(3+m)^2*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*P
i*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csg
n(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.29, size = 207, normalized size = 1.35

$$\frac{bf^mx^5e^{(m\log(x)+2)}\log(cx^n)}{m+5}+\frac{af^mx^5e^{(m\log(x)+2)}}{m+5}-\frac{bf^mnx^5e^{(m\log(x)+2)}}{(m+5)^2}+\frac{2\,bdf^mx^3e^{(m\log(x)+1)}\log(cx^n)}{m+3}+\frac{2\,adf^mx^3e^{(m\log(x)+1)}}{m+3}-\frac{2\,bdf^mnx^3e^{(m\log(x)+1)}}{(m+3)^2}-\frac{bd^2f^mnxx^m}{(m+1)^2}+\frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)}+\frac{(fx)^{m+1}ad^2}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] b*f^m*x^5*e^(m*log(x) + 2)*log(c*x^n)/(m + 5) + a*f^m*x^5*e^(m*log(x) + 2)/
(m + 5) - b*f^m*n*x^5*e^(m*log(x) + 2)/(m + 5)^2 + 2*b*d*f^m*x^3*e^(m*log(x
) + 1)*log(c*x^n)/(m + 3) + 2*a*d*f^m*x^3*e^(m*log(x) + 1)/(m + 3) - 2*b*d*
f^m*n*x^3*e^(m*log(x) + 1)/(m + 3)^2 - b*d^2*f^m*n*x*x^m/(m + 1)^2 + (f*x)^
(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^2/(f*(m + 1))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 553 vs. $2(153) = 306$.
time = 0.35, size = 553, normalized size = 3.61

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((a*m^5 + 13*a*m^4 + 62*a*m^3 + 134*a*m^2 + 129*a*m - (b*m^4 + 8*b*m^3 + 22
*b*m^2 + 24*b*m + 9*b)*n + 45*a)*x^5*e^2 + 2*(a*d*m^5 + 15*a*d*m^4 + 82*a*d
*m^3 + 198*a*d*m^2 + 205*a*d*m + 75*a*d - (b*d*m^4 + 12*b*d*m^3 + 46*b*d*m^
2 + 60*b*d*m + 25*b*d)*n)*x^3*e + (a*d^2*m^5 + 17*a*d^2*m^4 + 110*a*d^2*m^3
 + 334*a*d^2*m^2 + 465*a*d^2*m + 225*a*d^2 - (b*d^2*m^4 + 16*b*d^2*m^3 + 94
*b*d^2*m^2 + 240*b*d^2*m + 225*b*d^2)*n)*x + ((b*m^5 + 13*b*m^4 + 62*b*m^3
```

```
+ 134*b*m^2 + 129*b*m + 45*b)*x^5*e^2 + 2*(b*d*m^5 + 15*b*d*m^4 + 82*b*d*m^
3 + 198*b*d*m^2 + 205*b*d*m + 75*b*d)*x^3*e + (b*d^2*m^5 + 17*b*d^2*m^4 + 1
10*b*d^2*m^3 + 334*b*d^2*m^2 + 465*b*d^2*m + 225*b*d^2)*x)*log(c) + ((b*m^5
 + 13*b*m^4 + 62*b*m^3 + 134*b*m^2 + 129*b*m + 45*b)*n*x^5*e^2 + 2*(b*d*m^5
 + 15*b*d*m^4 + 82*b*d*m^3 + 198*b*d*m^2 + 205*b*d*m + 75*b*d)*n*x^3*e + (b
*d^2*m^5 + 17*b*d^2*m^4 + 110*b*d^2*m^3 + 334*b*d^2*m^2 + 465*b*d^2*m + 225
*b*d^2)*n*x)*log(x))*e^(m*log(f) + m*log(x))/(m^6 + 18*m^5 + 127*m^4 + 444*
m^3 + 799*m^2 + 690*m + 225)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 2820 vs. $2(146) = 292$.

time = 8.69, size = 2820, normalized size = 18.43

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((((-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*
x**4) - log(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2)
) - b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), Tr
ue)))/f**5, Eq(m, -5)), ((-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2
*x**2/2 - b*d**2*n/(4*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**
n)**2/n - b*e**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2)/f**3, Eq(m, -3)), ((
a*d**2*log(c*x**n)/n + a*d*e*x**2 + a*e**2*x**4/4 + b*d**2*log(c*x**n)**2/(
2*n) - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**4/16 + b*e**2*
x**4*log(c*x**n)/4)/f, Eq(m, -1)), (a*d**2*m**5*x*(f*x)**m/(m**6 + 18*m**5
+ 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 17*a*d**2*m**4*x*(f*x)**m
/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 110*a*d*
*2*m**3*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m
 + 225) + 334*a*d**2*m**2*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3
+ 799*m**2 + 690*m + 225) + 465*a*d**2*m*x*(f*x)**m/(m**6 + 18*m**5 + 127*m
**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 225*a*d**2*x*(f*x)**m/(m**6 + 18
*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 2*a*d*e*m**5*x**3*(
f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 3
0*a*d*e*m**4*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2
 + 690*m + 225) + 164*a*d*e*m**3*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 +
 444*m**3 + 799*m**2 + 690*m + 225) + 396*a*d*e*m**2*x**3*(f*x)**m/(m**6 +
18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 410*a*d*e*m*x**3*
(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) +
150*a*d*e*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 +
690*m + 225) + a*e**2*m**5*x**5*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m
**3 + 799*m**2 + 690*m + 225) + 13*a*e**2*m**4*x**5*(f*x)**m/(m**6 + 18*m**
5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 62*a*e**2*m**3*x**5*(f*
x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 134
```

```
*a*e**2*m**2*x**5*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2
 + 690*m + 225) + 129*a*e**2*m*x**5*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 4
44*m**3 + 799*m**2 + 690*m + 225) + 45*a*e**2*x**5*(f*x)**m/(m**6 + 18*m**5
 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + b*d**2*m**5*x*(f*x)**m*l
og(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225)
- b*d**2*m**4*n*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2
 + 690*m + 225) + 17*b*d**2*m**4*x*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 1
27*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) - 16*b*d**2*m**3*n*x*(f*x)**m/
(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 110*b*d**
2*m**3*x*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m
**2 + 690*m + 225) - 94*b*d**2*m**2*n*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4
 + 444*m**3 + 799*m**2 + 690*m + 225) + 334*b*d**2*m**2*x*(f*x)**m*log(c*x*
*n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) - 240*b
*d**2*m*n*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690
*m + 225) + 465*b*d**2*m*x*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4
+ 444*m**3 + 799*m**2 + 690*m + 225) - 225*b*d**2*n*x*(f*x)**m/(m**6 + 18*m
**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 225*b*d**2*x*(f*x)**m
*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225
) + 2*b*d*e*m**5*x**3*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444
*m**3 + 799*m**2 + 690*m + 225) - 2*b*d*e*m**4*n*x**3*(f*x)**m/(m**6 + 18*m
**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 30*b*d*e*m**4*x**3*(f
*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m
 + 225) - 24*b*d*e*m**3*n*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m*
*3 + 799*m**2 + 690*m + 225) + 164*b*d*e*m**3*x**3*(f*x)**m*log(c*x**n)/(m*
*6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) - 92*b*d*e*m**
2*n*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m
+ 225) + 396*b*d*e*m**2*x**3*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**
4 + 444*m**3 + 799*m**2 + 690*m + 225) - 120*b*d*e*m*n*x**3*(f*x)**m/(m**6
+ 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 410*b*d*e*m*x**
3*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 6
90*m + 225) - 50*b*d*e*n*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**
3 + 799*m**2 + 690*m + 225) + 150*b*d*e*x**3*(f*x)**m*log(c*x**n)/(m**6 + 1
8*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + b*e**2*m**5*x**5*(
f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*
m + 225) - b*e**2*m**4*n*x**5*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**
3 + 799*m**2 + 690*m + 225) + 13*b*e**2*m**4*x**5*(f*x)**m*log(c*x**n)/(m**
6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) - 8*b*e**2*m**3
*n*x**5*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m +
 225) + 62*b*e**2*m**3*x**5*(f*x)**m*log(c*x**n)/(m**6 + 18*m**5 + 127*m**4
 + 444*m**3 + 799*m**2 + 690*m + 225) - 22*b*e*...
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 396 vs. 2(153) = 306.

time = 2.54, size = 396, normalized size = 2.59

$$\frac{bf^4f^mx^5x^me^2\log(c)}{f^4m+5f^4}+\frac{af^4f^mx^5x^me^2}{f^4m+5f^4}+\frac{bf^mmnx^5x^me^2\log(x)}{m^2+10m+25}+\frac{2bdf^2f^mx^3x^me\log(c)}{f^2m+3f^2}+\frac{5bf^mnx^5x^me^2\log(x)}{m^2+10m+25}+\frac{2bdf^mmnx^3x^me\log(x)}{m^2+6m+9}-\frac{bf^mnx^5x^me^2}{m^2+10m+25}+\frac{2adf^2f^mx^3x^me}{f^2m+3f^2}+\frac{6bdf^mnx^3x^me\log(x)}{m^2+6m+9}-\frac{2bdf^mnx^3x^me}{m^2+6m+9}+\frac{bd^2f^mmnxx^m\log(x)}{m^2+2m+1}+\frac{bd^2f^mnxx^m\log(x)}{m^2+2m+1}-\frac{bd^2f^mnxx^m}{m^2+2m+1}+\frac{(fx)^mbd^2x\log(c)}{m+1}+\frac{(fx)^mad^2x}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^4*f^m*x^5*x^m*e^2*log(c)/(f^4*m + 5*f^4) + a*f^4*f^m*x^5*x^m*e^2/(f^4*m
 + 5*f^4) + b*f^m*m*n*x^5*x^m*e^2*log(x)/(m^2 + 10*m + 25) + 2*b*d*f^2*f^m*
x^3*x^m*e*log(c)/(f^2*m + 3*f^2) + 5*b*f^m*n*x^5*x^m*e^2*log(x)/(m^2 + 10*m
 + 25) + 2*b*d*f^m*m*n*x^3*x^m*e*log(x)/(m^2 + 6*m + 9) - b*f^m*n*x^5*x^m*e
^2/(m^2 + 10*m + 25) + 2*a*d*f^2*f^m*x^3*x^m*e/(f^2*m + 3*f^2) + 6*b*d*f^m*
n*x^3*x^m*e*log(x)/(m^2 + 6*m + 9) - 2*b*d*f^m*n*x^3*x^m*e/(m^2 + 6*m + 9)
+ b*d^2*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*d^2*f^m*n*x*x^m*log(x)/(m^
2 + 2*m + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*d^2*x*log(c)/(
m + 1) + (f*x)^m*a*d^2*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^m\,{\left(e\,x^2+d\right)}^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(d + e*x^2)^2*(a + b*log(c*x^n)), x)
```

3.320 $\int (fx)^m (d+ex^2)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=95

$$-\frac{bdn(fx)^{1+m}}{f(1+m)^2}-\frac{ben(fx)^{3+m}}{f^3(3+m)^2}+\frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}$$

```
[Out] -b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*(f*x)^(3+m)/f^3/(3+m)^2+d*(f*x)^(1+m)*(a
+b*ln(c*x^n))/f/(1+m)+e*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)
```

Rubi [A]
time = 0.06, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {14, 2392}

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}-\frac{bdn(fx)^{m+1}}{f(m+1)^2}-\frac{ben(fx)^{m+3}}{f^3(m+3)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d*n*(f*x)^(1 + m))/(f*(1 + m)^2)) - (b*e*n*(f*x)^(3 + m))/(f^3*(3 + m)
^2) + (d*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (e*(f*x)^(3 + m)*(
a + b*Log[c*x^n]))/(f^3*(3 + m))
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m \left(d+ex^2\right) (a+b\log(cx^n))\, dx = \frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} - (bn)\int (\ldots$$
$$= \frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} - (bn)\int \ldots$$
$$= -\frac{bdn(fx)^{1+m}}{f(1+m)^2} - \frac{ben(fx)^{3+m}}{f^3(3+m)^2} + \frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{e(fx \ldots}{}$$

Mathematica [A]
time = 0.10, size = 94, normalized size = 0.99

$$\frac{x(fx)^m\left(a(3+4m+m^2)\left(d(3+m)+e(1+m)x^2\right)-bn\left(d(3+m)^2+e(1+m)^2x^2\right)+b(3+4m+m^2)\left(d(3+m)+e(1+m)x^2\right)\log(cx^n)\right)}{(1+m)^2(3+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(f*x)^m*(a*(3 + 4*m + m^2)*(d*(3 + m) + e*(1 + m)*x^2) - b*n*(d*(3 + m)^
2 + e*(1 + m)^2*x^2) + b*(3 + 4*m + m^2)*(d*(3 + m) + e*(1 + m)*x^2)*Log[c*
x^n]))/((1 + m)^2*(3 + m)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 1180, normalized size = 12.42

method	result	size
risch	Expression too large to display	1180

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(e*m*x^2+e*x^2+d*m+3*d)/(1+m)/(3+m)*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi
*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn
(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)-1/2*x*(-30*a*d*m-6*a*e*x^2+18*b*d
*n-14*a*e*m*x^2-18*a*d-7*I*Pi*b*e*m*x^2*csgn(I*c)*csgn(I*c*x^n)^2-7*I*Pi*b*
e*m*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*c*x^n)^
2-2*a*d*m^3-5*I*Pi*b*e*m^2*x^2*csgn(I*c)*csgn(I*c*x^n)^2+9*I*Pi*b*d*csgn(I*
c*x^n)^3-18*d*b*ln(c)+2*b*e*m^2*n*x^2+I*Pi*b*e*m^3*x^2*csgn(I*c*x^n)^3-15*I
*Pi*b*d*m*csgn(I*x^n)*csgn(I*c*x^n)^2-2*a*e*m^3*x^2-14*ln(c)*b*d*m^2-30*ln(
c)*b*d*m-2*ln(c)*b*d*m^3+2*b*d*m^2*n-2*ln(c)*b*e*m^3*x^2-10*ln(c)*b*e*m^2*x
^2-14*ln(c)*b*e*m*x^2-14*a*d*m^2+I*Pi*b*d*m^3*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+12*b*d*m*n-6*ln(c)*b*e*x^2-10*a*e*m^2*x^2-7*I*Pi*b*d*m^2*csgn(I*x^n)
*csgn(I*c*x^n)^2+4*b*e*m*n*x^2+9*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)-3*I*Pi*b*e*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d*m^3*csgn(I*x^n)*csgn
```

```
(I*c*x^n)^2+I*Pi*b*d*m^3*csgn(I*c*x^n)^3+I*Pi*b*e*m^3*x^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+2*b*e*n*x^2-15*I*Pi*b*d*m*csgn(I*c)*csgn(I*c*x^n)^2+7*I*
Pi*b*e*m*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+5*I*Pi*b*e*m^2*x^2*csgn(I*
c*x^n)^3+7*I*Pi*b*e*m*x^2*csgn(I*c*x^n)^3-7*I*Pi*b*d*m^2*csgn(I*c)*csgn(I*c
*x^n)^2-9*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d*m^3*csgn(I*c)*csgn(I*
c*x^n)^2+15*I*Pi*b*d*m*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+7*I*Pi*b*d*m^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi*b*e*x^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+5*I*Pi*b*e*m^2*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-5*I*Pi*b*
e*m^2*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*e*m^3*x^2*csgn(I*c)*csgn(I*c*x
^n)^2-I*Pi*b*e*m^3*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-9*I*Pi*b*d*csgn(I*x^n)*c
sgn(I*c*x^n)^2+15*I*Pi*b*d*m*csgn(I*c*x^n)^3+7*I*Pi*b*d*m^2*csgn(I*c*x^n)^3
+3*I*Pi*b*e*x^2*csgn(I*c*x^n)^3)/(3+m)^2/(1+m)^2*exp(1/2*m*(-I*Pi*csgn(I*f*
x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*
f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.30, size = 128, normalized size = 1.35

$$\frac{bf^m x^3 e^{(m\log(x)+1)}\log(cx^n)}{m+3}+\frac{af^m x^3 e^{(m\log(x)+1)}}{m+3}-\frac{bf^m n x^3 e^{(m\log(x)+1)}}{(m+3)^2}-\frac{bdf^m n x x^m}{(m+1)^2}+\frac{(fx)^{m+1}bd\log(cx^n)}{f(m+1)}+\frac{(fx)^{m+1}ad}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] b*f^m*x^3*e^(m*log(x) + 1)*log(c*x^n)/(m + 3) + a*f^m*x^3*e^(m*log(x) + 1)/
(m + 3) - b*f^m*n*x^3*e^(m*log(x) + 1)/(m + 3)^2 - b*d*f^m*n*x*x^m/(m + 1)^
2 + (f*x)^(m + 1)*b*d*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1)
)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 225 vs. 2(97) = 194.
time = 0.36, size = 225, normalized size = 2.37

$$\frac{((am^3+5\,am^2+7\,am-(bm^2+2\,bm+b)n+3\,a)x^3e+(adm^3+7\,adm^2+15\,adm+9\,ad-(bdm^2+6\,bdm+9\,bd)n)x+((bm^3+5\,bm^2+7\,bm+3\,b)x^3e+(bdm^3+7\,bdm^2+15\,bdm+9\,bd)x)\log(c)+((bm^3+5\,bm^2+7\,bm+3\,b)nx^3e+(bdm^3+7\,bdm^2+15\,bdm+9\,bd)nx)\log(x))e^{(m\log(f)+m\log(x))}}{m^4+8\,m^3+22\,m^2+24\,m+9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((a*m^3 + 5*a*m^2 + 7*a*m - (b*m^2 + 2*b*m + b)*n + 3*a)*x^3*e + (a*d*m^3 +
 7*a*d*m^2 + 15*a*d*m + 9*a*d - (b*d*m^2 + 6*b*d*m + 9*b*d)*n)*x + ((b*m^3
+ 5*b*m^2 + 7*b*m + 3*b)*x^3*e + (b*d*m^3 + 7*b*d*m^2 + 15*b*d*m + 9*b*d)*x
)*log(c) + ((b*m^3 + 5*b*m^2 + 7*b*m + 3*b)*n*x^3*e + (b*d*m^3 + 7*b*d*m^2
+ 15*b*d*m + 9*b*d)*n*x)*log(x))*e^(m*log(f) + m*log(x))/(m^4 + 8*m^3 + 22*
m^2 + 24*m + 9)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 920 vs. 2(87) = 174.

time = 4.25, size = 920, normalized size = 9.68

$$\begin{cases} \frac{-\frac{ad}{2x^2}+ae\log(x)+bd\left(-\frac{n}{4x^2}-\frac{\log(cx^n)}{2x^2}\right)-be\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)}{f^3} & \text{for } m=-3 \\ \frac{\frac{ad\log(cx^n)}{n}+\frac{aex^2}{2}+\frac{bd\log(cx^n)^2}{2n}-\frac{benx^2}{4}+\frac{bex^2\log(cx^n)}{2}}{f} & \text{for } m=-1 \\ \frac{adm^3x(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{7adm^2x(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{15admx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{9adx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{aem^3x^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{5aem^2x^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{7aemx^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{3aex^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{bdm^3x(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}-\frac{bdm^2nx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{7bdm^2x(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}-\frac{6bdmnx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{15bdmx(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}-\frac{9bdnx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{9bdx(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}+\frac{bem^3x^3(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}-\frac{bem^2nx^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{5bem^2x^3(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}-\frac{2bemnx^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{7bemx^3(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9}-\frac{benx^3(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{3bex^3(fx)^m\log(cx^n)}{m^4+8m^3+22m^2+24m+9} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2*
x**2)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n),
True)))/f**3, Eq(m, -3)), ((a*d*log(c*x**n)/n + a*e*x**2/2 + b*d*log(c*x**n
)**2/(2*n) - b*e*n*x**2/4 + b*e*x**2*log(c*x**n)/2)/f, Eq(m, -1)), (a*d*m**
3*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 7*a*d*m**2*x*(f*x)**m/(
m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 15*a*d*m*x*(f*x)**m/(m**4 + 8*m**3 +
22*m**2 + 24*m + 9) + 9*a*d*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9)
 + a*e*m**3*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 5*a*e*m**2
*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 7*a*e*m*x**3*(f*x)**m
/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 3*a*e*x**3*(f*x)**m/(m**4 + 8*m**3
+ 22*m**2 + 24*m + 9) + b*d*m**3*x*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22
*m**2 + 24*m + 9) - b*d*m**2*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m +
 9) + 7*b*d*m**2*x*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9
) - 6*b*d*m*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 15*b*d*m*x*
(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) - 9*b*d*n*x*(f*x)
**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 9*b*d*x*(f*x)**m*log(c*x**n)/(m*
*4 + 8*m**3 + 22*m**2 + 24*m + 9) + b*e*m**3*x**3*(f*x)**m*log(c*x**n)/(m**
4 + 8*m**3 + 22*m**2 + 24*m + 9) - b*e*m**2*n*x**3*(f*x)**m/(m**4 + 8*m**3
+ 22*m**2 + 24*m + 9) + 5*b*e*m**2*x**3*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3
 + 22*m**2 + 24*m + 9) - 2*b*e*m*n*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 +
 24*m + 9) + 7*b*e*m*x**3*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 2
4*m + 9) - b*e*n*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 3*b*e
*x**3*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 239 vs. 2(97) = 194.

time = 2.05, size = 239, normalized size = 2.52

$$\frac{bf^2f^mx^3x^me\log(c)}{f^2m+3f^2}+\frac{bf^mmnx^3x^me\log(x)}{m^2+6m+9}+\frac{af^2f^mx^3x^me}{f^2m+3f^2}+\frac{3bf^mnx^3x^me\log(x)}{m^2+6m+9}-\frac{bf^mnx^3x^me}{m^2+6m+9}+\frac{bdf^mmnxx^m\log(x)}{m^2+2m+1}+\frac{bdf^mnxx^m\log(x)}{m^2+2m+1}-\frac{bdf^mnxx^m}{m^2+2m+1}+\frac{(fx)^mbdx\log(c)}{m+1}+\frac{(fx)^madx}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^2*f^m*x^3*x^m*e*log(c)/(f^2*m + 3*f^2) + b*f^m*m*n*x^3*x^m*e*log(x)/(m^
2 + 6*m + 9) + a*f^2*f^m*x^3*x^m*e/(f^2*m + 3*f^2) + 3*b*f^m*n*x^3*x^m*e*lo
g(x)/(m^2 + 6*m + 9) - b*f^m*n*x^3*x^m*e/(m^2 + 6*m + 9) + b*d*f^m*m*n*x*x^
m*log(x)/(m^2 + 2*m + 1) + b*d*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d*f^m
```

```
*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m
+ 1)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^m\,\left(e\,x^2+d\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^2)*(a + b*log(c*x^n)),x)
[Out] int((f*x)^m*(d + e*x^2)*(a + b*log(c*x^n)), x)
```

3.321 $\int (fx)^m (a+b\log(cx^n))\,dx$

Optimal. Leaf size=46

$$-\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

```
[Out] -b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Rubi [A]
time = 0.01, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {2341}

$$\frac{(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}-\frac{bn(fx)^{m+1}}{f(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/(
f*(1 + m))
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (fx)^m (a+b\log(cx^n))\,dx=-\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

Mathematica [A]
time = 0.01, size = 32, normalized size = 0.70

$$\frac{x(fx)^m(a+am-bn+b(1+m)\log(cx^n))}{(1+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.03, size = 371, normalized size = 8.07

method	result
risch	$\frac{bx\,\mathrm{e}^{\frac{m\left(-i\pi\operatorname{csgn}(ifx)^{3}+i\pi\operatorname{csgn}(ifx)^{2}\operatorname{csgn}(if)+i\pi\operatorname{csgn}(ifx)^{2}\operatorname{csgn}(ix)-i\pi\operatorname{csgn}(ifx)\operatorname{csgn}(if)\operatorname{csgn}(ix)+2\ln(x)+2\ln(f)\right)}{2}}\ln(x^{n})}{1+m}-\frac{\left(i\pi b\operatorname{csgn}(ic)\mathrm{cs}\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b/(1+m)*x*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*
csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f
)))*ln(x^n)-1/2*(I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m-I*Pi*b*csgn(I
*c)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*c*
x^n)^3*m+I*csgn(I*c*x^n)*csgn(I*x^n)*b*Pi*csgn(I*c)-I*csgn(I*c*x^n)^2*csgn(
I*c)*b*Pi-I*csgn(I*c*x^n)^2*csgn(I*x^n)*b*Pi+I*csgn(I*c*x^n)^3*b*Pi-2*b*ln(
c)*m-2*b*ln(c)-2*a*m+2*b*n-2*a)/(1+m)^2*x*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*
Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*cs
gn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.33, size = 57, normalized size = 1.24

$$-\frac{bf^{m}nxx^{m}}{(m+1)^{2}}+\frac{(fx)^{m+1}\,b\log(cx^{n})}{f(m+1)}+\frac{(fx)^{m+1}\,a}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^(
m + 1)*a/(f*(m + 1))
```

Fricas [A]
time = 0.34, size = 52, normalized size = 1.13

$$\frac{((bm+b)nx\log(x)+(bm+b)x\log(c)+(am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^{2}+2\,m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f)
 + m*log(x))/(m^2 + 2*m + 1)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(37) = 74$.
time = 4.94, size = 141, normalized size = 3.07

$$\begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m \log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m \log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
+ b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*m
+ 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise((a
*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**
n))**2/(2*b*n), True))/f, True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(46) = 92$.
time = 1.83, size = 95, normalized size = 2.07

$$\frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx \log(c)}{m + 1} + \frac{(fx)^m ax}{m + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m*a
*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (f\,x)^m\,\left(a + b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(a + b*log(c*x^n)), x)
```

3.322 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx$

Optimal. Leaf size=28

$$\text{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^2},x\right)$$

[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)

Rubi [A]
time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^2}\,dx$$

Verification is not applicable to the result.

[In] Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2),x]

[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2), x]

Rubi steps

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^2}\,dx = \int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 108 vs. 2(28) = 56.
time = 0.15, size = 108, normalized size = 3.86

$$\frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,\frac{1}{2}+\frac{m}{2},\frac{1}{2}+\frac{m}{2};\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2};-\frac{ex^2}{d}\right)+(1+m)\,{}_2F_1\left(1,\frac{1+m}{2};\frac{3+m}{2};-\frac{ex^2}{d}\right)\left(a+b\log\left(cx^n\right)\right)\right)}{d(1+m)^2}$$

Antiderivative was successfully verified.

[In] Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2),x]

[Out] (x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, 1/2 + m/2, 1/2 + m/2}, {3/2 + m/2, 3/2 + m/2}, -((e*x^2)/d)]) + (1 + m)*Hypergeometric2F1[1, (1 + m)/2, (3 + m)/2, -((e*x^2)/d)]*(a + b*Log[c*x^n])))/(d*(1 + m)^2)

Maple [A]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\ln\left(c\,x^n\right)\right)}{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^2*e + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

```
[Out] integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(x^2*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m (a + b\log{(cx^n)})}{d + ex^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**2), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^2*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{e\,x^2+d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2),x)
[Out] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.323 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

Optimal. Leaf size=28

$$\operatorname{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^2\right)^2},x\right)$$

```
[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^2\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2, x]
```

Rubi steps

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^2\right)^2}\,dx = \int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^2\right)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 108 vs. 2(28) = 56.
time = 0.07, size = 108, normalized size = 3.86

$$\frac{x(fx)^m\left(-bn\,{}_3F_2\left(2,\frac{1}{2}+\frac{m}{2},\frac{1}{2}+\frac{m}{2};\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2};-\frac{ex^2}{d}\right)+(1+m)\,{}_2F_1\left(2,\frac{1+m}{2};\frac{3+m}{2};-\frac{ex^2}{d}\right)\left(a+b\log\left(cx^n\right)\right)\right)}{d^2(1+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
[Out] (x*(f*x)^m*(-(b*n*HypergeometricPFQ[{2, 1/2 + m/2, 1/2 + m/2}, {3/2 + m/2,
3/2 + m/2}, -((e*x^2)/d)]) + (1 + m)*Hypergeometric2F1[2, (1 + m)/2, (3 + m
)/2, -((e*x^2)/d)]*(a + b*Log[c*x^n])))/(d^2*(1 + m)^2)
```

Maple [A]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\ln\left(c\,x^n\right)\right)}{\left(e\,x^2+d\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^2*e + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

```
[Out] integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(x^4*e^2 + 2*d*x^2*e + d^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^2\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^2*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\left(e\,x^2+d\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
[Out] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.324 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$

Optimal. Leaf size=1198

$$\frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}-\frac{\sqrt[3]{-1}\,x(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)}-\frac{bn(a+b\log}{}$$

```
[Out] 1/9*x*(a+b*ln(c*x^n))^3/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c*
x^n))^3/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+b*
ln(c*x^n))^3/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)-1/3*b*n*(a+b*ln(c*x^n))
^2*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))^3*ln(1+e^(1/
3)*x/d^(1/3))/d^(5/3)/e^(1/3)+3*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))^2*ln(1-(-1)^
(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+1/3*(-1)^(1/3)*b*
n*(a+b*ln(c*x^n))^2*ln(1+(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-2/3*
b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/3*b
*n*(a+b*ln(c*x^n))^2*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+6*(-1)^(
1/3)*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1
)^(1/3))^4/d^(5/3)/e^(1/3)+2/3*(-1)^(1/3)*b^2*n^2*(a+b*ln(c*x^n))*polylog(2
,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/3*b^3*n^3*polylog(3,-e^(1
/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/3*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-e^(1/
3)*x/d^(1/3))/d^(5/3)/e^(1/3)-6*(-1)^(1/3)*b^3*n^3*polylog(3,(-1)^(1/3)*e^(
1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-2/3*(-1)^(1/3)*b^3*n^3*pol
ylog(3,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+4/3*b^3*n^3*polylog(4
,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*(a+b*ln(c*x^n))^3*ln(1-1/2*e^(1/3)
*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-4/3*b*n*(a+b*ln(c*x
^n))^2*polylog(2,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*
3^(1/2))+8/3*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,1/2*e^(1/3)*x*(1-I*3^(1/2))/
d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-8/3*b^3*n^3*polylog(4,1/2*e^(1/3)*x*
(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-4/9*(a+b*ln(c*x^n))^3*
ln(1-1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))-4/3
*b*n*(a+b*ln(c*x^n))^2*polylog(2,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/
3)/e^(1/3)/(1+I*3^(1/2))+8/3*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,1/2*e^(1/3)*
x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))-8/3*b^3*n^3*polylog(
4,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))
```

Rubi [A]
time = 1.06, antiderivative size = 1198, normalized size of antiderivative = 1.00, number of steps used = 26, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$, Rules used = {2367, 2355, 2354, 2421, 6724, 2430}

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/(d + e*x^3)^2,x]
```

```
[Out] (x*(a + b*Log[c*x^n])^3)/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x*
(a + b*Log[c*x^n])^3)/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e^(
1/3)*x)) + (x*(a + b*Log[c*x^n])^3)/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(1/3
)*x)) - (b*n*(a + b*Log[c*x^n])^2*Log[1 + (e^(1/3)*x)/d^(1/3)])/(3*d^(5/3)*
e^(1/3)) + (2*(a + b*Log[c*x^n])^3*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)
*e^(1/3)) + (3*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])^2*Log[1 - ((-1)^(1/3)*e^(1
/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[3]*(a +
 b*Log[c*x^n])^3*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))
^5*d^(5/3)*e^(1/3)) + ((-1)^(1/3)*b*n*(a + b*Log[c*x^n])^2*Log[1 + ((-1)^(2
/3)*e^(1/3)*x)/d^(1/3)])/(3*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])^3*Log[
1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) -
 (2*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(3*d^(5/
3)*e^(1/3)) + (2*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -((e^(1/3)*x)/d^(1/3))
])/(3*d^(5/3)*e^(1/3)) + (6*(-1)^(1/3)*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2
, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - (
(6*I)*Sqrt[3]*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^
(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b^2*n^2*(a + b
*Log[c*x^n])*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/(3*d^(5/3)*e^(1
/3)) + (6*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1
/3))])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) + (2*b^3*n^3*PolyLog[3, -((e^(1
/3)*x)/d^(1/3))])/(3*d^(5/3)*e^(1/3)) - (4*b^2*n^2*(a + b*Log[c*x^n])*PolyL
og[3, -((e^(1/3)*x)/d^(1/3))])/(3*d^(5/3)*e^(1/3)) - (6*(-1)^(1/3)*b^3*n^3*
PolyLog[3, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(
1/3)) + ((12*I)*Sqrt[3]*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, ((-1)^(1/3)*e
^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) - (2*(-1)^(1/3)*b^
3*n^3*PolyLog[3, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/(3*d^(5/3)*e^(1/3)) -
(12*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))
])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) + (4*b^3*n^3*PolyLog[4, -((e^(1/3)*
x)/d^(1/3))])/(3*d^(5/3)*e^(1/3)) - ((12*I)*Sqrt[3]*b^3*n^3*PolyLog[4, ((-1
)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (12*b^3
*n^3*PolyLog[4, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^(1/3))^4*d^(
5/3)*e^(1/3))
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
```

```
, p}, x] && GtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2430

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Dist[b*n*(p/q), Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p - 1
)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \int \left(\frac{(a+b\log(cx^n))^3}{9d^{4/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)^2} + \frac{2(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}\,(a+b\log(c\right.}{\left(1+\sqrt[3]{-1}\right)^4 d^{4/3}\left(-\sqrt[3]{d}+\right.}$$

$$= \frac{2\int \frac{(a+b\log(cx^n))^3}{\sqrt[3]{d}+\sqrt[3]{e}\,x}\,dx}{9d^{5/3}} + \frac{2\int \frac{(a+b\log(cx^n))^3}{\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x}\,dx}{9d^{5/3}} - \frac{\left(2(-1)^{5/6}\sqrt{3}\right)\int \frac{(a+b\log(cx^n))^3}{-\sqrt[3]{d}+\sqrt[3]{-1}\,\sqrt[3]{\right.}}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}}$$

$$= \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}x(a+b\log(cx^n))^3}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,\right.}$$

$$= \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}x(a+b\log(cx^n))^3}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{\right.}$$

$$= \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}x(a+b\log(cx^n))^3}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,\right.}$$

$$= \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}x(a+b\log(cx^n))^3}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,\right.}$$

Mathematica [A]
time = 7.21, size = 2215, normalized size = 1.85

Result too large to show

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^3/(d + e*x^3)^2,x]
```

```
[Out] (x*(a + b*(-(n*Log[x]) + Log[c*x^n]))^3)/(3*d*(d + e*x^3)) + (2*ArcTan[(-d^
(1/3) + 2*e^(1/3)*x)/(Sqrt[3]*d^(1/3))]*(a + b*(-(n*Log[x]) + Log[c*x^n]))^
3)/(3*Sqrt[3]*d^(5/3)*e^(1/3)) + (2*(a + b*(-(n*Log[x]) + Log[c*x^n]))^3*Lo
g[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) - ((a + b*(-(n*Log[x]) + Log[c*
x^n]))^3*Log[d^(2/3) - d^(1/3)*e^(1/3)*x + e^(2/3)*x^2])/(9*d^(5/3)*e^(1/3)
) + 3*b*n*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2*(-1/3*((-1 + (-1)^(1/3))*((-
((-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x] + ((-1
```

```
)^(1/3)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/d^(1/3)))/((1 + (-1)^(1/3))
^2*d^(4/3)*e^(1/3)) + ((-1)^(1/3)*((d^(-1/3) - (d^(1/3) + e^(1/3)*x)^(-1))*
Log[x] - Log[d^(1/3) + e^(1/3)*x]/d^(1/3)))/(3*(1 + (-1)^(1/3))^2*d^(4/3)*e
^(1/3)) - (Log[x]/(e^(1/3)*((-1)^(1/3)*d^(1/3) - e^(1/3)*x)) - (-(((-1)^(2/
3)*Log[x])/d^(1/3)) + ((-1)^(2/3)*Log[d^(1/3) + (-1)^(2/3)*e^(1/3)*x])/d^(1
/3))/e^(1/3))/(3*(1 + (-1)^(1/3))^2*d^(4/3)) + (2*(-1)^(1/3)*(Log[x]*Log[1
+ (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^
(1/3))^2*d^(5/3)*e^(1/3)) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/
3)] + PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/(3*(1 + (-1)^(1/3))^2*d^
(5/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + ((-1)^(2/3)*e^(1/3)*x
)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(
1/3))^2*d^(5/3)*e^(1/3))) + 3*b^2*n^2*(a + b*(-(n*Log[x]) + Log[c*x^n]))*((
(-1)^(1/3)*(Log[x]*((e^(1/3)*x*Log[x])/(d^(1/3) + e^(1/3)*x) - 2*Log[1 + (e
^(1/3)*x)/d^(1/3)]) - 2*PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(
1/3))^2*d^(5/3)*e^(1/3)) - ((-1 + (-1)^(1/3))*(Log[x]*((-((-1)^(1/3)/d^(1/3
)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x] + (2*(-1)^(1/3)*Log[1 -
((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3)) + (2*(-1)^(1/3)*PolyLog[2, ((-1)^
(1/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3)))/(3*(1 + (-1)^(1/3))^2*d^(4/3)*e^(1/3))
 - (Log[x]*((-1)^(2/3)*e^(1/3)*x*Log[x] - 2*(d^(1/3) + (-1)^(2/3)*e^(1/3)*x
)*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)]) - 2*(d^(1/3) + (-1)^(2/3)*e^(1/3
)*x)*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/(3*(1 + (-1)^(1/3))^2*d
^(4/3)*(-((-1)^(1/3)*d^(2/3)*e^(1/3)) + d^(1/3)*e^(2/3)*x)) + (2*(-1)^(1/3)
*(Log[x]^2*Log[1 + (e^(1/3)*x)/d^(1/3)] + 2*Log[x]*PolyLog[2, -((e^(1/3)*x)
/d^(1/3))] - 2*PolyLog[3, -((e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/3))^2*d
^(5/3)*e^(1/3)) - (2*(Log[x]^2*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + 2*
Log[x]*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] - 2*PolyLog[3, ((-1)^(1/3
)*e^(1/3)*x)/d^(1/3)]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(-1 + (
-1)^(1/3))*(Log[x]^2*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)] + 2*Log[x]*Pol
yLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))] - 2*PolyLog[3, -(((-1)^(2/3)*e^(
1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3))) + b^3*n^3*(((-1
)^(1/3)*(Log[x]^2*((d^(-1/3) - (d^(1/3) + e^(1/3)*x)^(-1))*Log[x] - (3*Log[
1 + (e^(1/3)*x)/d^(1/3)])/d^(1/3)) - (6*Log[x]*PolyLog[2, -((e^(1/3)*x)/d^(
1/3))])/d^(1/3) + (6*PolyLog[3, -((e^(1/3)*x)/d^(1/3))])/d^(1/3)))/(3*(1 +
(-1)^(1/3))^2*d^(4/3)*e^(1/3)) - ((-1 + (-1)^(1/3))*(-(((-1)^(1/3)*Log[x]^3
)/d^(1/3)) - Log[x]^3/((-1)^(2/3)*d^(1/3) + e^(1/3)*x) + (3*(-1)^(1/3)*Log[
x]^2*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3) + (6*(-1)^(1/3)*(Log[
x]*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] - PolyLog[3, ((-1)^(1/3)*e^(1
/3)*x)/d^(1/3)]))/d^(1/3)))/(3*(1 + (-1)^(1/3))^2*d^(4/3)*e^(1/3)) - (((-1)
^(2/3)*Log[x]^3)/d^(1/3) + Log[x]^3/((-1)^(1/3)*d^(1/3) - e^(1/3)*x) - (3*(
-1)^(2/3)*Log[x]^2*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3) - (6*(-
1)^(2/3)*(Log[x]*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))] - PolyLog[3,
 -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))]))/d^(1/3))/(3*(1 + (-1)^(1/3))^2*d^(4/3
)*e^(1/3)) + (2*(-1)^(1/3)*(Log[x]^3*Log[1 + (e^(1/3)*x)/d^(1/3)] + 3*Log[x
]^2*PolyLog[2, -((e^(1/3)*x)/d^(1/3))] - 6*Log[x]*PolyLog[3, -((e^(1/3)*x)/
d^(1/3))] + 6*PolyLog[4, -((e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/3))^2*d^
```

```
(5/3)*e^(1/3)) - (2*(Log[x]^3*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + 3*L
og[x]^2*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] - 6*Log[x]*PolyLog[3, ((
-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + 6*PolyLog[4, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)
]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]^3
*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)] + 3*Log[x]^2*PolyLog[2, -(((-1)^(2
/3)*e^(1/3)*x)/d^(1/3))] - 6*Log[x]*PolyLog[3, -(((-1)^(2/3)*e^(1/3)*x)/d^(
1/3))] + 6*PolyLog[4, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/
3))^2*d^(5/3)*e^(1/3)))
```

Maple [F]
time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))^3}{(e\,x^3+d)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/(e*x^3+d)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))^3/(e*x^3+d)^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="maxima")
```

```
[Out] 1/9*a^3*(2*sqrt(3)*arctan(-1/3*sqrt(3)*(d^(1/3)*e^(-1/3) - 2*x)*e^(1/3)/d^(
1/3))*e^(-1/3)/d^(5/3) - e^(-1/3)*log(-d^(1/3)*x*e^(-1/3) + x^2 + d^(2/3)*e
^(-2/3))/d^(5/3) + 2*e^(-1/3)*log(d^(1/3)*e^(-1/3) + x)/d^(5/3) + 3*x/(d*x^
3*e + d^2)) + integrate((b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log(c)^2 +
 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)^2 + 2*a
*b^2*log(c) + a^2*b)*log(x^n))/(x^6*e^2 + 2*d*x^3*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a^
3)/(x^6*e^2 + 2*d*x^3*e + d^2), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/(e*x**3+d)**2,x)
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^3/(x^3*e + d)^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b \ln(c x^n))^3}{(e x^3 + d)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/(d + e*x^3)^2,x)
[Out] int((a + b*log(c*x^n))^3/(d + e*x^3)^2, x)
```

3.325 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$

Optimal. Leaf size=860

$$\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}-\frac{\sqrt[3]{-1}\,x(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)}-\frac{2bn(a+b\,\mathrm{lo}}{}$$

```
[Out] 1/9*x*(a+b*ln(c*x^n))^2/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c*
x^n))^2/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+b*
ln(c*x^n))^2/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)-2/9*b*n*(a+b*ln(c*x^n))
*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))^2*ln(1+e^(1/3)
*x/d^(1/3))/d^(5/3)/e^(1/3)+2*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))*ln(1-(-1)^(1/3
)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+2/9*(-1)^(1/3)*b*n*(a
+b*ln(c*x^n))*ln(1+(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-2/9*b^2*n^
2*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+4/9*b*n*(a+b*ln(c*x^n))*pol
ylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2*(-1)^(1/3)*b^2*n^2*polylog(2,(
-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+2/9*(-1)^(1/3
)*b^2*n^2*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*b^2*
n^2*polylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*(a+b*ln(c*x^n))^2*ln(
1-1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-8/9*b*
n*(a+b*ln(c*x^n))*polylog(2,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^
(1/3)/(1-I*3^(1/2))+8/9*b^2*n^2*polylog(3,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/
3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-4/9*(a+b*ln(c*x^n))^2*ln(1-1/2*e^(1/3)*x*
(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))-8/9*b*n*(a+b*ln(c*x^n)
)*polylog(2,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/
2))+8/9*b^2*n^2*polylog(3,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1
/3)/(1+I*3^(1/2))
```

Rubi [A]
time = 0.58, antiderivative size = 860, normalized size of antiderivative = 1.00, number of steps used = 20, number of rules used = 6, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$, Rules used = {2367, 2355, 2354, 2438, 2421, 6724}

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d + e*x^3)^2,x]
```

```
[Out] (x*(a + b*Log[c*x^n])^2)/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x*
(a + b*Log[c*x^n])^2)/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e^(
1/3)*x)) + (x*(a + b*Log[c*x^n])^2)/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(1/3
)*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*
```

```
e^(1/3)) + (2*(a + b*Log[c*x^n])^2*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)
*e^(1/3)) + (2*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])*Log[1 - ((-1)^(1/3)*e^(1/3
)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[3]*(a + b
*Log[c*x^n])^2*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5
*d^(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])*Log[1 + ((-1)^(2/3
)*e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])^2*Log[1
+ ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - (
2*b^2*n^2*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) + (4*b*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3))
+ (2*(-1)^(1/3)*b^2*n^2*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (
-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((4*I)*Sqrt[3]*b*n*(a + b*Log[c*x^n])*PolyL
og[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3))
 + (2*(-1)^(1/3)*b^2*n^2*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/(9*
d^(5/3)*e^(1/3)) + (4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -(((-1)^(2/3)*e^(1/
3)*x)/d^(1/3))])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - (4*b^2*n^2*PolyLog[
3, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) + ((4*I)*Sqrt[3]*b^2*n^2*Po
lyLog[3, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/
3)) - (4*b^2*n^2*PolyLog[3, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^
(1/3))^4*d^(5/3)*e^(1/3))
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
```

```
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \int \left(\frac{(a+b\log(cx^n))^2}{9d^{4/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)^2}+\frac{2(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{(-1)^{2/3}\,(a+b\log(c\cdots}{\left(1+\sqrt[3]{-1}\right)^4 d^{4/3}\left(-\sqrt[3]{d}+\cdots\right.}\right.$$

$$=\frac{2\int\frac{(a+b\log(cx^n))^2}{\sqrt[3]{d}+\sqrt[3]{e}\,x}\,dx}{9d^{5/3}}+\frac{2\int\frac{(a+b\log(cx^n))^2}{\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x}\,dx}{9d^{5/3}}-\frac{\left(2(-1)^{5/6}\sqrt{3}\right)\int\frac{(a+b\log(cx^n))^2}{-\sqrt[3]{d}+\sqrt[3]{-1}\,\sqrt[3]{\cdots}}}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}}$$

$$=\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{(-1)^{2/3}x(a+b\log(cx^n))^2}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,\cdots\right.}$$

$$=\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{(-1)^{2/3}x(a+b\log(cx^n))^2}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,\cdots\right.}$$

$$=\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{(-1)^{2/3}x(a+b\log(cx^n))^2}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,\cdots\right.}$$

Mathematica [A]
time = 6.07, size = 1379, normalized size = 1.60

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d + e*x^3)^2,x]
```

```
[Out] (x*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2)/(3*d*(d + e*x^3)) + (2*ArcTan[(-d^
(1/3) + 2*e^(1/3)*x)/(Sqrt[3]*d^(1/3))]*(a + b*(-(n*Log[x]) + Log[c*x^n]))^
2)/(3*Sqrt[3]*d^(5/3)*e^(1/3)) + (2*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2*Lo
g[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) - ((a + b*(-(n*Log[x]) + Log[c*
x^n]))^2*Log[d^(2/3) - d^(1/3)*e^(1/3)*x + e^(2/3)*x^2])/(9*d^(5/3)*e^(1/3)
) + 2*b*n*(a + b*(-(n*Log[x]) + Log[c*x^n]))*(-1/3*((-1 + (-1)^(1/3))*((-((
-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x] + ((-1)^
(1/3)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/d^(1/3)))/((1 + (-1)^(1/3))^2
*d^(4/3)*e^(1/3)) + ((-1)^(1/3)*((d^(-1/3) - (d^(1/3) + e^(1/3)*x)^(-1))*Lo
g[x] - Log[d^(1/3) + e^(1/3)*x]/d^(1/3)))/(3*(1 + (-1)^(1/3))^2*d^(4/3)*e^(
1/3)) - (Log[x]/(e^(1/3)*((-1)^(1/3)*d^(1/3) - e^(1/3)*x)) - (-(((-1)^(2/3)
*Log[x])/d^(1/3)) + ((-1)^(2/3)*Log[d^(1/3) + (-1)^(2/3)*e^(1/3)*x])/d^(1/3
))/e^(1/3))/(3*(1 + (-1)^(1/3))^2*d^(4/3)) + (2*(-1)^(1/3)*(Log[x]*Log[1 +
(e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1
/3))^2*d^(5/3)*e^(1/3)) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)
] + PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/(3*(1 + (-1)^(1/3))^2*d^(5
/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/
d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/
3))^2*d^(5/3)*e^(1/3))) + b^2*n^2*(((-1)^(1/3)*(Log[x]*((e^(1/3)*x*Log[x])/
(d^(1/3) + e^(1/3)*x) - 2*Log[1 + (e^(1/3)*x)/d^(1/3)]) - 2*PolyLog[2, -((e
^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - ((-1 + (-1)^
(1/3))*(Log[x]*((-((-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(
-1))*Log[x] + (2*(-1)^(1/3)*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3
)) + (2*(-1)^(1/3)*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3)))/(3
*(1 + (-1)^(1/3))^2*d^(4/3)*e^(1/3)) - (Log[x]*((-1)^(2/3)*e^(1/3)*x*Log[x]
 - 2*(d^(1/3) + (-1)^(2/3)*e^(1/3)*x)*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3
)]) - 2*(d^(1/3) + (-1)^(2/3)*e^(1/3)*x)*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x
)/d^(1/3))])/(3*(1 + (-1)^(1/3))^2*d^(4/3)*(-((-1)^(1/3)*d^(2/3)*e^(1/3)) +
 d^(1/3)*e^(2/3)*x)) + (2*(-1)^(1/3)*(Log[x]^2*Log[1 + (e^(1/3)*x)/d^(1/3)]
 + 2*Log[x]*PolyLog[2, -((e^(1/3)*x)/d^(1/3))] - 2*PolyLog[3, -((e^(1/3)*x)
/d^(1/3))]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(Log[x]^2*Log[1 -
((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + 2*Log[x]*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x
)/d^(1/3)] - 2*PolyLog[3, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/(3*(1 + (-1)^(1
/3))^2*d^(5/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]^2*Log[1 + ((-1)^(2/3
)*e^(1/3)*x)/d^(1/3)] + 2*Log[x]*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3
))] - 2*PolyLog[3, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))]))/(3*(1 + (-1)^(1/3))
^2*d^(5/3)*e^(1/3)))
```

Maple [**F**]

time = 0.03, size = 0, normalized size = 0.00

$$\int \frac{\left(a +b \ln \left(c \,x^{n}\right)\right)^{2}}{\left(e \,x^{3}+d \right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(e*x^3+d)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))^2/(e*x^3+d)^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="maxima")
```

```
[Out] 1/9*a^2*(2*sqrt(3)*arctan(-1/3*sqrt(3)*(d^(1/3)*e^(-1/3) - 2*x)*e^(1/3)/d^(
1/3))*e^(-1/3)/d^(5/3) - e^(-1/3)*log(-d^(1/3)*x*e^(-1/3) + x^2 + d^(2/3)*e
^(-2/3))/d^(5/3) + 2*e^(-1/3)*log(d^(1/3)*e^(-1/3) + x)/d^(5/3) + 3*x/(d*x^
3*e + d^2)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(
b^2*log(c) + a*b)*log(x^n))/(x^6*e^2 + 2*d*x^3*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(x^6*e^2 + 2*d*x^3*e +
 d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b\log\left(cx^n\right)\right)^2}{\left(d + ex^3\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(e*x**3+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(d + e*x**3)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/(x^3*e + d)^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{\left(e\,x^3+d\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d + e*x^3)^2,x)
```

```
[Out] int((a + b*log(c*x^n))^2/(d + e*x^3)^2, x)
```

3.326 $\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$

Optimal. Leaf size=520

$$\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}-\frac{\sqrt[3]{-1}\,x(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)}+\frac{\sqrt[3]{-1}\,bn\log}{(1+}$$

```
[Out] 1/9*x*(a+b*ln(c*x^n))/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c*x^
n))/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+b*ln(c
*x^n))/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)+(-1)^(1/3)*b*n*ln(-(-1)^(2/3)
*d^(1/3)-e^(1/3)*x)/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-1/9*b*n*ln(d^(1/3)+e^(
1/3)*x)/d^(5/3)/e^(1/3)+1/9*(-1)^(1/3)*b*n*ln(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)
/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3
)+2/9*b*n*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*(a+b*ln(c*x^n))
*ln(1-1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-4/
9*b*n*polylog(2,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3
^(1/2))-4/9*(a+b*ln(c*x^n))*ln(1-1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/
3)/e^(1/3)/(1+I*3^(1/2))-4/9*b*n*polylog(2,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1
/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))
```

Rubi [A]
time = 0.32, antiderivative size = 520, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 11, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.550$, Rules used = {205, 206, 31, 648, 631, 210, 642, 2367, 2351, 2354, 2438}

$$\frac{2bn\,\text{PolyLog}\left(2,-\frac{\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}\,bn\,\text{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{2\log\left(\frac{\sqrt[3]{e}\,x}{\sqrt[3]{d}}+1\right)(a+b\log(cx^n))}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}\,x}{\sqrt[3]{d}}+1\right)(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}-\frac{\sqrt[3]{-1}\,x(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)}+\frac{\sqrt[3]{-1}\,bn\log\left(-(-1)^{2/3}\sqrt[3]{d}-\sqrt[3]{e}\,x\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}-\frac{bn\log\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}{9d^{5/3}\sqrt[3]{e}}+\frac{\sqrt[3]{-1}\,bn\log\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)}{9d^{5/3}\sqrt[3]{e}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^3)^2,x]
```

```
[Out] (x*(a + b*Log[c*x^n]))/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x*(a
 + b*Log[c*x^n]))/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e^(1/3)
*x)) + (x*(a + b*Log[c*x^n]))/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(1/3)*x))
+ ((-1)^(1/3)*b*n*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/((1 + (-1)^(1/3))
^4*d^(5/3)*e^(1/3)) - (b*n*Log[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) +
((-1)^(1/3)*b*n*Log[d^(1/3) + (-1)^(2/3)*e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) +
(2*(a + b*Log[c*x^n])*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*e^(1/3)) - (
(2*I)*Sqrt[3]*(a + b*Log[c*x^n])*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/(
(1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])*Log[1 + ((-1)^(
2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) + (2*b*n*Pol
yLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[3]*b*n*P
olyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1
```

```
/3)) + (2*b*n*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^(1/
3))^4*d^(5/3)*e^(1/3))
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^n)^(p +
 1)/(a*n*(p + 1))), x] + Dist[(n*(p + 1) + 1)/(a*n*(p + 1)), Int[(a + b*x^n
)^(p + 1), x], x] /; FreeQ[{a, b}, x] && IGtQ[n, 0] && LtQ[p, -1] && (Integ
erQ[2*p] || (n == 2 && IntegerQ[4*p]) || (n == 2 && IntegerQ[3*p]) || Denom
inator[p + 1/n] < Denominator[p])
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^3)^(-1), x_Symbol] :> Dist[1/(3*Rt[a, 3]^2), Int[1/(
Rt[a, 3] + Rt[b, 3]*x), x], x] + Dist[1/(3*Rt[a, 3]^2), Int[(2*Rt[a, 3] - R
t[b, 3]*x)/(Rt[a, 3]^2 - Rt[a, 3]*Rt[b, 3]*x + Rt[b, 3]^2*x^2), x], x] /; F
reeQ[{a, b}, x]
```

Rule 210

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(-(Rt[-a, 2]*Rt[-b, 2])^(
-1))*ArcTan[Rt[-b, 2]*(x/Rt[-a, 2])], x] /; FreeQ[{a, b}, x] && PosQ[a/b] &
& (LtQ[a, 0] || LtQ[b, 0])
```

Rule 631

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[a*(c/b^2)]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + 2*c*(x/b)
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 642

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[d*(Log[RemoveContent[a + b*x + c*x^2, x]]/b), x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 648

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
```

```
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \int \left(\frac{a+b\log(cx^n)}{9d^{4/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)^2} + \frac{2(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}\left(a+b\log(c\right.}{\left(1+\sqrt[3]{-1}\right)^4 d^{4/3}\left(-\sqrt[3]{d}+\right.}\right.$$

$$= \frac{2\int \frac{a+b\log(cx^n)}{\sqrt[3]{d}+\sqrt[3]{e}\,x}\,dx}{9d^{5/3}} + \frac{2\int \frac{a+b\log(cx^n)}{\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x}\,dx}{9d^{5/3}} - \frac{\left(2(-1)^{5/6}\sqrt{3}\right)\int \frac{a+b\log(cx^n)}{-\sqrt[3]{d}+\sqrt[3]{-1}\,\sqrt[3]{e}\,x}}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}}$$

$$= \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}x(a+b\log(cx^n))}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right.}$$

$$= \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{(-1)^{2/3}x(a+b\log(cx^n))}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}\,x\right)} + \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right.}$$

Mathematica [A]
time = 1.00, size = 571, normalized size = 1.10

$$\frac{\frac{3d^{2/3}x(a-bn\log(x)+b\log(cx^n))}{d+ex^3} - \frac{2\sqrt{3}\tan^{-1}\left(\frac{1-\frac{2\sqrt[3]{e}\,x}{\sqrt[3]{d}}}{\sqrt{3}}\right)(a-bn\log(x)+b\log(cx^n))}{\sqrt[3]{e}} + \frac{2(a-bn\log(x)+b\log(cx^n))\log\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}{\sqrt[3]{e}} - \frac{(a-bn\log(x)+b\log(cx^n))\log\left(d^{2/3}-\sqrt[3]{d}\,\sqrt[3]{e}\,x+e^{2/3}x^2\right)}{\sqrt[3]{e}} + \frac{3bn\left(\frac{\left(-1+\sqrt[3]{-1}\right)\left(\sqrt[3]{-1}\,\sqrt[3]{e}\,x\log(x)+\left(\sqrt[3]{d}-\sqrt[3]{-1}\,\sqrt[3]{e}\,x\right)\log\left(-(-1)^{2/3}\sqrt[3]{d}-\sqrt[3]{e}\,x\right)\right)}{(-1)^{2/3}\sqrt[3]{d}\,\sqrt[3]{e}+e^{2/3}x} + \sqrt[3]{-1}\left(\frac{x\log(x)}{\sqrt[3]{d}+\sqrt[3]{e}\,x} - \frac{\log\left(\sqrt[3]{d}+\sqrt[3]{e}\,x\right)}{\sqrt[3]{e}}\right) + \frac{-(-1)^{2/3}\sqrt[3]{e}\,x\log(x)+\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)\log\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}\,x\right)}{-\sqrt[3]{-1}\,\sqrt[3]{d}\,\sqrt[3]{e}+e^{2/3}x} + \frac{2\sqrt[3]{-1}\left(\log(x)\log\left(1+\frac{\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)+\text{Li}_2\left(-\frac{\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)\right)}{\sqrt[3]{e}} - \frac{2\left(\log(x)\log\left(1-\frac{\sqrt[3]{-1}\,\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)+\text{Li}_2\left(\frac{\sqrt[3]{-1}\,\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)\right)}{\sqrt[3]{e}} - \frac{2\left(-1+\sqrt[3]{-1}\right)\left(\log(x)\log\left(1+\frac{(-1)^{2/3}\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)+\text{Li}_2\left(-\frac{(-1)^{2/3}\sqrt[3]{e}\,x}{\sqrt[3]{d}}\right)\right)}{\sqrt[3]{e}}\right)}{\left(1+\sqrt[3]{-1}\right)^2}}{9d^{5/3}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^3)^2,x]
```

```
[Out] ((3*d^(2/3)*x*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^3) - (2*Sqrt[3]*Arc
Tan[(1 - (2*e^(1/3)*x)/d^(1/3))/Sqrt[3]]*(a - b*n*Log[x] + b*Log[c*x^n]))/e
^(1/3) + (2*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d^(1/3) + e^(1/3)*x])/e^(1/
3) - ((a - b*n*Log[x] + b*Log[c*x^n])*Log[d^(2/3) - d^(1/3)*e^(1/3)*x + e^(
2/3)*x^2])/e^(1/3) + (3*b*n*(((-1 + (-1)^(1/3))*((-1)^(1/3)*e^(1/3)*x*Log[x
] + (d^(1/3) - (-1)^(1/3)*e^(1/3)*x)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x]
))/((-1)^(2/3)*d^(1/3)*e^(1/3) + e^(2/3)*x) + (-1)^(1/3)*((x*Log[x])/(d^(1/
3) + e^(1/3)*x) - Log[d^(1/3) + e^(1/3)*x]/e^(1/3)) + (-((-1)^(2/3)*e^(1/3)
*x*Log[x]) + (d^(1/3) + (-1)^(2/3)*e^(1/3)*x)*Log[d^(1/3) + (-1)^(2/3)*e^(1
/3)*x])/(-((-1)^(1/3)*d^(1/3)*e^(1/3)) + e^(2/3)*x) + (2*(-1)^(1/3)*(Log[x]
*Log[1 + (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))/e^(1/3
) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, ((-1)^(
1/3)*e^(1/3)*x)/d^(1/3)]))/e^(1/3) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + (
(-1)^(2/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3
))]))/e^(1/3)))/(1 + (-1)^(1/3))^2)/(9*d^(5/3))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 1388, normalized size = 2.67

method	result	size
risch	Expression too large to display	1388

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(e*x^3+d)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/9*b/d/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))*n*ln
(x)+2/9*b*ln(c)/d/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x
-1))-2/9*b/d/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))*n*ln(x)+1/9*b/d/e/(d/e)^(2/3)*
ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))*n*ln(x)-1/9*b*n/d/e/(d/e)^(2/3)*3^(1/2)*a
rctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))+2/9*a/d/e/(d/e)^(2/3)*3^(1/2)*arctan
(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))+1/3*a*x/d/(e*x^3+d)-1/9*I*b*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)/d/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/
e)^(1/3)*x-1))+1/9*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/e/(d/e)^(2/3)*ln(x+(d
/e)^(1/3))-1/18*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/e/(d/e)^(2/3)*ln(x^2-(d/
e)^(1/3)*x+(d/e)^(2/3))-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x/d/
(e*x^3+d)+1/3*b*x/d/(e*x^3+d)*ln(x^n)-1/9*b*n/d/e/(d/e)^(2/3)*ln(x+(d/e)^(1
/3))+1/18*b*n/d/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))+2/9*b*ln(c)
/d/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))-1/9*b*ln(c)/d/e/(d/e)^(2/3)*ln(x^2-(d/e)
^(1/3)*x+(d/e)^(2/3))-1/9*a/d/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3
))+1/6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*x/d/(e*x^3+d)+2/9*a/d/e/(d/e)^(2/3)
*ln(x+(d/e)^(1/3))+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*x/d/(e*x^3+d)-1/9
*I*b*Pi*csgn(I*c*x^n)^3/d/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))+2/9*b/d/e/(d/e)^(
2/3)*ln(x+(d/e)^(1/3))*ln(x^n)-1/9*b/d/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(
d/e)^(2/3))*ln(x^n)+2/9*b/d/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/
e)^(1/3)*x-1))*ln(x^n)+1/18*I*b*Pi*csgn(I*c*x^n)^3/d/e/(d/e)^(2/3)*ln(x^2-(
d/e)^(1/3)*x+(d/e)^(2/3))-1/6*I*b*Pi*csgn(I*c*x^n)^3*x/d/(e*x^3+d)+1/3*b*ln
(c)*x/d/(e*x^3+d)-1/9*I*b*Pi*csgn(I*c*x^n)^3/d/e/(d/e)^(2/3)*3^(1/2)*arctan
(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))+2/9*b*n/e/d*sum(1/_R1^2*(ln(x)*ln((_R1-x)
/_R1)+dilog((_R1-x)/_R1)),_R1=RootOf(_Z^3*e+d))-1/18*I*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2/d/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))+1/9*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2/d/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))+1/9*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2/d/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e
)^(1/3)*x-1))-1/9*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/e/(d/e)^(2/3
)*ln(x+(d/e)^(1/3))+1/18*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/e/(d/
e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))+1/9*I*b*Pi*csgn(I*c)*csgn(I*c*x^
n)^2/d/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="maxima")
```

```
[Out] 1/9*a*(2*sqrt(3)*arctan(-1/3*sqrt(3)*(d^(1/3)*e^(-1/3) - 2*x)*e^(1/3)/d^(1/
3))*e^(-1/3)/d^(5/3) - e^(-1/3)*log(-d^(1/3)*x*e^(-1/3) + x^2 + d^(2/3)*e^(
-2/3))/d^(5/3) + 2*e^(-1/3)*log(d^(1/3)*e^(-1/3) + x)/d^(5/3) + 3*x/(d*x^3*
e + d^2)) + b*integrate((log(c) + log(x^n))/(x^6*e^2 + 2*d*x^3*e + d^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^6*e^2 + 2*d*x^3*e + d^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{\left(d + ex^{3}\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(e*x**3+d)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**3)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^3*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a + b\,\ln\left(c\,x^{n}\right)}{{\left(e\,x^{3} + d\right)}^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^3)^2,x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^3)^2, x)
```

3.327 $\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=25

$$\mathrm{Int}\left(\frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)},x\right)$$

```
[Out] Unintegrable(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

Rubi [A]
time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification is not applicable to the result.

```
[In] Int[1/((d + e*x^3)^2*(a + b*Log[c*x^n])),x]
```

```
[Out] Defer[Int][1/((d + e*x^3)^2*(a + b*Log[c*x^n])), x]
```

Rubi steps

$$\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Mathematica [A]
time = 4.05, size = 0, normalized size = 0.00

$$\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])),x]
```

```
[Out] Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])), x]
```

Maple [A]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{1}{\left(e\,x^3+d\right)^2\left(a+b\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

```
[Out] int(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] integrate(1/((x^3*e + d)^2*(b*log(c*x^n) + a)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(1/(a*x^6*e^2 + 2*a*d*x^3*e + a*d^2 + (b*x^6*e^2 + 2*b*d*x^3*e + b*
d^2)*log(c*x^n)), x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n)),x)
```

```
[Out] Timed out
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(1/((x^3*e + d)^2*(b*log(c*x^n) + a)), x)
```

Mupad [A]

time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{\left(e\,x^3+d\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d + e*x^3)^2*(a + b*log(c*x^n))),x)
[Out] int(1/((d + e*x^3)^2*(a + b*log(c*x^n))), x)
```

3.328 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=25

$$\operatorname{Int}\left(\frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)^2},x\right)$$

```
[Out] Unintegrable(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

Rubi [A]
time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2),x]
[Out] Defer[Int][1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2), x]
```

Rubi steps

$$\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx=\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Mathematica [A]
time = 19.22, size = 0, normalized size = 0.00

$$\int \frac{1}{\left(d+ex^3\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2),x]
[Out] Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2), x]
```

Maple [A]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{1}{\left(e\,x^3+d\right)^2\left(a+b\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] -x/((b^2*n*log(c) + a*b*n)*x^6*e^2 + b^2*d^2*n*log(c) + a*b*d^2*n + 2*(b^2*
d*n*log(c) + a*b*d*n)*x^3*e + (b^2*n*x^6*e^2 + 2*b^2*d*n*x^3*e + b^2*d^2*n)
*log(x^n)) - integrate((5*x^3*e - d)/((b^2*n*log(c) + a*b*n)*x^9*e^3 + 3*(b
^2*d*n*log(c) + a*b*d*n)*x^6*e^2 + b^2*d^3*n*log(c) + a*b*d^3*n + 3*(b^2*d^
2*n*log(c) + a*b*d^2*n)*x^3*e + (b^2*n*x^9*e^3 + 3*b^2*d*n*x^6*e^2 + 3*b^2*
d^2*n*x^3*e + b^2*d^3*n)*log(x^n)), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(1/(a^2*x^6*e^2 + 2*a^2*d*x^3*e + a^2*d^2 + (b^2*x^6*e^2 + 2*b^2*d*
x^3*e + b^2*d^2)*log(c*x^n)^2 + 2*(a*b*x^6*e^2 + 2*a*b*d*x^3*e + a*b*d^2)*l
og(c*x^n)), x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Timed out
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((x^3*e + d)^2*(b*log(c*x^n) + a)^2), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{1}{\left(e\,x^3+d\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d + e*x^3)^2*(a + b*log(c*x^n))^2),x)
```

```
[Out] int(1/((d + e*x^3)^2*(a + b*log(c*x^n))^2), x)
```

3.329 $\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=185

$$-\frac{ae^3x}{d^4}+\frac{be^3nx}{d^4}-\frac{be^2nx^2}{4d^3}+\frac{benx^3}{9d^2}-\frac{bnx^4}{16d}-\frac{be^3x\log\left(cx^n\right)}{d^4}+\frac{e^2x^2(a+b\log\left(cx^n\right))}{2d^3}-\frac{ex^3(a+b\log\left(cx^n\right))}{3d^2}+\frac{x^4(a+$$

```
[Out] -a*e^3*x/d^4+b*e^3*n*x/d^4-1/4*b*e^2*n*x^2/d^3+1/9*b*e*n*x^3/d^2-1/16*b*n*x
^4/d-b*e^3*x*ln(c*x^n)/d^4+1/2*e^2*x^2*(a+b*ln(c*x^n))/d^3-1/3*e*x^3*(a+b*l
n(c*x^n))/d^2+1/4*x^4*(a+b*ln(c*x^n))/d+e^4*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^5
+b*e^4*n*polylog(2,-d*x/e)/d^5
```

Rubi [A]
time = 0.14, antiderivative size = 185, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {269, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{be^4n\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^5}+\frac{e^4\log\left(\frac{dx}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^5}+\frac{e^2x^2(a+b\log\left(cx^n\right))}{2d^3}-\frac{ex^3(a+b\log\left(cx^n\right))}{3d^2}+\frac{x^4(a+b\log\left(cx^n\right))}{4d}-\frac{ae^3x}{d^4}-\frac{be^3x\log\left(cx^n\right)}{d^4}+\frac{be^3nx}{d^4}-\frac{be^2nx^2}{4d^3}+\frac{benx^3}{9d^2}-\frac{bnx^4}{16d}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e/x),x]
```

```
[Out] -((a*e^3*x)/d^4) + (b*e^3*n*x)/d^4 - (b*e^2*n*x^2)/(4*d^3) + (b*e*n*x^3)/(9
*d^2) - (b*n*x^4)/(16*d) - (b*e^3*x*Log[c*x^n])/d^4 + (e^2*x^2*(a + b*Log[c
*x^n]))/(2*d^3) - (e*x^3*(a + b*Log[c*x^n]))/(3*d^2) + (x^4*(a + b*Log[c*x^
n]))/(4*d) + (e^4*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d^5 + (b*e^4*n*PolyL
og[2, -((d*x)/e)])/d^5
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \left(-\frac{e^3(a+b\log(cx^n))}{d^4}+\frac{e^2x(a+b\log(cx^n))}{d^3}-\frac{ex^2(a+b\log(cx^n))}{d^2}+\frac{x^3(a+$$

$$= \frac{\int x^3(a+b\log(cx^n))\,dx}{d}-\frac{e\int x^2(a+b\log(cx^n))\,dx}{d^2}+\frac{e^2\int x(a+b\log(cx^n))\,d}{d^3}$$

$$= -\frac{ae^3x}{d^4}-\frac{be^2nx^2}{4d^3}+\frac{benx^3}{9d^2}-\frac{bnx^4}{16d}+\frac{e^2x^2(a+b\log(cx^n))}{2d^3}-\frac{ex^3(a+b\log(cx^n)}{3d^2}$$

$$= -\frac{ae^3x}{d^4}+\frac{be^3nx}{d^4}-\frac{be^2nx^2}{4d^3}+\frac{benx^3}{9d^2}-\frac{bnx^4}{16d}-\frac{be^3x\log(cx^n)}{d^4}+\frac{e^2x^2(a+b\log(c}{2d^3}$$

Mathematica [A]
time = 0.07, size = 171, normalized size = 0.92

$$\frac{-144ade^3x+144bde^3nx-36bd^2e^2nx^2+16bd^3enx^3-9bd^4nx^4-144bde^3x\log(cx^n)+72d^2e^2x^2(a+b\log(cx^n))-48d^3ex^3(a+b\log(cx^n))+36d^4x^4(a+b\log(cx^n))+144e^4(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)+144be^4n\text{Li}_2\left(-\frac{dx}{e}\right)}{144d^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e/x),x]
```

```
[Out] (-144*a*d*e^3*x + 144*b*d*e^3*n*x - 36*b*d^2*e^2*n*x^2 + 16*b*d^3*e*n*x^3 -
 9*b*d^4*n*x^4 - 144*b*d*e^3*x*Log[c*x^n] + 72*d^2*e^2*x^2*(a + b*Log[c*x^n
]) - 48*d^3*e*x^3*(a + b*Log[c*x^n]) + 36*d^4*x^4*(a + b*Log[c*x^n]) + 144*
e^4*(a + b*Log[c*x^n])*Log[1 + (d*x)/e] + 144*b*e^4*n*PolyLog[2, -((d*x)/e)
])/(144*d^5)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.10, size = 867, normalized size = 4.69

method	result
risch	$\frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2 x^2 e^2}{4d^3}-\frac{bn\,e^4\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^5}-\frac{bn\,e^4\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d^5}+\frac{a\,e^4\ln(dx+e)}{d^5}-\frac{ae\,x^3}{3d^2}+\frac{a\,x^2e^2}{2d^3}-\frac{b\ln(x^n)}{3d^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/8*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*x^4-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)/d^3*x^2*e^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*e^4/d^5*ln(d*x+e)-b*n*e^4/d^5*ln(d*x+e)*ln(-d*x/e)+1/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2*e^4/d^5*ln(d*x+e)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^
4*x*e^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e^4/d^5*ln(d*x+e)-1/2*I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2/d^4*x*e^3+1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3
*x^2*e^2+1/2*I*b*Pi*csgn(I*c*x^n)^3/d^4*x*e^3-1/8*I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)/d*x^4-1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*e*x^3-1/
6*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*e*x^3+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2/d^3*x^2*e^2+1/8*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*x^4+a*e^4/d^5*l
n(d*x+e)-1/3*a/d^2*e*x^3+1/2*a/d^3*x^2*e^2-1/4*I*b*Pi*csgn(I*c*x^n)^3/d^3*x
^2*e^2-1/3*b*ln(x^n)/d^2*e*x^3-1/4*b*e^2*n*x^2/d^3+1/9*b*e*n*x^3/d^2-1/8*I*
b*Pi*csgn(I*c*x^n)^3/d*x^4+b*e^3*n*x/d^4+1/2*b*ln(c)/d^3*x^2*e^2-b*ln(c)/d^
4*x*e^3+b*ln(c)*e^4/d^5*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^4/d^5*ln(d*x
+e)+1/4*a/d*x^4+1/4*b*ln(x^n)/d*x^4+1/4*b*ln(c)/d*x^4+205/144*b*n*e^4/d^5-b
*n*e^4/d^5*dilog(-d*x/e)-1/3*b*ln(c)/d^2*e*x^3+1/2*b*ln(x^n)/d^3*x^2*e^2-b*
ln(x^n)/d^4*x*e^3+b*ln(x^n)*e^4/d^5*ln(d*x+e)+1/6*I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)/d^2*e*x^3+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/
d^4*x*e^3+1/6*I*b*Pi*csgn(I*c*x^n)^3/d^2*e*x^3-a*e^3*x/d^4-1/16*b*n*x^4/d
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

```
[Out] 1/12*a*((3*d^3*x^4 - 4*d^2*x^3*e + 6*d*x^2*e^2 - 12*x*e^3)/d^4 + 12*e^4*log
(d*x + e)/d^5) + b*integrate((x^4*log(c) + x^4*log(x^n))/(d*x + e), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x^4*log(c*x^n) + a*x^4)/(d*x + e), x)
```

Sympy [A]
time = 115.41, size = 316, normalized size = 1.71

$$\frac{ax^4}{4d} - \frac{aex^3}{3d^2} + \frac{ae^2x^2}{2d^3} + \frac{ae^4\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)}{d^4} - \frac{ae^3x}{d^4} - \frac{bnx^4}{16d} + \frac{bx^4\log(cx^n)}{4d} + \frac{benx^3}{9d^2} - \frac{bex^3\log(cx^n)}{3d^2} - \frac{be^2nx^2}{4d^3} + \frac{be^2x^2\log(cx^n)}{2d^3} - \frac{be^4n\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log(e)\log(x) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: |x| < 1 \\ -\log(e)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\ 0, 0 & \end{matrix} \middle| x\right)\log(e) + G_{2,2}^{0,2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| x\right)\log(e) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}\right)}{d^4} + \frac{be^4\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)\log(cx^n)}{d^4} + \frac{be^3nx}{d^4} - \frac{be^3x\log(cx^n)}{d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(d+e/x),x)
```

```
[Out] a*x**4/(4*d) - a*e*x**3/(3*d**2) + a*e**2*x**2/(2*d**3) + a*e**4*Piecewise(
(x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d**4 - a*e**3*x/d**4 - b*n*x**4/(1
6*d) + b*x**4*log(c*x**n)/(4*d) + b*e*n*x**3/(9*d**2) - b*e*x**3*log(c*x**n
)/(3*d**2) - b*e**2*n*x**2/(4*d**3) + b*e**2*x**2*log(c*x**n)/(2*d**3) - b*
e**4*n*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*p
i)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_
polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I
*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + m
eijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*p
i)/e), True))/d, True))/d**4 + b*e**4*Piecewise((x/e, Eq(d, 0)), (log(d*x +
 e)/d, True))*log(c*x**n)/d**4 + b*e**3*n*x/d**4 - b*e**3*x*log(c*x**n)/d**
4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,(a+b\,\ln{(c\,x^n)})}{d+\frac{e}{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e/x),x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e/x), x)
```

3.330 $\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=148

$$\frac{ae^2x}{d^3}-\frac{be^2nx}{d^3}+\frac{benx^2}{4d^2}-\frac{bnx^3}{9d}+\frac{be^2x\log\left(cx^n\right)}{d^3}-\frac{ex^2\left(a+b\log\left(cx^n\right)\right)}{2d^2}+\frac{x^3\left(a+b\log\left(cx^n\right)\right)}{3d}-\frac{e^3\left(a+b\log\left(cx^n\right)\right)}{d^4}$$

```
[Out] a*e^2*x/d^3-b*e^2*n*x/d^3+1/4*b*e*n*x^2/d^2-1/9*b*n*x^3/d+b*e^2*x*ln(c*x^n)
/d^3-1/2*e*x^2*(a+b*ln(c*x^n))/d^2+1/3*x^3*(a+b*ln(c*x^n))/d-e^3*(a+b*ln(c*
x^n))*ln(1+d*x/e)/d^4-b*e^3*n*polylog(2,-d*x/e)/d^4
```

Rubi [A]
time = 0.12, antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {269, 45, 2393, 2332, 2341, 2354, 2438}

$$-\frac{be^3n\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}-\frac{e^3\log\left(\frac{dx}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^4}-\frac{ex^2\left(a+b\log\left(cx^n\right)\right)}{2d^2}+\frac{x^3\left(a+b\log\left(cx^n\right)\right)}{3d}+\frac{ae^2x}{d^3}+\frac{be^2x\log\left(cx^n\right)}{d^3}-\frac{be^2nx}{d^3}+\frac{benx^2}{4d^2}-\frac{bnx^3}{9d}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e/x),x]
```

```
[Out] (a*e^2*x)/d^3 - (b*e^2*n*x)/d^3 + (b*e*n*x^2)/(4*d^2) - (b*n*x^3)/(9*d) + (
b*e^2*x*Log[c*x^n])/d^3 - (e*x^2*(a + b*Log[c*x^n]))/(2*d^2) + (x^3*(a + b*
Log[c*x^n]))/(3*d) - (e^3*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d^4 - (b*e^3
*n*PolyLog[2, -((d*x)/e)])/d^4
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \left(\frac{e^2(a+b\log(cx^n))}{d^3} - \frac{ex(a+b\log(cx^n))}{d^2} + \frac{x^2(a+b\log(cx^n))}{d} - \frac{e^3(a+b\log}{d^3(e+}\right.$$

$$= \frac{\int x^2(a+b\log(cx^n))\,dx}{d} - \frac{e\int x(a+b\log(cx^n))\,dx}{d^2} + \frac{e^2\int(a+b\log(cx^n))\,dx}{d^3} -$$

$$= \frac{ae^2x}{d^3} + \frac{benx^2}{4d^2} - \frac{bnx^3}{9d} - \frac{ex^2(a+b\log(cx^n))}{2d^2} + \frac{x^3(a+b\log(cx^n))}{3d} - \frac{e^3(a+b\log}{}$$

$$= \frac{ae^2x}{d^3} - \frac{be^2nx}{d^3} + \frac{benx^2}{4d^2} - \frac{bnx^3}{9d} + \frac{be^2x\log(cx^n)}{d^3} - \frac{ex^2(a+b\log(cx^n))}{2d^2} + \frac{x^3(a+}{}$$

Mathematica [A]
time = 0.05, size = 142, normalized size = 0.96

$$\frac{36ade^2x-36bde^2nx-18ad^2ex^2+9bd^2enx^2+12ad^3x^3-4bd^3nx^3-36ae^3\log\left(1+\frac{dx}{e}\right)+6b\log(cx^n)\left(dx(6e^2-3dex+2d^2x^2)-6e^3\log\left(1+\frac{dx}{e}\right)\right)-36be^3n\mathrm{Li}_2\left(-\frac{dx}{e}\right)}{36d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e/x),x]
```

```
[Out] (36*a*d*e^2*x - 36*b*d*e^2*n*x - 18*a*d^2*e*x^2 + 9*b*d^2*e*n*x^2 + 12*a*d^
3*x^3 - 4*b*d^3*n*x^3 - 36*a*e^3*Log[1 + (d*x)/e] + 6*b*Log[c*x^n]*(d*x*(6*
e^2 - 3*d*e*x + 2*d^2*x^2) - 6*e^3*Log[1 + (d*x)/e]) - 36*b*e^3*n*PolyLog[2
, -((d*x)/e)])/(36*d^4)
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.06, size = 693, normalized size = 4.68

method	result
risch	$-\frac{ae\,x^2}{2d^2}-\frac{a\,e^3\ln(dx+e)}{d^4}+\frac{bn\,e^3\operatorname{dilog}\left(-\frac{dx}{e}\right)}{d^4}+\frac{a\,x^3}{3d}+\frac{b\ln(c)x^3}{3d}-\frac{49bn\,e^3}{36d^4}+\frac{b\ln(x^n)x^3}{3d}+\frac{ben\,x^2}{4d^2}-\frac{ib\pi\operatorname{csgn}(ic)\operatorname{csgn}(i$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] b*n*e^3/d^4*dilog(-d*x/e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^
3*x*e^2-1/2*a*e/d^2*x^2-a*e^3/d^4*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x
^n)^2*e^3/d^4*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^3*x*e^2-1/4*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/d^2*x^2-1/6*I*b*Pi*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)/d*x^3+1/3*a/d*x^3+1/3*b*ln(c)/d*x^3+1/6*I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2/d*x^3-49/36*b*n*e^3/d^4-1/6*I*b*Pi*csgn(I*c*x^n)^3/d*x^3+1/3*b
*ln(x^n)/d*x^3+1/4*b*e*n*x^2/d^2-b*e^2*n*x/d^3+1/2*I*b*Pi*csgn(I*x^n)*csgn(
I*c*x^n)^2/d^3*x*e^2-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^3/d^4*ln(d*x+
e)-1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2*x^2+b*n*e^3/d^4*ln(d*x+e)*l
n(-d*x/e)-1/2*b*ln(x^n)*e/d^2*x^2+1/6*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*
x^3+b*ln(x^n)/d^3*x*e^2-b*ln(x^n)*e^3/d^4*ln(d*x+e)+1/4*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*e/d^2*x^2+b*ln(c)/d^3*x*e^2-b*ln(c)*e^3/d^4*ln(d*x+
e)-1/2*b*ln(c)*e/d^2*x^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*e^3
/d^4*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c*x^n)^3*e^3/d^4*ln(d*x+e)-1/2*I*b*Pi*csgn
(I*c*x^n)^3/d^3*x*e^2+1/4*I*b*Pi*csgn(I*c*x^n)^3*e/d^2*x^2+a*e^2*x/d^3-1/9*
b*n*x^3/d
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

```
[Out] 1/6*a*((2*d^2*x^3 - 3*d*x^2*e + 6*x*e^2)/d^3 - 6*e^3*log(d*x + e)/d^4) + b*
integrate((x^3*log(c) + x^3*log(x^n))/(d*x + e), x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(d*x + e), x)
```

Sympy [A]
time = 121.40, size = 267, normalized size = 1.80

$$\frac{ax^3}{3d} - \frac{aex^2}{2d^2} - \frac{ae^3\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log{\left(dx+e \right)}}{d} & \text{otherwise} \end{cases}\right)}{d^3} + \frac{ae^2x}{d^3} - \frac{bnx^3}{9d} + \frac{bx^3\log{\left(cx^n \right)}}{3d} + \frac{benx^2}{4d^2} - \frac{bex^2\log{\left(cx^n \right)}}{2d^2} + \frac{be^3n\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\begin{cases} -\operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log{\left(e \right)}\log{\left(x \right)} - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: |x| < 1 \\ -\log{\left(e \right)}\log{\left(\frac{1}{x} \right)} - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\ 0, 0 & \end{matrix} \middle| {x} \right)\log{\left(e \right)} + G_{2,2}^{0,2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)\log{\left(e \right)} - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}\right)}{d^3} - \frac{be^3\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log{\left(dx+e \right)}}{d} & \text{otherwise} \end{cases}\right)\log{\left(cx^n \right)}}{d^3} - \frac{be^2nx}{d^3} + \frac{be^2x\log{\left(cx^n \right)}}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(d+e/x),x)
```

```
[Out] a*x**3/(3*d) - a*e*x**2/(2*d**2) - a*e**3*Piecewise((x/e, Eq(d, 0)), (log(d
*x + e)/d, True))/d**3 + a*e**2*x/d**3 - b*n*x**3/(9*d) + b*x**3*log(c*x**n
)/(3*d) + b*e*n*x**2/(4*d**2) - b*e*x**2*log(c*x**n)/(2*d**2) + b*e**3*n*Pi
ecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (A
bs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*p
i)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e),
1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((
1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), Tr
ue))/d, True))/d**3 - b*e**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, Tr
ue))*log(c*x**n)/d**3 - b*e**2*n*x/d**3 + b*e**2*x*log(c*x**n)/d**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+\frac{e}{x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e/x),x)
```

```
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e/x), x)
```

3.331 $\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=107

$$-\frac{aex}{d^2}+\frac{benx}{d^2}-\frac{bnx^2}{4d}-\frac{bex\log(cx^n)}{d^2}+\frac{x^2(a+b\log(cx^n))}{2d}+\frac{e^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^3}+\frac{be^2n\text{Li}_2\left(-\frac{dx}{e}\right)}{d^3}$$

```
[Out] -a*e*x/d^2+b*e*n*x/d^2-1/4*b*n*x^2/d-b*e*x*ln(c*x^n)/d^2+1/2*x^2*(a+b*ln(c*
x^n))/d+e^2*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^3+b*e^2*n*polylog(2,-d*x/e)/d^3
```

Rubi [A]
time = 0.09, antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {269, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{be^2n\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}+\frac{e^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^3}+\frac{x^2(a+b\log(cx^n))}{2d}-\frac{aex}{d^2}-\frac{bex\log(cx^n)}{d^2}+\frac{benx}{d^2}-\frac{bnx^2}{4d}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e/x),x]
```

```
[Out] -((a*e*x)/d^2) + (b*e*n*x)/d^2 - (b*n*x^2)/(4*d) - (b*e*x*Log[c*x^n])/d^2 +
 (x^2*(a + b*Log[c*x^n]))/(2*d) + (e^2*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])
/d^3 + (b*e^2*n*PolyLog[2, -((d*x)/e)])/d^3
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx &= \int \left(-\frac{e(a+b\log(cx^n))}{d^2}+\frac{x(a+b\log(cx^n))}{d}+\frac{e^2(a+b\log(cx^n))}{d^2(e+dx)}\right)dx\\ &= \frac{\int x(a+b\log(cx^n))\,dx}{d}-\frac{e\int(a+b\log(cx^n))\,dx}{d^2}+\frac{e^2\int\frac{a+b\log(cx^n)}{e+dx}\,dx}{d^2}\\ &= -\frac{aex}{d^2}-\frac{bnx^2}{4d}+\frac{x^2(a+b\log(cx^n))}{2d}+\frac{e^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^3}-\frac{(be)\int\log\ldots}{d\ldots}\\ &= -\frac{aex}{d^2}+\frac{benx}{d^2}-\frac{bnx^2}{4d}-\frac{bex\log(cx^n)}{d^2}+\frac{x^2(a+b\log(cx^n))}{2d}+\frac{e^2(a+b\log(cx^n))\ldots}{d^3}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 105, normalized size = 0.98

$$\frac{-4adex+4bdenx+2ad^2x^2-bd^2nx^2+4ae^2\log\left(1+\frac{dx}{e}\right)+2b\log(cx^n)\left(dx(-2e+dx)+2e^2\log\left(1+\frac{dx}{e}\right)\right)+4be^2n\,\mathrm{Li}_2\left(-\frac{dx}{e}\right)}{4d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e/x),x]
```

```
[Out] (-4*a*d*e*x + 4*b*d*e*n*x + 2*a*d^2*x^2 - b*d^2*n*x^2 + 4*a*e^2*Log[1 + (d*
x)/e] + 2*b*Log[c*x^n]*(d*x*(-2*e + d*x) + 2*e^2*Log[1 + (d*x)/e]) + 4*b*e^
2*n*PolyLog[2, -((d*x)/e)])/(4*d^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.05, size = 521, normalized size = 4.87

method	result
risch	$\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2x^2}{4d}+\frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2x^2}{4d}+\frac{a\,e^2\ln(dx+e)}{d^3}-\frac{b\ln(c)xe}{d^2}+\frac{b\ln(c)e^2\ln(dx+e)}{d^3}-\frac{bn\,e^2\,\mathrm{dilog}(-}{d^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*x^2/d+1/4*I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2*x^2/d-1/2*I*b*Pi*csgn(I*c*x^n)^3*e^2/d^3*ln(d*x+e)+a*e^2/d^3*ln(d*x+
e)-b*ln(c)/d^2*x*e+b*ln(c)*e^2/d^3*ln(d*x+e)+1/2*a*x^2/d+1/2*I*b*Pi*csgn(I*
c*x^n)^3/d^2*x*e+1/2*b*ln(x^n)*x^2/d-1/4*I*b*Pi*csgn(I*c*x^n)^3*x^2/d+5/4*b
*n*e^2/d^3+1/2*b*ln(c)*x^2/d-b*n*e^2/d^3*dilog(-d*x/e)+b*e*n*x/d^2+1/2*I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e^2/d^3*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2*e^2/d^3*ln(d*x+e)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*x*e
-1/4*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^2/d-1/2*I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2/d^2*x*e-b*n*e^2/d^3*ln(d*x+e)*ln(-d*x/e)-1/2*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)*e^2/d^3*ln(d*x+e)-b*ln(x^n)/d^2*x*e+b*ln(x^n)*
e^2/d^3*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2*x*e-a*
e*x/d^2-1/4*b*n*x^2/d
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

```
[Out] 1/2*a*((d*x^2 - 2*x*e)/d^2 + 2*e^2*log(d*x + e)/d^3) + b*integrate((x^2*log
(c) + x^2*log(x^n))/(d*x + e), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(d*x + e), x)
```

Sympy [A]
time = 77.89, size = 218, normalized size = 2.04

$$\frac{ax^2}{2d} + \frac{ae^2\left(\begin{cases}\frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^2} - \frac{aex}{d^2} - \frac{bnx^2}{4d} + \frac{bx^2\log(cx^n)}{2d} - \frac{be^2n\left(\begin{cases}\frac{x}{e} & \text{for}\: d = 0 \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log(e)\log(x) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: |x| < 1 \\ -\log(e)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix} \middle| x\right)\log(e) + G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix} \middle| x\right)\log(e) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{d^2} + \frac{be^2\left(\begin{cases}\frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2} + \frac{benx}{d^2} - \frac{bex\log(cx^n)}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(d+e/x),x)
```

```
[Out] a*x**2/(2*d) + a*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d*
*2 - a*e*x/d**2 - b*n*x**2/(4*d) + b*x**2*log(c*x**n)/(2*d) - b*e**2*n*Piec
ewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs
(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)
/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/
Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1,
 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True
))/d, True))/d**2 + b*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True
))*log(c*x**n)/d**2 + b*e*n*x/d**2 - b*e*x*log(c*x**n)/d**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+\frac{e}{x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e/x),x)
```

```
[Out] int((x*(a + b*log(c*x^n)))/(d + e/x), x)
```

3.332 $\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=69

$$\frac{ax}{d}-\frac{bnx}{d}+\frac{bx\log\left(cx^n\right)}{d}-\frac{e(a+b\log\left(cx^n\right))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{ben\text{Li}_2\left(-\frac{dx}{e}\right)}{d^2}$$

```
[Out] a*x/d-b*n*x/d+b*x*ln(c*x^n)/d-e*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^2-b*e*n*polyl
og(2,-d*x/e)/d^2
```

Rubi [A]
time = 0.06, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {199, 45, 2367, 2332, 2354, 2438}

$$-\frac{ben\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}-\frac{e\log\left(\frac{dx}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^2}+\frac{ax}{d}+\frac{bx\log\left(cx^n\right)}{d}-\frac{bnx}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d + e/x),x]
```

```
[Out] (a*x)/d - (b*n*x)/d + (b*x*Log[c*x^n])/d - (e*(a + b*Log[c*x^n])*Log[1 + (d
*x)/e])/d^2 - (b*e*n*PolyLog[2, -((d*x)/e)])/d^2
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 199

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(n*p)*(b + a/x^n)^p,
x] /; FreeQ[{a, b}, x] && LtQ[n, 0] && IntegerQ[p]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
```

```
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx &= \int \left(\frac{a+b\log(cx^n)}{d}-\frac{e(a+b\log(cx^n))}{d(e+dx)}\right)dx\\ &= \frac{\int (a+b\log(cx^n))\,dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{e+dx}\,dx}{d}\\ &= \frac{ax}{d}-\frac{e(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^2}+\frac{b\int \log(cx^n)\,dx}{d}+\frac{(ben)\int \frac{\log\left(1+\frac{dx}{e}\right)}{x}\,dx}{d^2}\\ &= \frac{ax}{d}-\frac{bnx}{d}+\frac{bx\log(cx^n)}{d}-\frac{e(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{ben\text{Li}_2\left(-\frac{dx}{e}\right)}{d^2}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 66, normalized size = 0.96

$$\frac{adx-bdnx-ae\log\left(1+\frac{dx}{e}\right)+b\log(cx^n)\left(dx-e\log\left(1+\frac{dx}{e}\right)\right)-ben\text{Li}_2\left(-\frac{dx}{e}\right)}{d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e/x),x]
```

```
[Out] (a*d*x - b*d*n*x - a*e*Log[1 + (d*x)/e] + b*Log[c*x^n]*(d*x - e*Log[1 + (d*
x)/e]) - b*e*n*PolyLog[2, -((d*x)/e)])/d^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.08, size = 343, normalized size = 4.97

method	result

risch	$\frac{b\ln(x^n)x}{d} - \frac{b\ln(x^n)e\ln(dx+e)}{d^2} - \frac{bnx}{d} - \frac{bne}{d^2} + \frac{bne\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^2} + \frac{bne\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d^2} + \frac{ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2x}{2d}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(x^n)/d*x-b*ln(x^n)*e/d^2*ln(d*x+e)-b*n*x/d-b*n*e/d^2+b*n*e/d^2*ln(d*x+
e)*ln(-d*x/e)+b*n*e/d^2*dilog(-d*x/e)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^
2/d*x-1/2*I*b*Pi*csgn(I*c*x^n)^3/d*x-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)/d*x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*e/d^2*ln(d*x+e)+1/2*I*b
*Pi*csgn(I*c*x^n)^3*e/d^2*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*e/
d^2*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*x+1/2*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*e/d^2*ln(d*x+e)+b*ln(c)/d*x-b*ln(c)*e/d^2*ln(d*x
+e)+a*x/d-a*e/d^2*ln(d*x+e)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

```
[Out] a*(x/d - e*log(d*x + e)/d^2) + b*integrate((x*log(c) + x*log(x^n))/(d*x + e
), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x*log(c*x^n) + a*x)/(d*x + e), x)
```

Sympy [A]
time = 67.87, size = 163, normalized size = 2.36

$$-\frac{ae\left(\begin{cases}\frac{x}{e} & \text{for}\: d = 0\\\frac{\log\left(dx+e\right)}{d} & \text{otherwise}\end{cases}\right)}{d} + \frac{ax}{d} + \frac{ben\left(\begin{cases}\frac{x}{e} & \text{for}\: d = 0\\\frac{\begin{cases}-\operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1\\\log\left(e\right)\log\left(x\right) - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \left|x\right| < 1\\-\log\left(e\right)\log\left(\frac{1}{x}\right) - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| x\right)\log\left(e\right) + G_{2,2}^{0,2}\left(\begin{matrix}1, 1 & \\ & 0, 0 \end{matrix} \middle| x\right)\log\left(e\right) - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{d} - \frac{be\left(\begin{cases}\frac{x}{e} & \text{for}\: d = 0\\\frac{\log\left(dx+e\right)}{d} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d} - \frac{bnx}{d} + \frac{bx\log\left(cx^{n}\right)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d+e/x),x)
```

```
[Out] -a*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d + a*x/d + b*e*n*P
iecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (
Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*
pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e),
 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg((
(1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), T
rue))/d, True))/d - b*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*
log(c*x**n)/d - b*n*x/d + b*x*log(c*x**n)/d
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{d+\frac{e}{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e/x),x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e/x), x)
```

3.333 $\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x} \, dx$

Optimal. Leaf size=39

$$\frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d}+\frac{bn\text{Li}_2\left(-\frac{dx}{e}\right)}{d}$$

```
[Out] (a+b*ln(c*x^n))*ln(1+d*x/e)/d+b*n*polylog(2,-d*x/e)/d
```

Rubi [A]
time = 0.05, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2370, 2354, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}+\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/((d + e/x)*x),x]
```

```
[Out] ((a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d + (b*n*PolyLog[2, -((d*x)/e)])/d
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2370

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)/(x_))^(q_.)*(
x_)^(m_.), x_Symbol] :> Int[(e + d*x)^q*(a + b*Log[c*x^n])^p, x] /; FreeQ[{
a, b, c, d, e, m, n, p}, x] && EqQ[m, q] && IntegerQ[q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{a+b\log(cx^n)}{e+dx}\,dx$$
$$= \frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d} - \frac{(bn)\int \frac{\log\left(1+\frac{dx}{e}\right)}{x}\,dx}{d}$$
$$= \frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d} + \frac{bn\text{Li}_2\left(-\frac{dx}{e}\right)}{d}$$

Mathematica [**A**]
time = 0.01, size = 37, normalized size = 0.95

$$\frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)+bn\text{Li}_2\left(-\frac{dx}{e}\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/((d + e/x)*x),x]
```

```
[Out] ((a + b*Log[c*x^n])*Log[1 + (d*x)/e] + b*n*PolyLog[2, -((d*x)/e)])/d
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.06, size = 195, normalized size = 5.00

method	result
risch	$\frac{b\ln(dx+e)\ln(x^n)}{d}-\frac{bn\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d}-\frac{bn\,\text{dilog}\left(-\frac{dx}{e}\right)}{d}-\frac{i\ln(dx+e)b\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)}{2d}+\frac{i\ln(dx+e)b\pi\,\text{csgn}}{2d}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d+e/x)/x,x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(d*x+e)/d*ln(x^n)-b/d*n*ln(d*x+e)*ln(-d*x/e)-b/d*n*dilog(-d*x/e)-1/2*I*
ln(d*x+e)/d*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*ln(d*x+e)/d*b*Pi
*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(d*x+e)/d*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-1/2*I*ln(d*x+e)/d*b*Pi*csgn(I*c*x^n)^3+ln(d*x+e)/d*b*ln(c)+a*ln(d*x+e)/d
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="maxima")
```

```
[Out] b*integrate((log(c) + log(x^n))/(d*x + e), x) + a*log(d*x + e)/d
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)/(d*x + e), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(cx^{n} \right)}}{dx + e}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d+e/x)/x,x)
[Out] Integral((a + b*log(c*x**n))/(d*x + e), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((d + e/x)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+\frac{e}{x}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e/x)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e/x)), x)
```

3.334 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^2}\,dx$

Optimal. Leaf size=44

$$-\frac{\log\left(1+\frac{e}{dx}\right)\left(a+b\log\left(cx^n\right)\right)}{e}+\frac{bn\text{Li}_2\left(-\frac{e}{dx}\right)}{e}$$

```
[Out] -ln(1+e/d/x)*(a+b*ln(c*x^n))/e+b*n*polylog(2,-e/d/x)/e
```

Rubi [A]
time = 0.04, antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2375, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/((d + e/x)*x^2),x]
```

```
[Out] -((Log[1 + e/(d*x)]*(a + b*Log[c*x^n]))/e) + (b*n*PolyLog[2, -(e/(d*x))])/e
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^2}\,dx&=-\frac{\log\left(1+\frac{e}{dx}\right)\left(a+b\log\left(cx^n\right)\right)}{e}+\frac{(bn)\int\frac{\log\left(1+\frac{e}{dx}\right)}{x}\,dx}{e}\\&=-\frac{\log\left(1+\frac{e}{dx}\right)\left(a+b\log\left(cx^n\right)\right)}{e}+\frac{bn\text{Li}_2\left(-\frac{e}{dx}\right)}{e}\end{aligned}$$

Mathematica [A]
time = 0.03, size = 63, normalized size = 1.43

$$\frac{(a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{dx}{e}\right)\right)}{2ben}-\frac{bn\text{Li}_2\left(-\frac{dx}{e}\right)}{e}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^2),x]
```

```
[Out] ((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (d*x)/e]))/(2*b*e*n)
- (b*n*PolyLog[2, -((d*x)/e)])/e
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.06, size = 336, normalized size = 7.64

method	result
risch	$\frac{b\ln(x^n)\ln(x)}{e}-\frac{b\ln(x^n)\ln(dx+e)}{e}-\frac{bn\ln(x)^2}{2e}+\frac{bn\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{e}+\frac{bn\,\text{dilog}\left(-\frac{dx}{e}\right)}{e}+\frac{ib\pi\text{csgn}(ic\,x^n)^3\ln(dx+e)}{2e}+$ i

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d+e/x)/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] b*ln(x^n)/e*ln(x)-b*ln(x^n)/e*ln(d*x+e)-1/2*b*n/e*ln(x)^2+b*n/e*ln(d*x+e)*l
n(-d*x/e)+b*n/e*dilog(-d*x/e)+1/2*I*b*Pi*csgn(I*c*x^n)^3/e*ln(d*x+e)+1/2*I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*ln(d*x+e)+1/2*I*b*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2/e*ln(x)-1/2*I*b*Pi*csgn(I*c*x^n)^3/e*ln(x)-1/2*I*b*Pi*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^
2/e*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e*ln(d*x+e)-1/2*I*b*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2/e*ln(d*x+e)+b*ln(c)/e*ln(x)-b*ln(c)/e*ln(d*x+e)+a/e*
ln(x)-a/e*ln(d*x+e)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="maxima")
```

```
[Out] -(e^(-1)*log(d*x + e) - e^(-1)*log(x))*a + b*integrate((log(c) + log(x^n))/
(d*x^2 + x*e), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(d*x^2 + x*e), x)
```

Sympy [C] Result contains complex when optimal does not.
time = 7.47, size = 173, normalized size = 3.93

$$\frac{2ad\left(\begin{cases} -\frac{x}{e} - \frac{1}{2d} & \text{for}\: d = 0 \\ \frac{\log{\left(2dx \right)}}{2d} & \text{otherwise} \end{cases}\right)}{e} - \frac{2ad\left(\begin{cases} \frac{x}{e} + \frac{1}{2d} & \text{for}\: d = 0 \\ \frac{\log{\left(2dx + 2e \right)}}{2d} & \text{otherwise} \end{cases}\right)}{e} + bn\left(\begin{cases} -\frac{1}{dx} & \text{for}\: e = 0 \\ \frac{\begin{cases} \operatorname{Li}_{2}\left(\frac{e e^{i\pi}}{dx}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| < 1 \\ \log{\left(d \right)} \log{\left(x \right)} + \operatorname{Li}_{2}\left(\frac{e e^{i\pi}}{dx}\right) & \text{for}\: \left|x\right| < 1 \\ - \log{\left(d \right)} \log{\left(\frac{1}{x} \right)} + \operatorname{Li}_{2}\left(\frac{e e^{i\pi}}{dx}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \\ - G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix} \middle| {x} \right) \log{\left(d \right)} + G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right) \log{\left(d \right)} + \operatorname{Li}_{2}\left(\frac{e e^{i\pi}}{dx}\right) & \text{otherwise} \end{cases}}{e} & \text{otherwise} \end{cases}\right) - b\left(\begin{cases} \frac{1}{dx} & \text{for}\: e = 0 \\ \frac{\log{\left(d + \frac{e}{x} \right)}}{e} & \text{otherwise} \end{cases}\right) \log{\left(cx^{n} \right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d+e/x)/x**2,x)
```

```
[Out] 2*a*d*Piecewise((-x/e - 1/(2*d), Eq(d, 0)), (log(2*d*x)/(2*d), True))/e - 2
*a*d*Piecewise((x/e + 1/(2*d), Eq(d, 0)), (log(2*d*x + 2*e)/(2*d), True))/e
 + b*n*Piecewise((-1/(d*x), Eq(e, 0)), (Piecewise((polylog(2, e*exp_polar(I
*pi)/(d*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) + polylog(2, e*
exp_polar(I*pi)/(d*x)), Abs(x) < 1), (-log(d)*log(1/x) + polylog(2, e*exp_p
olar(I*pi)/(d*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*
log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) + polylog(2, e*exp_p
olar(I*pi)/(d*x)), True))/e, True)) - b*Piecewise((1/(d*x), Eq(e, 0)), (log
(d + e/x)/e, True))*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((d + e/x)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\left(d+\frac{e}{x}\right)} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e/x)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^2*(d + e/x)), x)
```

3.335 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^3}\,dx$

Optimal. Leaf size=95

$$-\frac{bn}{ex}-\frac{a+b\log\left(cx^n\right)}{ex}-\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{2be^2n}+\frac{d\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{dx}{e}\right)}{e^2}+\frac{bdn\text{Li}_2\left(-\frac{dx}{e}\right)}{e^2}$$

```
[Out] -b*n/e/x+(-a-b*ln(c*x^n))/e/x-1/2*d*(a+b*ln(c*x^n))^2/b/e^2/n+d*(a+b*ln(c*x
^n))*ln(1+d*x/e)/e^2+b*d*n*polylog(2,-d*x/e)/e^2
```

Rubi [A]
time = 0.11, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {269, 46, 2393, 2341, 2338, 2354, 2438}

$$\frac{bdn\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^2}-\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{2be^2n}+\frac{d\log\left(\frac{dx}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{e^2}-\frac{a+b\log\left(cx^n\right)}{ex}-\frac{bn}{ex}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/((d + e/x)*x^3),x]
```

```
[Out] -((b*n)/(e*x)) - (a + b*Log[c*x^n])/(e*x) - (d*(a + b*Log[c*x^n])^2)/(2*b*e
^2*n) + (d*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])/e^2 + (b*d*n*PolyLog[2, -((
d*x)/e)])/e^2
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx &= \int \left(\frac{a+b\log(cx^n)}{ex^2}-\frac{d(a+b\log(cx^n))}{e^2x}+\frac{d^2(a+b\log(cx^n))}{e^2(e+dx)}\right)dx\\ &= -\frac{d\int \frac{a+b\log(cx^n)}{x}\,dx}{e^2}+\frac{d^2\int \frac{a+b\log(cx^n)}{e+dx}\,dx}{e^2}+\frac{\int \frac{a+b\log(cx^n)}{x^2}\,dx}{e}\\ &= -\frac{bn}{ex}-\frac{a+b\log(cx^n)}{ex}-\frac{d(a+b\log(cx^n))^2}{2be^2n}+\frac{d(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{e^2}-\frac{(bdn\\ &= -\frac{bn}{ex}-\frac{a+b\log(cx^n)}{ex}-\frac{d(a+b\log(cx^n))^2}{2be^2n}+\frac{d(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{e^2}+\frac{bdn\mathrm{I}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 88, normalized size = 0.93

$$-\frac{\frac{2ben}{x}+\frac{2e(a+b\log(cx^n))}{x}+\frac{d(a+b\log(cx^n))^2}{bn}-2d(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)-2bdn\mathrm{Li}_2\left(-\frac{dx}{e}\right)}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^3),x]
```

[Out] -1/2*((2*b*e*n)/x + (2*e*(a + b*Log[c*x^n]))/x + (d*(a + b*Log[c*x^n])^2)/(b*n) - 2*d*(a + b*Log[c*x^n])*Log[1 + (d*x)/e] - 2*b*d*n*PolyLog[2, -((d*x)/e)])/e^2

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.06, size = 504, normalized size = 5.31

method	result
risch	$-\frac{b\ln(x^n)d\ln(x)}{e^2}+\frac{bnd\ln(x)^2}{2e^2}-\frac{bnd\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{e^2}-\frac{b\ln(c)}{ex}-\frac{bnd\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{e^2}-\frac{ib\pi\,\mathrm{csgn}(ic\,x^n)^3d\ln(dx+e)}{2e^2}-ib\pi$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a+b*ln(c*x^n))/(d+e/x)/x^3,x,method=_RETURNVERBOSE)

[Out] -b*ln(x^n)*d/e^2*ln(x)+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^2*ln(x)-1/2*I*b*Pi*csgn(I*c*x^n)^3*d/e^2*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e/x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/e/x-b*n*d/e^2*dilog(-d*x/e)+1/2*b*n*d/e^2*ln(x)^2+1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/e/x-b*ln(c)/e/x-b*n*d/e^2*ln(d*x+e)*ln(-d*x/e)+1/2*I*b*Pi*csgn(I*c*x^n)^3/e/x-a/e/x+1/2*I*b*Pi*csgn(I*c*x^n)^3*d/e^2*ln(x)-b*ln(c)*d/e^2*ln(x)+b*ln(c)*d/e^2*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^2*ln(x)+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d/e^2*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^2*ln(d*x+e)-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d/e^2*ln(x)-a*d/e^2*ln(x)+a*d/e^2*ln(d*x+e)+b*ln(x^n)*d/e^2*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^2*ln(d*x+e)-b*ln(x^n)/e/x-b*n/e/x

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="maxima")

[Out] (d*e^(-2)*log(d*x + e) - d*e^(-2)*log(x) - e^(-1)/x)*a + b*integrate((log(c) + log(x^n))/(d*x^3 + x^2*e), x)

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="fricas")

[Out] integral((b*log(c*x^n) + a)/(d*x^3 + x^2*e), x)

Sympy [A]
time = 59.41, size = 216, normalized size = 2.27

$$\frac{ad^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^2}-\frac{ad\log(x)}{e^2}-\frac{a}{ex}-\frac{bd^2n\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{bd^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}+\frac{bdn\log(x)^2}{2e^2}-\frac{bd\log(x)\log(cx^n)}{e^2}-\frac{bn}{ex}-\frac{b\log(cx^n)}{ex}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d+e/x)/x**3,x)
```

```
[Out] a*d**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**2 - a*d*log(x)
/e**2 - a/(e*x) - b*d**2*n*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(
2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) -
 polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylo
g(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0)
, ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(
2, d*x*exp_polar(I*pi)/e), True))/d, True))/e**2 + b*d**2*Piecewise((x/e, E
q(d, 0)), (log(d*x + e)/d, True))*log(c*x**n)/e**2 + b*d*n*log(x)**2/(2*e**
2) - b*d*log(x)*log(c*x**n)/e**2 - b*n/(e*x) - b*log(c*x**n)/(e*x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((d + e/x)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\left(d+\frac{e}{x}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e/x)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x^3*(d + e/x)), x)
```

3.336 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x^4}\,dx$

Optimal. Leaf size=135

$$-\frac{bn}{4ex^2}+\frac{bdn}{e^2x}-\frac{a+b\log(cx^n)}{2ex^2}+\frac{d(a+b\log(cx^n))}{e^2x}+\frac{d^2(a+b\log(cx^n))^2}{2be^3n}-\frac{d^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{e^3}-b\ldots$$

```
[Out] -1/4*b*n/e/x^2+b*d*n/e^2/x+1/2*(-a-b*ln(c*x^n))/e/x^2+d*(a+b*ln(c*x^n))/e^2
/x+1/2*d^2*(a+b*ln(c*x^n))^2/b/e^3/n-d^2*(a+b*ln(c*x^n))*ln(1+d*x/e)/e^3-b*
d^2*n*polylog(2,-d*x/e)/e^3
```

Rubi [A]
time = 0.12, antiderivative size = 135, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {269, 46, 2393, 2341, 2338, 2354, 2438}

$$-\frac{bd^2n\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^3}+\frac{d^2(a+b\log(cx^n))^2}{2be^3n}-\frac{d^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{e^3}+\frac{d(a+b\log(cx^n))}{e^2x}-\frac{a+b\log(cx^n)}{2ex^2}+\frac{bdn}{e^2x}-\frac{bn}{4ex^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/((d + e/x)*x^4),x]
```

```
[Out] -1/4*(b*n)/(e*x^2) + (b*d*n)/(e^2*x) - (a + b*Log[c*x^n])/(2*e*x^2) + (d*(a
 + b*Log[c*x^n]))/(e^2*x) + (d^2*(a + b*Log[c*x^n])^2)/(2*b*e^3*n) - (d^2*(
a + b*Log[c*x^n])*Log[1 + (d*x)/e])/e^3 - (b*d^2*n*PolyLog[2, -((d*x)/e)])/
e^3
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \left(\frac{a+b\log(cx^n)}{ex^3}-\frac{d(a+b\log(cx^n))}{e^2x^2}+\frac{d^2(a+b\log(cx^n))}{e^3x}-\frac{d^3(a+b\log(cx^n))}{e^3(e+dx)}\right)$$

$$=\frac{d^2\int\frac{a+b\log(cx^n)}{x}\,dx}{e^3}-\frac{d^3\int\frac{a+b\log(cx^n)}{e+dx}\,dx}{e^3}-\frac{d\int\frac{a+b\log(cx^n)}{x^2}\,dx}{e^2}+\frac{\int\frac{a+b\log(cx^n)}{x^3}\,dx}{e}$$

$$=-\frac{bn}{4ex^2}+\frac{bdn}{e^2x}-\frac{a+b\log(cx^n)}{2ex^2}+\frac{d(a+b\log(cx^n))}{e^2x}+\frac{d^2(a+b\log(cx^n))^2}{2be^3n}-\frac{d^2(a+}{}$$

$$=-\frac{bn}{4ex^2}+\frac{bdn}{e^2x}-\frac{a+b\log(cx^n)}{2ex^2}+\frac{d(a+b\log(cx^n))}{e^2x}+\frac{d^2(a+b\log(cx^n))^2}{2be^3n}-\frac{d^2(a+}{}$$

Mathematica [A]
time = 0.14, size = 124, normalized size = 0.92

$$-\frac{\frac{be^2n}{x^2}-\frac{4bden}{x}+\frac{2e^2(a+b\log(cx^n))}{x^2}-\frac{4de(a+b\log(cx^n))}{x}-\frac{2d^2(a+b\log(cx^n))^2}{bn}+4d^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)+4bd^2n\text{Li}_2\left(-\frac{dx}{e}\right)}{4e^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^4),x]
```

```
[Out] -1/4*((b*e^2*n)/x^2 - (4*b*d*e*n)/x + (2*e^2*(a + b*Log[c*x^n]))/x^2 - (4*d
*e*(a + b*Log[c*x^n]))/x - (2*d^2*(a + b*Log[c*x^n])^2)/(b*n) + 4*d^2*(a +
b*Log[c*x^n])*Log[1 + (d*x)/e] + 4*b*d^2*n*PolyLog[2, -((d*x)/e)])/e^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.06, size = 689, normalized size = 5.10

method	result
risch	$\frac{ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2 d}{2e^2x} - \frac{ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2 d^2 \ln(dx+e)}{2e^3} + \frac{ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(icx^n)^2 d}{2e^2x} + \frac{ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(i}{4e\,x^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d+e/x)/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -b*ln(x^n)*d^2/e^3*ln(d*x+e)-1/2*a/e/x^2+b*ln(x^n)*d/e^2/x+b*ln(x^n)*d^2/e^
3*ln(x)+1/4*I*b*Pi*csgn(I*c*x^n)^3/e/x^2+b*d*n/e^2/x+1/2*I*b*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2*d/e^2/x-1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^3*ln(
d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d/e^2/x+1/4*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)/e/x^2+b*n*d^2/e^3*ln(d*x+e)*ln(-d*x/e)+1/2*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2*d^2/e^3*ln(x)-1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)
^2*d^2/e^3*ln(d*x+e)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2*d^2/e^3*ln(x)+a*d
^2/e^3*ln(x)+a*d/e^2/x-a*d^2/e^3*ln(d*x+e)-1/2*b*n*d^2/e^3*ln(x)^2+b*n*d^2/
e^3*dilog(-d*x/e)-1/2*b*ln(x^n)/e/x^2-1/2*b*ln(c)/e/x^2+b*ln(c)*d^2/e^3*ln(
x)+b*ln(c)*d/e^2/x-b*ln(c)*d^2/e^3*ln(d*x+e)-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)*d^2/e^3*ln(x)-1/4*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/e/x^2+1
/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d^2/e^3*ln(d*x+e)-1/4*b*n/e/x
^2-1/2*I*b*Pi*csgn(I*c*x^n)^3*d/e^2/x-1/2*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^3*ln
(x)+1/2*I*b*Pi*csgn(I*c*x^n)^3*d^2/e^3*ln(d*x+e)-1/4*I*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2/e/x^2-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*d/e^2/x
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="maxima")
```

```
[Out] -1/2*(2*d^2*e^(-3)*log(d*x + e) - 2*d^2*e^(-3)*log(x) - (2*d*x - e)*e^(-2)/
x^2)*a + b*integrate((log(c) + log(x^n))/(d*x^4 + x^3*e), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="fricas")

[Out] integral((b*log(c*x^n) + a)/(d*x^4 + x^3*e), x)

Sympy [A]
time = 63.20, size = 265, normalized size = 1.96

$$-\frac{ad^3\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{ad^2\log(x)}{e^3}+\frac{ad}{e^2x}-\frac{a}{2ex^2}+\frac{bd^3n\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{e^3}-\frac{bd^3\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{bd^2n\log(x)^2}{2e^3}+\frac{bd^2\log(x)\log(cx^n)}{e^3}+\frac{bdn}{e^2x}+\frac{bd\log(cx^n)}{e^2x}-\frac{bn}{4ex^2}-\frac{b\log(cx^n)}{2ex^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*ln(c*x**n))/(d+e/x)/x**4,x)

[Out] -a*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**3 + a*d**2*log(x)/e**3 + a*d/(e**2*x) - a/(2*e*x**2) + b*d**3*n*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e**3 - b*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x**n)/e**3 - b*d**2*n*log(x)**2/(2*e**3) + b*d**2*log(x)*log(c*x**n)/e**3 + b*d*n/(e**2*x) + b*d*log(c*x**n)/(e**2*x) - b*n/(4*e*x**2) - b*log(c*x**n)/(2*e*x**2)

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="giac")

[Out] integrate((b*log(c*x^n) + a)/((d + e/x)*x^4), x)

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\left(d+\frac{e}{x}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*log(c*x^n))/(x^4*(d + e/x)),x)

[Out] int((a + b*log(c*x^n))/(x^4*(d + e/x)), x)

3.337 $\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=170

$$-\frac{ae^3x}{d^4}+\frac{be^3x}{d^4}-\frac{be^2x^2}{4d^3}+\frac{bex^3}{9d^2}-\frac{bx^4}{16d}-\frac{be^3x\log(cx)}{d^4}+\frac{e^2x^2(a+b\log(cx))}{2d^3}-\frac{ex^3(a+b\log(cx))}{3d^2}+\frac{x^4(a+b\log(cx)}{4d}$$

```
[Out] -a*e^3*x/d^4+b*e^3*x/d^4-1/4*b*e^2*x^2/d^3+1/9*b*e*x^3/d^2-1/16*b*x^4/d-b*e
^3*x*ln(c*x)/d^4+1/2*e^2*x^2*(a+b*ln(c*x))/d^3-1/3*e*x^3*(a+b*ln(c*x))/d^2+
1/4*x^4*(a+b*ln(c*x))/d+e^4*(a+b*ln(c*x))*ln(1+d*x/e)/d^5+b*e^4*polylog(2,-
d*x/e)/d^5
```

Rubi [A]
time = 0.13, antiderivative size = 170, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {269, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{be^4\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^5}+\frac{e^4\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^5}+\frac{e^2x^2(a+b\log(cx))}{2d^3}-\frac{ex^3(a+b\log(cx))}{3d^2}+\frac{x^4(a+b\log(cx))}{4d}-\frac{ae^3x}{d^4}-\frac{be^3x\log(cx)}{d^4}+\frac{be^3x}{d^4}-\frac{be^2x^2}{4d^3}+\frac{bex^3}{9d^2}-\frac{bx^4}{16d}$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(a + b*Log[c*x]))/(d + e/x),x]
```

```
[Out] -((a*e^3*x)/d^4) + (b*e^3*x)/d^4 - (b*e^2*x^2)/(4*d^3) + (b*e*x^3)/(9*d^2)
- (b*x^4)/(16*d) - (b*e^3*x*Log[c*x])/d^4 + (e^2*x^2*(a + b*Log[c*x]))/(2*d
^3) - (e*x^3*(a + b*Log[c*x]))/(3*d^2) + (x^4*(a + b*Log[c*x]))/(4*d) + (e^
4*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^5 + (b*e^4*PolyLog[2, -((d*x)/e)])/d
^5
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \left(-\frac{e^3(a+b\log(cx))}{d^4}+\frac{e^2x(a+b\log(cx))}{d^3}-\frac{ex^2(a+b\log(cx))}{d^2}+\frac{x^3(a+b\log(\ldots}{d}\right.$$

$$=\frac{\int x^3(a+b\log(cx))\,dx}{d}-\frac{e\int x^2(a+b\log(cx))\,dx}{d^2}+\frac{e^2\int x(a+b\log(cx))\,dx}{d^3}-\frac{e^3\int\ldots}{\ldots}$$

$$=-\frac{ae^3x}{d^4}-\frac{be^2x^2}{4d^3}+\frac{bex^3}{9d^2}-\frac{bx^4}{16d}+\frac{e^2x^2(a+b\log(cx))}{2d^3}-\frac{ex^3(a+b\log(cx))}{3d^2}+\frac{x^4(a\ldots}{\ldots}$$

$$=-\frac{ae^3x}{d^4}+\frac{be^3x}{d^4}-\frac{be^2x^2}{4d^3}+\frac{bex^3}{9d^2}-\frac{bx^4}{16d}-\frac{be^3x\log(cx)}{d^4}+\frac{e^2x^2(a+b\log(cx))}{2d^3}-\frac{ex^3\ldots}{\ldots}$$

Mathematica [A]
time = 0.06, size = 156, normalized size = 0.92

$$\frac{-144ade^3x+144bde^3x-36bd^2e^2x^2+16bd^3ex^3-9bd^4x^4-144bde^3x\log(cx)+72d^2e^2x^2(a+b\log(cx))-48d^3ex^3(a+b\log(cx))+36d^4x^4(a+b\log(cx))+144e^4(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+144be^4\text{Li}_2\left(-\frac{dx}{e}\right)}{144d^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x]))/(d + e/x),x]
```

```
[Out] (-144*a*d*e^3*x + 144*b*d*e^3*x - 36*b*d^2*e^2*x^2 + 16*b*d^3*e*x^3 - 9*b*d
^4*x^4 - 144*b*d*e^3*x*Log[c*x] + 72*d^2*e^2*x^2*(a + b*Log[c*x]) - 48*d^3*
e*x^3*(a + b*Log[c*x]) + 36*d^4*x^4*(a + b*Log[c*x]) + 144*e^4*(a + b*Log[c
*x])*Log[1 + (d*x)/e] + 144*b*e^4*PolyLog[2, -((d*x)/e)])/(144*d^5)
```

Maple [A]
time = 0.13, size = 258, normalized size = 1.52

method	result
risch	$\frac{a x^4}{4d} - \frac{ae x^3}{3d^2} + \frac{a x^2 e^2}{2d^3} - \frac{a e^3 x}{d^4} + \frac{a e^4 \ln(dx+e)}{d^5} + \frac{b x^4 \ln(cx)}{4d} - \frac{b x^4}{16d} - \frac{be x^3 \ln(cx)}{3d^2} + \frac{be x^3}{9d^2} + \frac{b e^2 x^2 \ln(cx)}{2d^3} \cdots$
derivativedivides	$\frac{-\frac{a c^4 e^3 x}{d^4} + \frac{a c^4 e^2 x^2}{2d^3} - \frac{ae c^4 x^3}{3d^2} + \frac{a c^4 x^4}{4d} + \frac{a c^4 e^4 \ln(cdx+ce)}{d^5} + \frac{b c^4 x^4 \ln(cx)}{4d} - \frac{b c^4 x^4}{16d} - \frac{b c^4 e x^3 \ln(cx)}{3d^2} + \frac{be c^4 x^3}{9d^2} + \frac{b c^4 e^2 x^2 \ln(cx)}{2d^3} \cdots}{c^4}$
default	$\frac{-\frac{a c^4 e^3 x}{d^4} + \frac{a c^4 e^2 x^2}{2d^3} - \frac{ae c^4 x^3}{3d^2} + \frac{a c^4 x^4}{4d} + \frac{a c^4 e^4 \ln(cdx+ce)}{d^5} + \frac{b c^4 x^4 \ln(cx)}{4d} - \frac{b c^4 x^4}{16d} - \frac{b c^4 e x^3 \ln(cx)}{3d^2} + \frac{be c^4 x^3}{9d^2} + \frac{b c^4 e^2 x^2 \ln(cx)}{2d^3} \cdots}{c^4}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^4*(-a/d^4*c^4*e^3*x+1/2*a/d^3*c^4*e^2*x^2-1/3*a/d^2*e*c^4*x^3+1/4*a/d*c
^4*x^4+a*c^4*e^4/d^5*ln(c*d*x+c*e)+1/4*b/d*c^4*x^4*ln(c*x)-1/16*b/d*c^4*x^4
-1/3*b*c^4/d^2*e*x^3*ln(c*x)+1/9*b/d^2*e*c^4*x^3+1/2*b*c^4/d^3*e^2*x^2*ln(c
*x)-1/4*b/d^3*c^4*e^2*x^2-b*c^4*e^3/d^4*x*ln(c*x)+b/d^4*c^4*e^3*x+b*c^4*e^4
/d^5*dilog((c*d*x+c*e)/e/c)+b*c^4*e^4/d^5*ln(c*x)*ln((c*d*x+c*e)/e/c))
```

Maxima [A]
time = 0.32, size = 184, normalized size = 1.08

$$\frac{\left(\log\left(dxe^{(-1)}+1\right)\log(x)+\mathrm{Li}_2\left(-dxe^{(-1)}\right)\right)be^4}{d^5}+\frac{(b\log(c)+a)e^4\log(dx+e)}{d^5}+\frac{9\,(4\,ad^3+(4\,d^3\log(c)-d^3)b)x^4-16\,(3\,ad^2+(3\,d^2\log(c)-d^2)b)x^3e+36\,((2\,d\log(c)-d)b+2\,ad)x^2e^2-144\,(b(\log(c)-1)+a)xe^3+12\,(3\,bd^3x^4-4\,bd^2x^3e+6\,bdx^2e^2-12\,bxe^3)\log(x)}{144\,d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

```
[Out] (log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b*e^4/d^5 + (b*log(c) + a
)*e^4*log(d*x + e)/d^5 + 1/144*(9*(4*a*d^3 + (4*d^3*log(c) - d^3)*b)*x^4 -
16*(3*a*d^2 + (3*d^2*log(c) - d^2)*b)*x^3*e + 36*((2*d*log(c) - d)*b + 2*a*
d)*x^2*e^2 - 144*(b*(log(c) - 1) + a)*x*e^3 + 12*(3*b*d^3*x^4 - 4*b*d^2*x^3
*e + 6*b*d*x^2*e^2 - 12*b*x*e^3)*log(x))/d^4
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x^4*log(c*x) + a*x^4)/(d*x + e), x)
```

Sympy [A]
time = 110.95, size = 299, normalized size = 1.76

$$\frac{ax^4}{4d} - \frac{aex^3}{3d^2} + \frac{ae^2x^2}{2d^3} + \frac{ae^4\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log\left(dx+e\right)}{d} & \text{otherwise} \end{cases}\right)}{d^4} - \frac{ae^3x}{d^4} + \frac{bx^4\log\left(cx\right)}{4d} - \frac{bx^4}{16d} - \frac{bex^3\log\left(cx\right)}{3d^2} + \frac{bex^3}{9d^2} + \frac{be^2x^2\log\left(cx\right)}{2d^3} - \frac{be^2x^2}{4d^3} - \frac{be^4\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\begin{cases} -\operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log\left(e\right)\log\left(x\right) - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: |x| < 1 \\ -\log\left(e\right)\log\left(\frac{1}{x}\right) - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\: \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\ 0, 0 & \end{matrix} \middle| x\right)\log\left(e\right) + G_{2,2}^{0,2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| x\right)\log\left(e\right) - \operatorname{Li}_{2}\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}\right)}{d^4} + \frac{be^4\left(\begin{cases} \frac{x}{e} & \text{for}\: d = 0 \\ \frac{\log\left(dx+e\right)}{d} & \text{otherwise} \end{cases}\right)\log\left(cx\right)}{d^4} - \frac{be^3x\log\left(cx\right)}{d^4} + \frac{be^3x}{d^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x))/(d+e/x),x)
```

```
[Out] a*x**4/(4*d) - a*e*x**3/(3*d**2) + a*e**2*x**2/(2*d**3) + a*e**4*Piecewise(
(x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d**4 - a*e**3*x/d**4 + b*x**4*log(
c*x)/(4*d) - b*x**4/(16*d) - b*e*x**3*log(c*x)/(3*d**2) + b*e*x**3/(9*d**2)
 + b*e**2*x**2*log(c*x)/(2*d**3) - b*e**2*x**2/(4*d**3) - b*e**4*Piecewise(
(x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) <
1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), A
bs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x)
 < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d,
True))/d**4 + b*e**4*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log
(c*x)/d**4 - b*e**3*x*log(c*x)/d**4 + b*e**3*x/d**4
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)*x^3/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3\,\left(a+b\,\ln\left(c\,x\right)\right)}{d+\frac{e}{x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x)))/(d + e/x),x)
```

```
[Out] int((x^3*(a + b*log(c*x)))/(d + e/x), x)
```

3.338 $\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=136

$$\frac{ae^2x}{d^3}-\frac{be^2x}{d^3}+\frac{bex^2}{4d^2}-\frac{bx^3}{9d}+\frac{be^2x\log(cx)}{d^3}-\frac{ex^2(a+b\log(cx))}{2d^2}+\frac{x^3(a+b\log(cx))}{3d}-\frac{e^3(a+b\log(cx))\log\left(1+\frac{dx}{e}\right.}{d^4}$$

```
[Out] a*e^2*x/d^3-b*e^2*x/d^3+1/4*b*e*x^2/d^2-1/9*b*x^3/d+b*e^2*x*ln(c*x)/d^3-1/2
*e*x^2*(a+b*ln(c*x))/d^2+1/3*x^3*(a+b*ln(c*x))/d-e^3*(a+b*ln(c*x))*ln(1+d*x
/e)/d^4-b*e^3*polylog(2,-d*x/e)/d^4
```

Rubi [A]

time = 0.11, antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {269, 45, 2393, 2332, 2341, 2354, 2438}

$$-\frac{be^3\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}-\frac{e^3\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^4}-\frac{ex^2(a+b\log(cx))}{2d^2}+\frac{x^3(a+b\log(cx))}{3d}+\frac{ae^2x}{d^3}+\frac{be^2x\log(cx)}{d^3}-\frac{be^2x}{d^3}+\frac{bex^2}{4d^2}-\frac{bx^3}{9d}$$

Antiderivative was successfully verified.

```
[In] Int[(x^2*(a + b*Log[c*x]))/(d + e/x),x]
```

```
[Out] (a*e^2*x)/d^3 - (b*e^2*x)/d^3 + (b*e*x^2)/(4*d^2) - (b*x^3)/(9*d) + (b*e^2*
x*Log[c*x])/d^3 - (e*x^2*(a + b*Log[c*x]))/(2*d^2) + (x^3*(a + b*Log[c*x]))
/(3*d) - (e^3*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^4 - (b*e^3*PolyLog[2, -(
(d*x)/e)])/d^4
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \left(\frac{e^2(a+b\log(cx))}{d^3} - \frac{ex(a+b\log(cx))}{d^2} + \frac{x^2(a+b\log(cx))}{d} - \frac{e^3(a+b\log(cx))}{d^3(e+dx)}\right.$$

$$= \frac{\int x^2(a+b\log(cx))\,dx}{d} - \frac{e\int x(a+b\log(cx))\,dx}{d^2} + \frac{e^2\int(a+b\log(cx))\,dx}{d^3} - \frac{e^3\int \frac{a+}{}}{}$$

$$= \frac{ae^2x}{d^3} + \frac{bex^2}{4d^2} - \frac{bx^3}{9d} - \frac{ex^2(a+b\log(cx))}{2d^2} + \frac{x^3(a+b\log(cx))}{3d} - \frac{e^3(a+b\log(cx))\,\mathrm{l}}{d^4}$$

$$= \frac{ae^2x}{d^3} - \frac{be^2x}{d^3} + \frac{bex^2}{4d^2} - \frac{bx^3}{9d} + \frac{be^2x\log(cx)}{d^3} - \frac{ex^2(a+b\log(cx))}{2d^2} + \frac{x^3(a+b\log(cx}{3d}$$

Mathematica [A]
time = 0.05, size = 125, normalized size = 0.92

$$\frac{36ade^2x - 36bde^2x + 9bd^2ex^2 - 4bd^3x^3 + 36bde^2x\log(cx) - 18d^2ex^2(a+b\log(cx)) + 12d^3x^3(a+b\log(cx)) - 36e^3(a+b\log(cx))\log\left(1+\frac{dx}{e}\right) - 36be^3\mathrm{Li}_2\left(-\frac{dx}{e}\right)}{36d^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x]))/(d + e/x),x]
```

```
[Out] (36*a*d*e^2*x - 36*b*d*e^2*x + 9*b*d^2*e*x^2 - 4*b*d^3*x^3 + 36*b*d*e^2*x*L
og[c*x] - 18*d^2*e*x^2*(a + b*Log[c*x]) + 12*d^3*x^3*(a + b*Log[c*x]) - 36*
e^3*(a + b*Log[c*x])*Log[1 + (d*x)/e] - 36*b*e^3*PolyLog[2, -((d*x)/e)])/(3
6*d^4)
```

Maple [A]
time = 0.07, size = 211, normalized size = 1.55

method	result
risch	$\frac{a x^3}{3d} - \frac{ae x^2}{2d^2} + \frac{a e^2 x}{d^3} - \frac{a e^3 \ln(dx+e)}{d^4} + \frac{b x^3 \ln(cx)}{3d} - \frac{b x^3}{9d} - \frac{be x^2 \ln(cx)}{2d^2} + \frac{be x^2}{4d^2} + \frac{b e^2 x \ln(cx)}{d^3} - \frac{b e^2 x}{d^3}$
derivativedivides	$\frac{\frac{a c^3 e^2 x}{d^3} - \frac{a c^3 e x^2}{2d^2} + \frac{a c^3 x^3}{3d} - \frac{a c^3 e^3 \ln(cdx+ce)}{d^4} + \frac{b c^3 x^3 \ln(cx)}{3d} - \frac{b c^3 x^3}{9d} - \frac{b c^3 e x^2 \ln(cx)}{2d^2} + \frac{b c^3 e x^2}{4d^2} + \frac{b c^3 e^2 x \ln(cx)}{d^3} - \frac{b c^3 e^2 x}{d^3} - \cdots}{c^3}$
default	$\frac{\frac{a c^3 e^2 x}{d^3} - \frac{a c^3 e x^2}{2d^2} + \frac{a c^3 x^3}{3d} - \frac{a c^3 e^3 \ln(cdx+ce)}{d^4} + \frac{b c^3 x^3 \ln(cx)}{3d} - \frac{b c^3 x^3}{9d} - \frac{b c^3 e x^2 \ln(cx)}{2d^2} + \frac{b c^3 e x^2}{4d^2} + \frac{b c^3 e^2 x \ln(cx)}{d^3} - \frac{b c^3 e^2 x}{d^3} - \cdots}{c^3}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^3*(a/d^3*c^3*e^2*x-1/2*a/d^2*c^3*e*x^2+1/3*a/d*c^3*x^3-a*c^3*e^3/d^4*ln
(c*d*x+c*e)+1/3*b/d*c^3*x^3*ln(c*x)-1/9*b/d*c^3*x^3-1/2*b*c^3/d^2*e*x^2*ln(
c*x)+1/4*b/d^2*c^3*e*x^2+b*c^3*e^2/d^3*x*ln(c*x)-b/d^3*c^3*e^2*x-b*c^3*e^3/
d^4*dilog((c*d*x+c*e)/e/c)-b*c^3*e^3/d^4*ln(c*x)*ln((c*d*x+c*e)/e/c))
```

Maxima [A]
time = 0.33, size = 146, normalized size = 1.07

$$-\frac{\left(\log\left(dxe^{(-1)}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-dxe^{(-1)}\right)\right)be^3}{d^4}-\frac{\left(b\log\left(c\right)+a\right)e^3\log\left(dx+e\right)}{d^4}+\frac{4\left(3\,ad^2+\left(3\,d^2\log\left(c\right)-d^2\right)b\right)x^3-9\left(\left(2\,d\log\left(c\right)-d\right)b+2\,ad\right)x^2e+36\left(b(\log\left(c\right)-1)+a\right)xe^2+6\left(2\,bd^2x^3-3\,bdx^2e+6\,bxe^2\right)\log\left(x\right)}{36\,d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

```
[Out] -(log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b*e^3/d^4 - (b*log(c) +
a)*e^3*log(d*x + e)/d^4 + 1/36*(4*(3*a*d^2 + (3*d^2*log(c) - d^2)*b)*x^3 -
9*((2*d*log(c) - d)*b + 2*a*d)*x^2*e + 36*(b*(log(c) - 1) + a)*x*e^2 + 6*(2
*b*d^2*x^3 - 3*b*d*x^2*e + 6*b*x*e^2)*log(x))/d^3
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x) + a*x^3)/(d*x + e), x)
```

Sympy [A]
time = 126.33, size = 253, normalized size = 1.86

$$\frac{ax^3}{3d} - \frac{aex^2}{2d^2} - \frac{ae^3\left(\begin{cases} \frac{x}{e} & \text{for}\ d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)}{d^3} + \frac{ae^2x}{d^3} + \frac{bx^3\log(cx)}{3d} - \frac{bx^3}{9d} - \frac{bex^2\log(cx)}{2d^2} + \frac{bex^2}{4d^2} + \frac{be^3\left(\begin{cases} \frac{x}{e} & \text{for}\ d = 0 \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log(e)\log(x) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x| < 1 \\ -\log(e)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(e) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}\right)}{d^3} - \frac{be^3\left(\begin{cases} \frac{x}{e} & \text{for}\ d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)\log(cx)}{d^3} + \frac{be^2x\log(cx)}{d^3} - \frac{be^2x}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x))/(d+e/x),x)
```

```
[Out] a*x**3/(3*d) - a*e*x**2/(2*d**2) - a*e**3*Piecewise((x/e, Eq(d, 0)), (log(d
*x + e)/d, True))/d**3 + a*e**2*x/d**3 + b*x**3*log(c*x)/(3*d) - b*x**3/(9*
d) - b*e*x**2*log(c*x)/(2*d**2) + b*e*x**2/(4*d**2) + b*e**3*Piecewise((x/e
, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) &
 (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x
) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1
), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()),
((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, True
))/d**3 - b*e**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x
)/d**3 + b*e**2*x*log(c*x)/d**3 - b*e**2*x/d**3
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)*x^2/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2\,\left(a+b\,\ln\left(c\,x\right)\right)}{d+\frac{e}{x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x)))/(d + e/x),x)
```

```
[Out] int((x^2*(a + b*log(c*x)))/(d + e/x), x)
```

3.339 $\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=98

$$-\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^3}+\frac{be^2\text{Li}_2\left(-\frac{dx}{e}\right)}{d^3}$$

```
[Out] -a*e*x/d^2+b*e*x/d^2-1/4*b*x^2/d-b*e*x*ln(c*x)/d^2+1/2*x^2*(a+b*ln(c*x))/d+
e^2*(a+b*ln(c*x))*ln(1+d*x/e)/d^3+b*e^2*polylog(2,-d*x/e)/d^3
```

Rubi [A]
time = 0.08, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.368$, Rules used = {269, 45, 2393, 2332, 2341, 2354, 2438}

$$\frac{be^2\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}+\frac{e^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^3}+\frac{x^2(a+b\log(cx))}{2d}-\frac{aex}{d^2}-\frac{bex\log(cx)}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}$$

Antiderivative was successfully verified.

```
[In] Int[(x*(a + b*Log[c*x]))/(d + e/x),x]
```

```
[Out] -((a*e*x)/d^2) + (b*e*x)/d^2 - (b*x^2)/(4*d) - (b*e*x*Log[c*x])/d^2 + (x^2*
(a + b*Log[c*x]))/(2*d) + (e^2*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^3 + (b*
e^2*PolyLog[2, -((d*x)/e)])/d^3
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx &= \int \left(-\frac{e(a+b\log(cx))}{d^2}+\frac{x(a+b\log(cx))}{d}+\frac{e^2(a+b\log(cx))}{d^2(e+dx)}\right)dx\\
&= \frac{\int x(a+b\log(cx))\,dx}{d}-\frac{e\int(a+b\log(cx))\,dx}{d^2}+\frac{e^2\int\frac{a+b\log(cx)}{e+dx}\,dx}{d^2}\\
&= -\frac{aex}{d^2}-\frac{bx^2}{4d}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^3}-\frac{(be)\int\log(cx)\,d}{d^2}\\
&= -\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(1+\right.}{d^3}
\end{aligned}$$

Mathematica [A]
time = 0.03, size = 99, normalized size = 1.01

$$-\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(\frac{e+dx}{e}\right)}{d^3}+\frac{be^2\text{Li}_2\left(-\frac{dx}{e}\right)}{d^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x]))/(d + e/x),x]
```

```
[Out] -((a*e*x)/d^2) + (b*e*x)/d^2 - (b*x^2)/(4*d) - (b*e*x*Log[c*x])/d^2 + (x^2*
(a + b*Log[c*x]))/(2*d) + (e^2*(a + b*Log[c*x])*Log[(e + d*x)/e])/d^3 + (b*
e^2*PolyLog[2, -((d*x)/e)])/d^3
```

Maple [A]
time = 0.07, size = 160, normalized size = 1.63

method	result
risch	$\frac{a x^2}{2d} - \frac{aex}{d^2} + \frac{a e^2 \ln(dx+e)}{d^3} + \frac{b x^2 \ln(cx)}{2d} - \frac{b x^2}{4d} - \frac{bex \ln(cx)}{d^2} + \frac{bex}{d^2} + \frac{b e^2 \operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^3} + \frac{b e^2 \ln(cx) \ln(}{d^3}$
derivativedivides	$\frac{-\frac{a c^2 ex}{d^2} + \frac{a c^2 x^2}{2d} + \frac{a c^2 e^2 \ln(cdx+ce)}{d^3} + \frac{b c^2 x^2 \ln(cx)}{2d} - \frac{b c^2 x^2}{4d} - \frac{be c^2 x \ln(cx)}{d^2} + \frac{b c^2 ex}{d^2} + \frac{b c^2 e^2 \operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^3} + \frac{b c^2 e^2 \ln(cx) \ln\left(c\right.}{d^3}}{c^2}$
default	$\frac{-\frac{a c^2 ex}{d^2} + \frac{a c^2 x^2}{2d} + \frac{a c^2 e^2 \ln(cdx+ce)}{d^3} + \frac{b c^2 x^2 \ln(cx)}{2d} - \frac{b c^2 x^2}{4d} - \frac{be c^2 x \ln(cx)}{d^2} + \frac{b c^2 ex}{d^2} + \frac{b c^2 e^2 \operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^3} + \frac{b c^2 e^2 \ln(cx) \ln\left(c\right.}{d^3}}{c^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^2*(-a/d^2*c^2*e*x+1/2*a/d*c^2*x^2+a*c^2*e^2/d^3*ln(c*d*x+c*e)+1/2*b/d*c
^2*x^2*ln(c*x)-1/4*b/d*c^2*x^2-b*e*c^2/d^2*x*ln(c*x)+b/d^2*c^2*e*x+b*c^2*e^
2/d^3*dilog((c*d*x+c*e)/e/c)+b*c^2*e^2/d^3*ln(c*x)*ln((c*d*x+c*e)/e/c))
```

Maxima [A]
time = 0.32, size = 102, normalized size = 1.04

$$\frac{\left(\log\left(dxe^{(-1)}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-dxe^{(-1)}\right)\right)be^2}{d^3} + \frac{\left(b\log\left(c\right)+a\right)e^2\log\left(dx+e\right)}{d^3} + \frac{\left(\left(2\,d\log\left(c\right)-d\right)b+2\,ad\right)x^2-4\left(b\left(\log\left(c\right)-1\right)+a\right)xe+2\left(bdx^2-2\,bxe\right)\log\left(x\right)}{4\,d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

```
[Out] (log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b*e^2/d^3 + (b*log(c) + a
)*e^2*log(d*x + e)/d^3 + 1/4*(((2*d*log(c) - d)*b + 2*a*d)*x^2 - 4*(b*(log(
c) - 1) + a)*x*e + 2*(b*d*x^2 - 2*b*x*e)*log(x))/d^2
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x) + a*x^2)/(d*x + e), x)
```

Sympy [A]
time = 87.50, size = 207, normalized size = 2.11

$$\frac{ax^2}{2d} + \frac{ae^2\left(\begin{cases} \frac{x}{e} & \text{for}\ d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)}{d^2} - \frac{aex}{d^2} + \frac{bx^2\log(cx)}{2d} - \frac{bx^2}{4d} - \frac{be^2\left(\begin{cases} \frac{x}{e} & \text{for}\ d = 0 \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|} < 1 \wedge |x| < 1 \\ \log(e)\log(x) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x| < 1 \\ -\log(e)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|} < 1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix} \middle| x\right)\log(e) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix} \middle| x\right)\log(e) - \operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}\right)}{d^2} + \frac{be^2\left(\begin{cases} \frac{x}{e} & \text{for}\ d = 0 \\ \frac{\log(dx+e)}{d} & \text{otherwise} \end{cases}\right)\log(cx)}{d^2} - \frac{bex\log(cx)}{d^2} + \frac{bex}{d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x))/(d+e/x),x)
```

```
[Out] a*x**2/(2*d) + a*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d*
*2 - a*e*x/d**2 + b*x**2*log(c*x)/(2*d) - b*x**2/(4*d) - b*e**2*Piecewise((
x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1
) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Ab
s(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()
), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, T
rue))/d**2 + b*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(
c*x)/d**2 - b*e*x*log(c*x)/d**2 + b*e*x/d**2
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)*x/(d + e/x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x\,\left(a+b\,\ln\left(c\,x\right)\right)}{d+\frac{e}{x}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x)))/(d + e/x),x)
```

```
[Out] int((x*(a + b*log(c*x)))/(d + e/x), x)
```

3.340 $\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$

Optimal. Leaf size=63

$$\frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{be\mathrm{Li}_2\left(-\frac{dx}{e}\right)}{d^2}$$

[Out] a*x/d-b*x/d+b*x*ln(c*x)/d-e*(a+b*ln(c*x))*ln(1+d*x/e)/d^2-b*e*polylog(2,-d*x/e)/d^2

Rubi [A]
time = 0.05, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 6, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {199, 45, 2367, 2332, 2354, 2438}

$$-\frac{be\mathrm{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}-\frac{e\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^2}+\frac{ax}{d}+\frac{bx\log(cx)}{d}-\frac{bx}{d}$$

Antiderivative was successfully verified.

[In] Int[(a + b*Log[c*x])/(d + e/x),x]

[Out] (a*x)/d - (b*x)/d + (b*x*Log[c*x])/d - (e*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^2 - (b*e*PolyLog[2, -((d*x)/e)])/d^2

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 199

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(n*p)*(b + a/x^n)^p,
x] /; FreeQ[{a, b}, x] && LtQ[n, 0] && IntegerQ[p]
```

Rule 2332

```
Int[Log[(c_.)*(x_)^(n_.)], x_Symbol] :> Simp[x*Log[c*x^n], x] - Simp[n*x, x
] /; FreeQ[{c, n}, x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
```

```
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2367

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx &= \int \left(\frac{a+b\log(cx)}{d}-\frac{e(a+b\log(cx))}{d(e+dx)}\right)dx\\
&= \frac{\int (a+b\log(cx))\,dx}{d}-\frac{e\int \frac{a+b\log(cx)}{e+dx}\,dx}{d}\\
&= \frac{ax}{d}-\frac{e(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^2}+\frac{b\int \log(cx)\,dx}{d}+\frac{(be)\int \frac{\log\left(1+\frac{dx}{e}\right)}{x}\,dx}{d^2}\\
&= \frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{be\text{Li}_2\left(-\frac{dx}{e}\right)}{d^2}
\end{aligned}$$

Mathematica [A]
time = 0.02, size = 64, normalized size = 1.02

$$\frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(\frac{e+dx}{e}\right)}{d^2}-\frac{be\text{Li}_2\left(-\frac{dx}{e}\right)}{d^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])/(d + e/x),x]
```

```
[Out] (a*x)/d - (b*x)/d + (b*x*Log[c*x])/d - (e*(a + b*Log[c*x])*Log[(e + d*x)/e]
)/d^2 - (b*e*PolyLog[2, -((d*x)/e)])/d^2
```

Maple [A]
time = 0.06, size = 101, normalized size = 1.60

method	result	size

risch	$\frac{ax}{d}-\frac{ae\ln(dx+e)}{d^2}+\frac{bx\ln(cx)}{d}-\frac{bx}{d}-\frac{be\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{be\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}$	88
derivativedivides	$\frac{\frac{acx}{d}-\frac{aec\ln(cdx+ce)}{d^2}+\frac{bcx\ln(cx)}{d}-\frac{bcx}{d}-\frac{bec\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{bec\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}}{c}$	101
default	$\frac{\frac{acx}{d}-\frac{aec\ln(cdx+ce)}{d^2}+\frac{bcx\ln(cx)}{d}-\frac{bcx}{d}-\frac{bec\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{bec\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}}{c}$	101

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))/(d+e/x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c*(a/d*c*x-a*e*c/d^2*ln(c*d*x+c*e)+b/d*c*x*ln(c*x)-b/d*c*x-b*e*c/d^2*dilo
g((c*d*x+c*e)/e/c)-b*e*c/d^2*ln(c*x)*ln((c*d*x+c*e)/e/c))
```

Maxima [A]
time = 0.32, size = 68, normalized size = 1.08

$$-\frac{\left(\log\left(dxe^{(-1)}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-dxe^{(-1)}\right)\right)be}{d^2}-\frac{(b\log\left(c\right)+a)e\log\left(dx+e\right)}{d^2}+\frac{bx\log\left(x\right)+(b(\log\left(c\right)-1)+a)x}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

```
[Out] -(log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b*e/d^2 - (b*log(c) + a)
*e*log(d*x + e)/d^2 + (b*x*log(x) + (b*(log(c) - 1) + a)*x)/d
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

```
[Out] integral((b*x*log(c*x) + a*x)/(d*x + e), x)
```

Sympy [A]
time = 74.40, size = 156, normalized size = 2.48

$$-\frac{ae\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log\left(dx+e\right)}{d} & \text{otherwise}\end{cases}\right)}{d}+\frac{ax}{d}+\frac{be\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\begin{cases}-\mathrm{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\wedge|x|<1\\ \log\left(e\right)\log\left(x\right)-\mathrm{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ |x|<1\\ -\log\left(e\right)\log\left(\frac{1}{x}\right)-\mathrm{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for}\ \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log\left(e\right)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log\left(e\right)-\mathrm{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \text{otherwise}\end{cases}\right)}{d}-\frac{be\left(\begin{cases}\frac{x}{e} & \text{for}\ d=0\\ \frac{\log\left(dx+e\right)}{d} & \text{otherwise}\end{cases}\right)\log\left(cx\right)}{d}+\frac{bx\log\left(cx\right)}{d}-\frac{bx}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))/(d+e/x),x)
```

```
[Out] -a*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d + a*x/d + b*e*Pie
cewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Ab
s(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi
)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1
/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1
, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), Tru
e))/d, True))/d - b*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*lo
g(c*x)/d + b*x*log(c*x)/d - b*x/d
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)/(d + e/x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x\right)}{d+\frac{e}{x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))/(d + e/x),x)
```

```
[Out] int((a + b*log(c*x))/(d + e/x), x)
```

3.341 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx$

Optimal. Leaf size=36

$$\frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d}+\frac{b\text{Li}_2\left(-\frac{dx}{e}\right)}{d}$$

```
[Out] (a+b*ln(c*x))*ln(1+d*x/e)/d+b*polylog(2,-d*x/e)/d
```

Rubi [A]
time = 0.05, antiderivative size = 36, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2370, 2354, 2438}

$$\frac{b\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}+\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x])/((d + e/x)*x),x]
```

```
[Out] ((a + b*Log[c*x])*Log[1 + (d*x)/e])/d + (b*PolyLog[2, -((d*x)/e)])/d
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2370

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)/(x_))^(q_.)*(
x_)^(m_.), x_Symbol] :> Int[(e + d*x)^q*(a + b*Log[c*x^n])^p, x] /; FreeQ[{
a, b, c, d, e, m, n, p}, x] && EqQ[m, q] && IntegerQ[q]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{a+b\log(cx)}{e+dx}\,dx$$
$$= \frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d} - \frac{b\int \frac{\log\left(1+\frac{dx}{e}\right)}{x}\,dx}{d}$$
$$= \frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d} + \frac{b\text{Li}_2\left(-\frac{dx}{e}\right)}{d}$$

Mathematica [A]
time = 0.01, size = 34, normalized size = 0.94

$$\frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+b\text{Li}_2\left(-\frac{dx}{e}\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])/((d + e/x)*x),x]
```

```
[Out] ((a + b*Log[c*x])*Log[1 + (d*x)/e] + b*PolyLog[2, -((d*x)/e)])/d
```

Maple [A]
time = 0.06, size = 62, normalized size = 1.72

method	result	size
risch	$\frac{a\ln(dx+e)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	59
derivativedivides	$\frac{a\ln(cdx+ce)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	62
default	$\frac{a\ln(cdx+ce)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	62

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))/(d+e/x)/x,x,method=_RETURNVERBOSE)
```

```
[Out] a*ln(c*d*x+c*e)/d+b*dilog((c*d*x+c*e)/e/c)/d+b*ln(c*x)*ln((c*d*x+c*e)/e/c)/
d
```

Maxima [A]
time = 0.31, size = 42, normalized size = 1.17

$$\frac{\left(\log\left(dxe^{(-1)}+1\right)\log(x)+\text{Li}_2\left(-dxe^{(-1)}\right)\right)b}{d}+\frac{(b\log(c)+a)\log(dx+e)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="maxima")
```

```
[Out] (log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b/d + (b*log(c) + a)*log(
d*x + e)/d
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x) + a)/(d*x + e), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(cx \right)}}{dx + e}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))/(d+e/x)/x,x)
```

```
[Out] Integral((a + b*log(c*x))/(d*x + e), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)/((d + e/x)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{a+b\,\ln\left(c\,x\right)}{x\,\left(d+\frac{e}{x}\right)} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))/(x*(d + e/x)),x)
```

```
[Out] int((a + b*log(c*x))/(x*(d + e/x)), x)
```

3.342 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx$

Optimal. Leaf size=41

$$-\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e}+\frac{b\text{Li}_2\left(-\frac{e}{dx}\right)}{e}$$

[Out] -ln(1+e/d/x)*(a+b*ln(c*x))/e+b*polylog(2,-e/d/x)/e

Rubi [A]
time = 0.04, antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2375, 2438}

$$\frac{b\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}$$

Antiderivative was successfully verified.

[In] Int[(a + b*Log[c*x])/((d + e/x)*x^2),x]

[Out] -((Log[1 + e/(d*x)]*(a + b*Log[c*x]))/e) + (b*PolyLog[2, -(e/(d*x))])/e

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx &= -\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e}+\frac{b\int \frac{\log\left(1+\frac{e}{dx}\right)}{x}\,dx}{e}\\ &= -\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e}+\frac{b\text{Li}_2\left(-\frac{e}{dx}\right)}{e}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 54, normalized size = 1.32

$$\frac{(a+b\log(cx))\left(a+b\log(cx)-2b\log\left(1+\frac{dx}{e}\right)\right)-2b^2\text{Li}_2\left(-\frac{dx}{e}\right)}{2be}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])/((d + e/x)*x^2),x]
```

```
[Out] ((a + b*Log[c*x])*(a + b*Log[c*x] - 2*b*Log[1 + (d*x)/e]) - 2*b^2*PolyLog[2
, -((d*x)/e)])/(2*b*e)
```

Maple [B] Leaf count of result is larger than twice the leaf count of optimal. 102 vs. $2(41) = 82$.
time = 0.07, size = 103, normalized size = 2.51

method	result	size
risch	$\frac{a\ln(x)}{e}-\frac{a\ln(dx+e)}{e}+\frac{b\ln(cx)^2}{2e}-\frac{b\,\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{e}-\frac{b\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{e}$	81
derivativedivides	$c\left(-\frac{a\ln(cdx+ce)}{ec}+\frac{a\ln(cx)}{ec}-\frac{b\,\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{ec}-\frac{b\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{ec}+\frac{b\ln(cx)^2}{2ec}\right)$	103
default	$c\left(-\frac{a\ln(cdx+ce)}{ec}+\frac{a\ln(cx)}{ec}-\frac{b\,\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{ec}-\frac{b\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{ec}+\frac{b\ln(cx)^2}{2ec}\right)$	103

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))/(d+e/x)/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] c*(-a/e/c*ln(c*d*x+c*e)+a/e/c*ln(c*x)-b/e/c*dilog((c*d*x+c*e)/e/c)-b/e/c*ln
(c*x)*ln((c*d*x+c*e)/e/c)+1/2*b*ln(c*x)^2/e/c)
```

Maxima [A]
time = 0.37, size = 62, normalized size = 1.51

$$\frac{1}{2}be^{(-1)}\log(x)^2-\left(\log\left(dxe^{(-1)}+1\right)\log(x)+\text{Li}_2\left(-dxe^{(-1)}\right)\right)be^{(-1)}-(b\log(c)+a)e^{(-1)}\log(dx+e)+(b\log(c)+a)e^{(-1)}\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*b*e^(-1)*log(x)^2 - (log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b
*e^(-1) - (b*log(c) + a)*e^(-1)*log(d*x + e) + (b*log(c) + a)*e^(-1)*log(x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x) + a)/(d*x^2 + x*e), x)
```

Sympy [C] Result contains complex when optimal does not.
time = 8.23, size = 170, normalized size = 4.15

$$\frac{2ad\left(\begin{cases}-\frac{x}{e}-\frac{1}{2d} & \text{for } d=0\\ \frac{\log(2dx)}{2d} & \text{otherwise}\end{cases}\right)}{e}-\frac{2ad\left(\begin{cases}\frac{x}{e}+\frac{1}{2d} & \text{for } d=0\\ \frac{\log(2dx+2e)}{2d} & \text{otherwise}\end{cases}\right)}{e}+b\left(\begin{cases}-\frac{1}{dx} & \text{for } e=0\\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)-b\left(\begin{cases}\frac{1}{dx} & \text{for } e=0\\ \frac{\log\left(d+\frac{e}{x}\right)}{e} & \text{otherwise}\end{cases}\right)\log(cx)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))/(d+e/x)/x**2,x)
```

```
[Out] 2*a*d*Piecewise((-x/e - 1/(2*d), Eq(d, 0)), (log(2*d*x)/(2*d), True))/e - 2
*a*d*Piecewise((x/e + 1/(2*d), Eq(d, 0)), (log(2*d*x + 2*e)/(2*d), True))/e
 + b*Piecewise((-1/(d*x), Eq(e, 0)), (Piecewise((polylog(2, e*exp_polar(I*p
i)/(d*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) + polylog(2, e*ex
p_polar(I*pi)/(d*x)), Abs(x) < 1), (-log(d)*log(1/x) + polylog(2, e*exp_pol
ar(I*pi)/(d*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*lo
g(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) + polylog(2, e*exp_pol
ar(I*pi)/(d*x)), True))/e, True)) - b*Piecewise((1/(d*x), Eq(e, 0)), (log(d
 + e/x)/e, True))*log(c*x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)/((d + e/x)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x\right)}{x^2\,\left(d+\frac{e}{x}\right)} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))/(x^2*(d + e/x)),x)
```

```
[Out] int((a + b*log(c*x))/(x^2*(d + e/x)), x)
```

3.343 $\int \frac{a+b\log(cx)}{(d+\frac{e}{x})x^3}\,dx$

Optimal. Leaf size=84

$$-\frac{b}{ex}-\frac{a+b\log(cx)}{ex}-\frac{d(a+b\log(cx))^2}{2be^2}+\frac{d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{e^2}+\frac{bd\text{Li}_2\left(-\frac{dx}{e}\right)}{e^2}$$

```
[Out] -b/e/x+(-a-b*ln(c*x))/e/x-1/2*d*(a+b*ln(c*x))^2/b/e^2+d*(a+b*ln(c*x))*ln(1+
d*x/e)/e^2+b*d*polylog(2,-d*x/e)/e^2
```

Rubi [A]
time = 0.09, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {269, 46, 2393, 2341, 2338, 2354, 2438}

$$\frac{bd\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^2}-\frac{d(a+b\log(cx))^2}{2be^2}+\frac{d\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{e^2}-\frac{a+b\log(cx)}{ex}-\frac{b}{ex}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x])/((d + e/x)*x^3),x]
```

```
[Out] -(b/(e*x)) - (a + b*Log[c*x])/(e*x) - (d*(a + b*Log[c*x])^2)/(2*b*e^2) + (d
*(a + b*Log[c*x])*Log[1 + (d*x)/e])/e^2 + (b*d*PolyLog[2, -((d*x)/e)])/e^2
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \left(\frac{a+b\log(cx)}{ex^2}-\frac{d(a+b\log(cx))}{e^2x}+\frac{d^2(a+b\log(cx))}{e^2(e+dx)}\right)dx$$
$$= -\frac{d\int \frac{a+b\log(cx)}{x}\,dx}{e^2}+\frac{d^2\int \frac{a+b\log(cx)}{e+dx}\,dx}{e^2}+\frac{\int \frac{a+b\log(cx)}{x^2}\,dx}{e}$$
$$= -\frac{b}{ex}-\frac{a+b\log(cx)}{ex}-\frac{d(a+b\log(cx))^2}{2be^2}+\frac{d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{e^2}-\frac{(bd)\int \frac{\log(1}{}}{e^2}$$
$$= -\frac{b}{ex}-\frac{a+b\log(cx)}{ex}-\frac{d(a+b\log(cx))^2}{2be^2}+\frac{d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{e^2}+\frac{bd\text{Li}_2\left(-\frac{dx}{e}\right.}{e^2}$$

Mathematica [A]
time = 0.06, size = 77, normalized size = 0.92

$$-\frac{\frac{2be}{x}+\frac{2e(a+b\log(cx))}{x}+\frac{d(a+b\log(cx))^2}{b}-2d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)-2bd\text{Li}_2\left(-\frac{dx}{e}\right)}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])/((d + e/x)*x^3),x]
```

```
[Out] -1/2*((2*b*e)/x + (2*e*(a + b*Log[c*x]))/x + (d*(a + b*Log[c*x])^2)/b - 2*d
*(a + b*Log[c*x])*Log[1 + (d*x)/e] - 2*b*d*PolyLog[2, -((d*x)/e)])/e^2
```

Maple [A]
time = 0.07, size = 148, normalized size = 1.76

method	result
risch	$-\frac{a}{ex}-\frac{ad\ln(x)}{e^2}+\frac{ad\ln(dx+e)}{e^2}-\frac{b\ln(cx)^2 d}{2e^2}-\frac{b\ln(cx)}{ex}-\frac{b}{ex}+\frac{bd\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2}+\frac{bd\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2}$
derivativedivides	$c^2\Bigg(-\frac{a}{e\,c^2x}-\frac{ad\ln(cx)}{e^2c^2}+\frac{ad\ln(cdx+ce)}{e^2c^2}-\frac{b\ln(cx)^2d}{2e^2c^2}+\frac{bd\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2c^2}+\frac{bd\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2c^2}-\frac{b\ln(cx}{e\,c^2x}$
default	$c^2\Bigg(-\frac{a}{e\,c^2x}-\frac{ad\ln(cx)}{e^2c^2}+\frac{ad\ln(cdx+ce)}{e^2c^2}-\frac{b\ln(cx)^2d}{2e^2c^2}+\frac{bd\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2c^2}+\frac{bd\ln(cx)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2c^2}-\frac{b\ln(cx}{e\,c^2x}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))/(d+e/x)/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] c^2*(-a/e/c^2/x-a/e^2/c^2*d*ln(c*x)+a/e^2/c^2*d*ln(c*d*x+c*e)-1/2*b*ln(c*x)
^2/e^2/c^2*d+b/e^2/c^2*d*dilog((c*d*x+c*e)/e/c)+b/e^2/c^2*d*ln(c*x)*ln((c*d
*x+c*e)/e/c)-b/e/c^2/x*ln(c*x)-b/e/c^2/x)
```

Maxima [A]
time = 0.31, size = 92, normalized size = 1.10

$$(\log(dxe^{(-1)}+1)\log(x)+\mathrm{Li}_2(-dxe^{(-1)}))bde^{(-2)}+(bd\log(c)+ad)e^{(-2)}\log(dx+e)-\frac{(bdx\log(x)^2+2(b(\log(c)+1)+a)e+2((bd\log(c)+ad)x+be)\log(x))e^{(-2)}}{2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="maxima")
```

```
[Out] (log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b*d*e^(-2) + (b*d*log(c)
+ a*d)*e^(-2)*log(d*x + e) - 1/2*(b*d*x*log(x)^2 + 2*(b*(log(c) + 1) + a)*e
 + 2*((b*d*log(c) + a*d)*x + b*e)*log(x))*e^(-2)/x
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x) + a)/(d*x^3 + x^2*e), x)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))/(d+e/x)/x**3,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)/((d + e/x)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x\right)}{x^3\,\left(d+\frac{e}{x}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))/(x^3*(d + e/x)),x)
```

```
[Out] int((a + b*log(c*x))/(x^3*(d + e/x)), x)
```

3.344 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx$

Optimal. Leaf size=121

$$-\frac{b}{4ex^2}+\frac{bd}{e^2x}-\frac{a+b\log(cx)}{2ex^2}+\frac{d(a+b\log(cx))}{e^2x}+\frac{d^2(a+b\log(cx))^2}{2be^3}-\frac{d^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{e^3}-\frac{bd^2\mathrm{Li}_2(}{e^3}$$

```
[Out] -1/4*b/e/x^2+b*d/e^2/x+1/2*(-a-b*ln(c*x))/e/x^2+d*(a+b*ln(c*x))/e^2/x+1/2*d
^2*(a+b*ln(c*x))^2/b/e^3-d^2*(a+b*ln(c*x))*ln(1+d*x/e)/e^3-b*d^2*polylog(2,
-d*x/e)/e^3
```

Rubi [A]
time = 0.11, antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {269, 46, 2393, 2341, 2338, 2354, 2438}

$$-\frac{bd^2\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^3}+\frac{d^2(a+b\log(cx))^2}{2be^3}-\frac{d^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{e^3}+\frac{d(a+b\log(cx))}{e^2x}-\frac{a+b\log(cx)}{2ex^2}+\frac{bd}{e^2x}-\frac{b}{4ex^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x])/((d + e/x)*x^4),x]
```

```
[Out] -1/4*b/(e*x^2) + (b*d)/(e^2*x) - (a + b*Log[c*x])/(2*e*x^2) + (d*(a + b*Log
[c*x]))/(e^2*x) + (d^2*(a + b*Log[c*x])^2)/(2*b*e^3) - (d^2*(a + b*Log[c*x]
)*Log[1 + (d*x)/e])/e^3 - (b*d^2*PolyLog[2, -((d*x)/e)])/e^3
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 269

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[x^(m + n*p)*
(b + a/x^n)^p, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && NegQ[n]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
```

```
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx &= \int \left(\frac{a+b\log(cx)}{ex^3}-\frac{d(a+b\log(cx))}{e^2x^2}+\frac{d^2(a+b\log(cx))}{e^3x}-\frac{d^3(a+b\log(cx))}{e^3(e+dx)}\right)dx \\
&= \frac{d^2\int \frac{a+b\log(cx)}{x}\,dx}{e^3}-\frac{d^3\int \frac{a+b\log(cx)}{e+dx}\,dx}{e^3}-\frac{d\int \frac{a+b\log(cx)}{x^2}\,dx}{e^2}+\frac{\int \frac{a+b\log(cx)}{x^3}\,dx}{e} \\
&= -\frac{b}{4ex^2}+\frac{bd}{e^2x}-\frac{a+b\log(cx)}{2ex^2}+\frac{d(a+b\log(cx))}{e^2x}+\frac{d^2(a+b\log(cx))^2}{2be^3}-\frac{d^2(a+b\log(c
\\
&= -\frac{b}{4ex^2}+\frac{bd}{e^2x}-\frac{a+b\log(cx)}{2ex^2}+\frac{d(a+b\log(cx))}{e^2x}+\frac{d^2(a+b\log(cx))^2}{2be^3}-\frac{d^2(a+b\log(c
\end{aligned}
$$

Mathematica [A]
time = 0.10, size = 110, normalized size = 0.91

$$
-\frac{\frac{be^2}{x^2}-\frac{4bde}{x}+\frac{2e^2(a+b\log(cx))}{x^2}-\frac{4de(a+b\log(cx))}{x}-\frac{2d^2(a+b\log(cx))^2}{b}+4d^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+4bd^2\mathrm{Li}_2\left(-\frac{dx}{e}\right)}{4e^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])/((d + e/x)*x^4),x]
```

```
[Out] -1/4*((b*e^2)/x^2 - (4*b*d*e)/x + (2*e^2*(a + b*Log[c*x]))/x^2 - (4*d*e*(a
+ b*Log[c*x]))/x - (2*d^2*(a + b*Log[c*x])^2)/b + 4*d^2*(a + b*Log[c*x])*Lo
g[1 + (d*x)/e] + 4*b*d^2*PolyLog[2, -((d*x)/e)])/e^3
```

Maple [A]
time = 0.08, size = 200, normalized size = 1.65

method	result
risch	$-\frac{a}{2e\,x^2}+\frac{a\,d^2\ln(x)}{e^3}+\frac{ad}{e^2x}-\frac{a\,d^2\ln(dx+e)}{e^3}+\frac{b\ln(cx)^2d^2}{2e^3}-\frac{b\ln(cx)}{2e\,x^2}-\frac{b}{4e\,x^2}+\frac{bd\ln(cx)}{e^2x}+\frac{bd}{e^2x}-\frac{b\,d^2\,\mathrm{di}}{}$
derivativedivides	$c^3\left(-\frac{a\,d^2\ln(cdx+ce)}{e^3c^3}-\frac{a}{2e\,c^3x^2}+\frac{a\,d^2\ln(cx)}{e^3c^3}+\frac{ad}{e^2c^3x}-\frac{b\ln(cx)}{2e\,c^3x^2}-\frac{b}{4e\,c^3x^2}+\frac{bd\ln(cx)}{e^2c^3x}+\frac{bd}{e^2c^3x}-\frac{b\,d^2\,\mathrm{c}}{}\right.$
default	$c^3\left(-\frac{a\,d^2\ln(cdx+ce)}{e^3c^3}-\frac{a}{2e\,c^3x^2}+\frac{a\,d^2\ln(cx)}{e^3c^3}+\frac{ad}{e^2c^3x}-\frac{b\ln(cx)}{2e\,c^3x^2}-\frac{b}{4e\,c^3x^2}+\frac{bd\ln(cx)}{e^2c^3x}+\frac{bd}{e^2c^3x}-\frac{b\,d^2\,\mathrm{c}}{}\right.$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))/(d+e/x)/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] c^3*(-a/e^3/c^3*d^2*ln(c*d*x+c*e)-1/2*a/e/c^3/x^2+a/e^3/c^3*d^2*ln(c*x)+a/e
^2/c^3*d/x-1/2*b/e/c^3/x^2*ln(c*x)-1/4*b/e/c^3/x^2+b/e^2/c^3*d/x*ln(c*x)+b/
e^2/c^3*d/x-b/e^3/c^3*d^2*dilog((c*d*x+c*e)/e/c)-b/e^3/c^3*d^2*ln(c*x)*ln((
c*d*x+c*e)/e/c)+1/2*b*ln(c*x)^2/e^3/c^3*d^2)
```

Maxima [A]
time = 0.31, size = 141, normalized size = 1.17

$$-\left(\log\left(dxe^{(-1)}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-dxe^{(-1)}\right)\right)bd^2e^{(-3)}-\left(bd^2\log\left(c\right)+ad^2\right)e^{(-3)}\log\left(dx+e\right)+\frac{\left(2\,bd^2x^2\log\left(x\right)^2+4\left(\left(d\log\left(c\right)+d\right)b+ad\right)xe-\left(b(2\,\log\left(c\right)+1)+2\,a\right)e^2+2\left(2\,bdxe+2\left(bd^2\log\left(c\right)+ad^2\right)x^2-be^2\right)\log\left(x\right)\right)e^{(-3)}}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="maxima")
```

```
[Out] -(log(d*x*e^(-1) + 1)*log(x) + dilog(-d*x*e^(-1)))*b*d^2*e^(-3) - (b*d^2*lo
g(c) + a*d^2)*e^(-3)*log(d*x + e) + 1/4*(2*b*d^2*x^2*log(x)^2 + 4*((d*log(c
) + d)*b + a*d)*x*e - (b*(2*log(c) + 1) + 2*a)*e^2 + 2*(2*b*d*x*e + 2*(b*d^
2*log(c) + a*d^2)*x^2 - b*e^2)*log(x))*e^(-3)/x^2
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x) + a)/(d*x^4 + x^3*e), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))/(d+e/x)/x**4,x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)/((d + e/x)*x^4), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x\right)}{x^4\,\left(d+\frac{e}{x}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))/(x^4*(d + e/x)),x)
```

```
[Out] int((a + b*log(c*x))/(x^4*(d + e/x)), x)
```

3.345 $\int \frac{x^{-1+n} \log(ex^n)}{1-ex^n} \, dx$

Optimal. Leaf size=17

$$\frac{\text{Li}_2(1 - ex^n)}{en}$$

```
[Out] polylog(2,1-e*x^n)/e/n
```

Rubi [A]
time = 0.04, antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2374, 2352}

$$\frac{\text{PolyLog}(2, 1 - ex^n)}{en}$$

Antiderivative was successfully verified.

```
[In] Int[(x^(-1 + n)*Log[e*x^n])/(1 - e*x^n),x]
```

```
[Out] PolyLog[2, 1 - e*x^n]/(e*n)
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2374

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[f^m/n, Subst[Int[(d + e*x)^q*(a +
b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Rubi steps

$$\begin{aligned} \int \frac{x^{-1+n} \log(ex^n)}{1 - ex^n} \, dx &= \frac{\text{Subst}\left(\int \frac{\log(ex)}{1-ex} \, dx, x, x^n\right)}{n} \\ &= \frac{\text{Li}_2(1 - ex^n)}{en} \end{aligned}$$

Mathematica [A]
time = 0.01, size = 17, normalized size = 1.00

$$\frac{\text{Li}_2(1 - ex^n)}{en}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^(-1 + n)*Log[e*x^n])/(1 - e*x^n),x]
```

```
[Out] PolyLog[2, 1 - e*x^n]/(e*n)
```

Maple [A]
time = 0.21, size = 14, normalized size = 0.82

method	result
default	$\frac{\operatorname{dilog}(e\,x^{n})}{en}$
risch	$-\frac{\ln(1-e\,x^{n})\ln(x^{n})}{ne}+\frac{\ln(1-e\,x^{n})\ln(e\,x^{n})}{ne}+\frac{\operatorname{dilog}(e\,x^{n})}{en}-\frac{i\ln(e\,x^{n}-1)\pi\operatorname{csgn}(ie)\operatorname{csgn}(ie\,x^{n})^{2}}{2ne}+\frac{i\ln(e\,x^{n}-1)\pi\operatorname{csgn}(ie)\operatorname{csgn}(ie$
meijerg	$\frac{i(-1)^{\frac{\operatorname{csgn}(ie)}{2}-\frac{\operatorname{csgn}(ix^{n})}{2}-\frac{\operatorname{csgn}(ix^{n})\operatorname{csgn}(ie)}{2}-\frac{-1+n}{n}-\frac{1}{n}}\ln(e)\ln\left(1+ix^{n}e(-1)^{-\frac{\operatorname{csgn}(ie)}{2}+\frac{\operatorname{csgn}(ix^{n})}{2}+\frac{\operatorname{csgn}(ix^{n})\operatorname{csgn}(ie)}{2}}\right)}{en}-\frac{i(-1)^{\frac{\operatorname{csgn}(i}{2}}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(-1+n)*ln(e*x^n)/(1-e*x^n),x,method=_RETURNVERBOSE)
```

```
[Out] 1/e/n*dilog(e*x^n)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 54 vs. $2(16) = 32$.
time = 0.44, size = 54, normalized size = 3.18

$$-\frac{\left(\log\left(x^{n}\right)\log\left(-e^{(n\log(x)+1)}+1\right)+\operatorname{Li}_{2}\left(e^{(n\log(x)+1)}\right)\right)e^{(-1)}}{n}-\frac{e^{(-1)}\log\left(\left(e^{(n\log(x)+1)}-1\right)e^{(-1)}\right)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="maxima")
```

```
[Out] -(log(x^n)*log(-e^(n*log(x) + 1) + 1) + dilog(e^(n*log(x) + 1)))*e^(-1)/n -
 e^(-1)*log((e^(n*log(x) + 1) - 1)*e^(-1))/n
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 38 vs. $2(16) = 32$.
time = 0.35, size = 38, normalized size = 2.24

$$-\frac{(n\log\left(-x^{n}e+1\right)\log\left(x\right)+\operatorname{Li}_{2}(x^{n}e)+\log\left(x^{n}e-1\right))e^{(-1)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="fricas")
```

```
[Out] -(n*log(-x^n*e + 1)*log(x) + dilog(x^n*e) + log(x^n*e - 1))*e^(-1)/n
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+n)*ln(e*x**n)/(1-e*x**n),x)
[Out] Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="giac")
[Out] integrate(-x^(n - 1)*log(x^n*e)/(x^n*e - 1), x)
```

Mupad [**B**]
time = 3.53, size = 13, normalized size = 0.76

$$\frac{\mathrm{Li}_2(e\,x^n)}{e\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(x^(n - 1)*log(e*x^n))/(e*x^n - 1),x)
[Out] dilog(e*x^n)/(e*n)
```

3.346 $\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx$

Optimal. Leaf size=16

$$\frac{\text{Li}_2\left(1-\frac{x^n}{d}\right)}{n}$$

[Out] polylog(2,1-x^n/d)/n

Rubi [A]
time = 0.04, antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2374, 2352}

$$\frac{\text{PolyLog}\left(2,1-\frac{x^n}{d}\right)}{n}$$

Antiderivative was successfully verified.

[In] Int[(x^(-1 + n)*Log[x^n/d])/(d - x^n),x]

[Out] PolyLog[2, 1 - x^n/d]/n

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2374

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[f^m/n, Subst[Int[(d + e*x)^q*(a +
b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Rubi steps

$$\begin{aligned}\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx &= \frac{\text{Subst}\left(\int \frac{\log\left(\frac{x}{d}\right)}{d-x}\,dx,x,x^n\right)}{n}\\ &= \frac{\text{Li}_2\left(1-\frac{x^n}{d}\right)}{n}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 17, normalized size = 1.06

$$\frac{\text{Li}_2\left(\frac{d-x^n}{d}\right)}{n}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^(-1 + n)*Log[x^n/d])/(d - x^n),x]
```

```
[Out] PolyLog[2, (d - x^n)/d]/n
```

Maple [A]
time = 0.14, size = 13, normalized size = 0.81

method	result
default	$\frac{\operatorname{dilog}\left(\frac{x^n}{d}\right)}{n}$
risch	$-\frac{\ln(x^n)\ln\left(-\frac{-d+x^n}{d}\right)}{n}-\frac{\operatorname{dilog}\left(-\frac{-d+x^n}{d}\right)}{n}-\frac{i\ln(-d+x^n)\pi\operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{ix^n}{d}\right)^2}{2n}+\frac{i\ln(-d+x^n)\pi\operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{ix^n}{d}\right)\operatorname{csgn}(ix}{2n}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(-1+n)*ln(x^n/d)/(d-x^n),x,method=_RETURNVERBOSE)
```

```
[Out] 1/n*dilog(x^n/d)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(15) = 30.
time = 0.38, size = 45, normalized size = 2.81

$$\frac{\log(d)\log(-d+x^n)}{n}-\frac{\log(x^n)\log\left(-\frac{x^n}{d}+1\right)+\mathrm{Li}_2\left(\frac{x^n}{d}\right)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="maxima")
```

```
[Out] log(d)*log(-d + x^n)/n - (log(x^n)*log(-x^n/d + 1) + dilog(x^n/d))/n
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(15) = 30.
time = 0.37, size = 50, normalized size = 3.12

$$-\frac{n\log(x)\log\left(\frac{d-x^n}{d}\right)+\log(-d+x^n)\log\left(\frac{1}{d}\right)+\mathrm{Li}_2\left(-\frac{d-x^n}{d}+1\right)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="fricas")
```

```
[Out] -(n*log(x)*log((d - x^n)/d) + log(-d + x^n)*log(1/d) + dilog(-(d - x^n)/d +
 1))/n
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+n)*ln(x**n/d)/(d-x**n),x)
```

```
[Out] Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="giac")
```

```
[Out] integrate(x^(n - 1)*log(x^n/d)/(d - x^n), x)
```

Mupad [**B**]
time = 3.48, size = 12, normalized size = 0.75

$$\frac{\mathrm{Li}_2\left(\frac{x^n}{d}\right)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^(n - 1)*log(x^n/d))/(d - x^n),x)
```

```
[Out] dilog(x^n/d)/n
```

3.347 $\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx$

Optimal. Leaf size=20

$$-\frac{\operatorname{Li}_2\left(1+\frac{ex^n}{d}\right)}{en}$$

```
[Out] -polylog(2,1+e*x^n/d)/e/n
```

Rubi [A]

time = 0.05, antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2374, 2352}

$$-\frac{\operatorname{PolyLog}\left(2,\frac{ex^n}{d}+1\right)}{en}$$

Antiderivative was successfully verified.

```
[In] Int[(x^(-1 + n)*Log[-((e*x^n)/d)])/(d + e*x^n),x]
```

```
[Out] -(PolyLog[2, 1 + (e*x^n)/d]/(e*n))
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2374

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[f^m/n, Subst[Int[(d + e*x)^q*(a +
b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Rubi steps

$$\begin{aligned}\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx &= \frac{\operatorname{Subst}\left(\int \frac{\log\left(-\frac{ex}{d}\right)}{d+ex}\,dx,x,x^n\right)}{n}\\ &= -\frac{\operatorname{Li}_2\left(1+\frac{ex^n}{d}\right)}{en}\end{aligned}$$

Mathematica [A]

time = 0.01, size = 21, normalized size = 1.05

$$-\frac{\operatorname{Li}_2\left(\frac{d+ex^n}{d}\right)}{en}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^(-1 + n)*Log[-((e*x^n)/d)])/(d + e*x^n),x]
```

```
[Out] -(PolyLog[2, (d + e*x^n)/d]/(e*n))
```

Maple [A]
time = 0.16, size = 19, normalized size = 0.95

method	result
default	$-\frac{\operatorname{dilog}\left(-\frac{e\,x^{n}}{d}\right)}{n e}$
risch	$\frac{\operatorname{dilog}\left(\frac{d+e\,x^{n}}{d}\right)}{n e}+\frac{\ln(x^{n})\ln\left(\frac{d+e\,x^{n}}{d}\right)}{n e}-\frac{i\ln(d+e\,x^{n})\pi\,\operatorname{csgn}(i e\,x^{n})\operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{i e\,x^{n}}{d}\right)}{2 n e}+\frac{i\ln(d+e\,x^{n})\pi\,\operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{i e\,x^{n}}{d}\right)^{2}}{2 n e}-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(-1+n)*ln(-e*x^n/d)/(d+e*x^n),x,method=_RETURNVERBOSE)
```

```
[Out] -1/n/e*dilog(-e*x^n/d)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 66 vs. 2(19) = 38.
time = 0.41, size = 66, normalized size = 3.30

$$-\frac{(\log(d)-1)e^{(-1)}\log\left(\left(d+e^{(n\log(x)+1)}\right)e^{(-1)}\right)}{n}+\frac{\left(\log(-x^{n})\log\left(\frac{e^{(n\log(x)+1)}}{d}+1\right)+\mathrm{Li}_2\left(-\frac{e^{(n\log(x)+1)}}{d}\right)\right)e^{(-1)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="maxima")
```

```
[Out] -(log(d) - 1)*e^(-1)*log((d + e^(n*log(x) + 1))*e^(-1))/n + (log(-x^n)*log(
e^(n*log(x) + 1)/d + 1) + dilog(-e^(n*log(x) + 1)/d))*e^(-1)/n
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 58 vs. 2(19) = 38.
time = 0.34, size = 58, normalized size = 2.90

$$\frac{\left(n\log(x)\log\left(\frac{x^{n}e+d}{d}\right)+\log(x^{n}e+d)\log\left(-\frac{e}{d}\right)+\mathrm{Li}_2\left(-\frac{x^{n}e+d}{d}+1\right)\right)e^{(-1)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="fricas")
```

```
[Out] (n*log(x)*log((x^n*e + d)/d) + log(x^n*e + d)*log(-e/d) + dilog(-(x^n*e + d
)/d + 1))*e^(-1)/n
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+n)*ln(-e*x**n/d)/(d+e*x**n),x)
[Out] Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="giac")
[Out] integrate(x^(n - 1)*log(-x^n*e/d)/(x^n*e + d), x)
```

Mupad [**B**]
time = 3.53, size = 18, normalized size = 0.90

$$-\frac{\mathrm{Li}_2\left(-\frac{e\,x^n}{d}\right)}{e\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^(n - 1)*log(-(e*x^n)/d))/(d + e*x^n),x)
[Out] -dilog(-(e*x^n)/d)/(e*n)
```

3.348 $\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx$

Optimal. Leaf size=14

$$\frac{\mathrm{Li}_2\left(1-\frac{a}{x}\right)}{a}$$

[Out] polylog(2,1-a/x)/a

Rubi [A]
time = 0.05, antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {1607, 2378, 2370, 2352}

$$\frac{\mathrm{PolyLog}\left(2,1-\frac{a}{x}\right)}{a}$$

Antiderivative was successfully verified.

[In] Int[Log[a/x]/(a*x - x^2),x]

[Out] PolyLog[2, 1 - a/x]/a

Rule 1607

```
Int[(u_.)*((a_.)*(x_)^(p_.) + (b_.)*(x_)^(q_.))^(n_.), x_Symbol] :> Int[u*x
^(n*p)*(a + b*x^(q - p))^n, x] /; FreeQ[{a, b, p, q}, x] && IntegerQ[n] &&
PosQ[q - p]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2370

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)/(x_))^(q_.)*(
x_)^(m_.), x_Symbol] :> Int[(e + d*x)^q*(a + b*Log[c*x^n])^p, x] /; FreeQ[{
a, b, c, d, e, m, n, p}, x] && EqQ[m, q] && IntegerQ[q]
```

Rule 2378

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Dist[1/n, Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx &= \int \frac{\log\left(\frac{a}{x}\right)}{(a-x)x}\,dx \\
&= -\text{Subst}\left(\int \frac{\log(ax)}{\left(a-\frac{1}{x}\right)x}\,dx, x, \frac{1}{x}\right) \\
&= -\text{Subst}\left(\int \frac{\log(ax)}{-1+ax}\,dx, x, \frac{1}{x}\right) \\
&= \frac{\text{Li}_2\left(1-\frac{a}{x}\right)}{a}
\end{aligned}
$$

Mathematica [A]
time = 0.00, size = 16, normalized size = 1.14

$$\frac{\text{Li}_2\left(-\frac{a-x}{x}\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a/x]/(a*x - x^2),x]
```

```
[Out] PolyLog[2, -((a - x)/x)]/a
```

Maple [A]
time = 0.11, size = 11, normalized size = 0.79

method	result	size
derivativedivides	$\frac{\text{dilog}\left(\frac{a}{x}\right)}{a}$	11
default	$\frac{\text{dilog}\left(\frac{a}{x}\right)}{a}$	11
risch	$\frac{\text{dilog}\left(\frac{a}{x}\right)}{a}$	11

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a/x)/(a*x-x^2),x,method=_RETURNVERBOSE)
```

```
[Out] 1/a*dilog(a/x)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(13) = 26.
time = 0.28, size = 72, normalized size = 5.14

$$-\left(\frac{\log\left(-a+x\right)}{a}-\frac{\log\left(x\right)}{a}\right)\log\left(\frac{a}{x}\right)-\frac{2\,\log\left(-a+x\right)\log\left(x\right)-\log\left(x\right)^2}{2\,a}+\frac{\log\left(x\right)\log\left(-\frac{x}{a}+1\right)+\text{Li}_2\left(\frac{x}{a}\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a/x)/(a*x-x^2),x, algorithm="maxima")
```

```
[Out] -(log(-a + x)/a - log(x)/a)*log(a/x) - 1/2*(2*log(-a + x)*log(x) - log(x)^2
)/a + (log(x)*log(-x/a + 1) + dilog(x/a))/a
```

Fricas [A]
time = 0.36, size = 13, normalized size = 0.93

$$\frac{\operatorname{Li}_2\left(-\frac{a}{x}+1\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a/x)/(a*x-x^2),x, algorithm="fricas")
```

```
[Out] dilog(-a/x + 1)/a
```

Sympy [C] Result contains complex when optimal does not.
time = 5.57, size = 82, normalized size = 5.86

$$-\left(\begin{cases} -\frac{1}{x} & \text{for } a=0 \\ \frac{\log\left(\frac{a}{x}-1\right)}{a} & \text{otherwise} \end{cases}\right)\log\left(\frac{a}{x}\right)-\begin{cases} \frac{1}{x} & \text{for } a=0 \\ \frac{\begin{cases} \operatorname{Li}_2\left(\frac{a}{x}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ i\pi\log(x)+\operatorname{Li}_2\left(\frac{a}{x}\right) & \text{for } |x|<1 \\ -i\pi\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{a}{x}\right) & \text{for } \frac{1}{|x|}<1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)+\operatorname{Li}_2\left(\frac{a}{x}\right) & \text{otherwise} \end{cases}}{a} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a/x)/(a*x-x**2),x)
```

```
[Out] -Piecewise((-1/x, Eq(a, 0)), (log(a/x - 1)/a, True))*log(a/x) - Piecewise((
1/x, Eq(a, 0)), (Piecewise((polylog(2, a/x), (Abs(x) < 1) & (1/Abs(x) < 1))
, (I*pi*log(x) + polylog(2, a/x), Abs(x) < 1), (-I*pi*log(1/x) + polylog(2,
 a/x), 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*pi*
meijerg(((1, 1), ()), ((), (0, 0)), x) + polylog(2, a/x), True))/a, True))
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a/x)/(a*x-x^2),x, algorithm="giac")
```

```
[Out] integrate(log(a/x)/(a*x - x^2), x)
```

Mupad [B]
time = 3.46, size = 10, normalized size = 0.71

$$\frac{\mathrm{Li}_2\left(\frac{a}{x}\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a/x)/(a*x - x^2),x)
```

```
[Out] dilog(a/x)/a
```

3.349 $\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx$

Optimal. Leaf size=17

$$\frac{\text{Li}_2\left(1-\frac{a}{x^2}\right)}{2a}$$

[Out] 1/2*polylog(2,1-a/x^2)/a

Rubi [A]
time = 0.06, antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {1607, 2378, 2370, 2352}

$$\frac{\text{PolyLog}\left(2,1-\frac{a}{x^2}\right)}{2a}$$

Antiderivative was successfully verified.

[In] Int[Log[a/x^2]/(a*x - x^3),x]

[Out] PolyLog[2, 1 - a/x^2]/(2*a)

Rule 1607

```
Int[(u_.)*((a_.)*(x_)^(p_.) + (b_.)*(x_)^(q_.))^(n_.), x_Symbol] :> Int[u*x
^(n*p)*(a + b*x^(q - p))^n, x] /; FreeQ[{a, b, p, q}, x] && IntegerQ[n] &&
PosQ[q - p]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2370

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)/(x_))^(q_.)*(
x_)^(m_.), x_Symbol] :> Int[(e + d*x)^q*(a + b*Log[c*x^n])^p, x] /; FreeQ[{
a, b, c, d, e, m, n, p}, x] && EqQ[m, q] && IntegerQ[q]
```

Rule 2378

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Dist[1/n, Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

Rubi steps

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \int \frac{\log\left(\frac{a}{x^2}\right)}{x(a-x^2)}\,dx$$
$$= -\left(\frac{1}{2}\text{Subst}\left(\int \frac{\log(ax)}{\left(a-\frac{1}{x}\right)x}\,dx, x, \frac{1}{x^2}\right)\right)$$
$$= -\left(\frac{1}{2}\text{Subst}\left(\int \frac{\log(ax)}{-1+ax}\,dx, x, \frac{1}{x^2}\right)\right)$$
$$= \frac{\text{Li}_2\left(1-\frac{a}{x^2}\right)}{2a}$$

Mathematica [A]
time = 0.01, size = 21, normalized size = 1.24

$$\frac{\text{Li}_2\left(-\frac{a-x^2}{x^2}\right)}{2a}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a/x^2]/(a*x - x^3),x]
[Out] PolyLog[2, -((a - x^2)/x^2)]/(2*a)
```

Maple [A]
time = 0.10, size = 12, normalized size = 0.71

method	result	size
derivativedivides	$\frac{\text{dilog}\left(\frac{a}{x^2}\right)}{2a}$	12
default	$\frac{\text{dilog}\left(\frac{a}{x^2}\right)}{2a}$	12
risch	$\frac{\text{dilog}\left(\frac{a}{x^2}\right)}{2a}$	12

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a/x^2)/(-x^3+a*x),x,method=_RETURNVERBOSE)
[Out] 1/2/a*dilog(a/x^2)
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 81 vs. 2(14) = 28.
time = 0.32, size = 81, normalized size = 4.76

$$-\frac{1}{2}\left(\frac{\log(x^2-a)}{a}-\frac{2\log(x)}{a}\right)\log\left(\frac{a}{x^2}\right)-\frac{\log(x^2-a)\log(x)-\log(x)^2}{a}+\frac{2\log(x)\log\left(-\frac{x^2}{a}+1\right)+\text{Li}_2\left(\frac{x^2}{a}\right)}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="maxima")
```

```
[Out] -1/2*(log(x^2 - a)/a - 2*log(x)/a)*log(a/x^2) - (log(x^2 - a)*log(x) - log(
x)^2)/a + 1/2*(2*log(x)*log(-x^2/a + 1) + dilog(x^2/a))/a
```

Fricas [A]
time = 0.37, size = 14, normalized size = 0.82

$$\frac{\mathrm{Li}_2\left(-\frac{a}{x^2}+1\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="fricas")
```

```
[Out] 1/2*dilog(-a/x^2 + 1)/a
```

Sympy [C] Result contains complex when optimal does not.
time = 6.54, size = 92, normalized size = 5.41

$$-\frac{\begin{cases} \frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for}\ \frac{1}{|x|}<1 \wedge |x|<1 \\ i\pi\log(x)+\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for}\ |x|<1 \\ -i\pi\log\left(\frac{1}{x}\right)+\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for}\ \frac{1}{|x|}<1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)+\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{otherwise} \end{cases}}{a}-\frac{\log\left(\frac{a}{x^2}\right)\log\left(\frac{a}{x^2}-1\right)}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a/x**2)/(-x**3+a*x),x)
```

```
[Out] -Piecewise((polylog(2, a/x**2)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*log
(x) + polylog(2, a/x**2)/2, Abs(x) < 1), (-I*pi*log(1/x) + polylog(2, a/x**
2)/2, 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*pi*m
eijerg(((1, 1), ()), ((), (0, 0)), x) + polylog(2, a/x**2)/2, True))/a - lo
g(a/x**2)*log(a/x**2 - 1)/(2*a)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="giac")
```

```
[Out] integrate(-log(a/x^2)/(x^3 - a*x), x)
```

Mupad [B]
time = 3.50, size = 11, normalized size = 0.65

$$\frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a/x^2)/(a*x - x^3),x)
```

```
[Out] dilog(a/x^2)/(2*a)
```

3.350 $\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx$

Optimal. Leaf size=26

$$-\frac{\text{Li}_2(1-ax^{1-n})}{a(1-n)}$$

[Out] -polylog(2,1-a*x^(1-n))/a/(1-n)

Rubi [A]
time = 0.07, antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$, Rules used = {1607, 2374, 2352}

$$-\frac{\text{PolyLog}(2,1-ax^{1-n})}{a(1-n)}$$

Antiderivative was successfully verified.

[In] Int[Log[a*x^(1 - n)]/(a*x - x^n),x]

[Out] -(PolyLog[2, 1 - a*x^(1 - n)]/(a*(1 - n)))

Rule 1607

```
Int[(u_.)*((a_.)*(x_)^(p_.) + (b_.)*(x_)^(q_.))^(n_.), x_Symbol] :> Int[u*x
^(n*p)*(a + b*x^(q - p))^n, x] /; FreeQ[{a, b, p, q}, x] && IntegerQ[n] &&
PosQ[q - p]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2374

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[f^m/n, Subst[Int[(d + e*x)^q*(a +
b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

Rubi steps

$$\int \frac{\log (ax^{1-n})}{ax-x^n} dx = \int \frac{x^{-n} \log (ax^{1-n})}{-1+ax^{1-n}} dx$$
$$= \frac{\text{Subst}\left(\int \frac{\log(ax)}{-1+ax} dx, x, x^{1-n}\right)}{1-n}$$
$$= -\frac{\text{Li}_2(1-ax^{1-n})}{a(1-n)}$$

Mathematica [A]
time = 0.01, size = 23, normalized size = 0.88

$$\frac{\text{Li}_2(1-ax^{1-n})}{a(-1+n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^(1 - n)]/(a*x - x^n),x]
[Out] PolyLog[2, 1 - a*x^(1 - n)]/(a*(-1 + n))
```

Maple [F]
time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\ln (a\,x^{-n+1})}{ax-x^n} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^(-n+1))/(a*x-x^n),x)
[Out] int(ln(a*x^(-n+1))/(a*x-x^n),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="maxima")
[Out] integrate(log(a*x^(-n + 1))/(a*x - x^n), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 89 vs. 2(22) = 44.
time = 0.44, size = 89, normalized size = 3.42

$$\frac{2\,(n-1)\log(a)\log(x)-(n^2-2\,n+1)\log(x)^2+2\,(n-1)\log(x)\log\left(\frac{a-x^{n-1}}{a}\right)-2\,\log(a)\log\left(-a+x^{n-1}\right)+2\,\text{Li}_2\left(-\frac{a-x^{n-1}}{a}+1\right)}{2\,(an-a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="fricas")
```

```
[Out] 1/2*(2*(n - 1)*log(a)*log(x) - (n^2 - 2*n + 1)*log(x)^2 + 2*(n - 1)*log(x)*
log((a - x^(n - 1))/a) - 2*log(a)*log(-a + x^(n - 1)) + 2*dilog(-(a - x^(n
- 1))/a + 1))/(a*n - a)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\log\left(axx^{-n}\right)}{ax - x^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**(1-n))/(a*x-x**n),x)
```

```
[Out] Integral(log(a*x/x**n)/(a*x - x**n), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="giac")
```

```
[Out] integrate(log(a*x^(-n + 1))/(a*x - x^n), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{\ln\left(a\,x^{1-n}\right)}{a\,x - x^n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^(1 - n))/(a*x - x^n),x)
```

```
[Out] int(log(a*x^(1 - n))/(a*x - x^n), x)
```

3.351 $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=171

$$-\frac{bd^3nx(fx)^{-1+m}}{m^2}-\frac{3bd^2enx^{1+m}(fx)^{-1+m}}{4m^2}-\frac{bde^2nx^{1+2m}(fx)^{-1+m}}{3m^2}-\frac{be^3nx^{1+3m}(fx)^{-1+m}}{16m^2}-\frac{bd^4nx^{1-m}(fx)^{-1}}{4em}$$

```
[Out] -b*d^3*n*x*(f*x)^(-1+m)/m^2-3/4*b*d^2*e*n*x^(1+m)*(f*x)^(-1+m)/m^2-1/3*b*d*
e^2*n*x^(1+2*m)*(f*x)^(-1+m)/m^2-1/16*b*e^3*n*x^(1+3*m)*(f*x)^(-1+m)/m^2-1/
4*b*d^4*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/e/m+1/4*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)
^4*(a+b*ln(c*x^n))/e/m
```

Rubi [A]
time = 0.15, antiderivative size = 171, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$, Rules used = {2377, 2376, 272, 45}

$$\frac{x^{1-m}(fx)^{m-1}(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bd^4nx^{1-m}\log(x)(fx)^{m-1}}{4em}-\frac{bd^3nx(fx)^{m-1}}{m^2}-\frac{3bd^2enx^{m+1}(fx)^{m-1}}{4m^2}-\frac{bde^2nx^{2m+1}(fx)^{m-1}}{3m^2}-\frac{be^3nx^{3m+1}(fx)^{m-1}}{16m^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d^3*n*x*(f*x)^(-1 + m))/m^2) - (3*b*d^2*e*n*x^(1 + m)*(f*x)^(-1 + m))/
(4*m^2) - (b*d*e^2*n*x^(1 + 2*m)*(f*x)^(-1 + m))/(3*m^2) - (b*e^3*n*x^(1 +
3*m)*(f*x)^(-1 + m))/(16*m^2) - (b*d^4*n*x^(1 - m)*(f*x)^(-1 + m)*Log[x])/(
4*e*m) + (x^(1 - m)*(f*x)^(-1 + m)*(d + e*x^m)^4*(a + b*Log[c*x^n]))/(4*e*m
)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
```

```
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx = \left(x^{1-m}(fx)^{-1+m}\right)\int x^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$= \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))}{4em} - \frac{(bnx^{1-m}(fx)^{-1}}{4e}$$
$$= \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))}{4em} - \frac{(bnx^{1-m}(fx)^{-1}}{}$$
$$= \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))}{4em} - \frac{(bnx^{1-m}(fx)^{-1}}{}$$
$$= -\frac{bd^3nx(fx)^{-1+m}}{m^2} - \frac{3bd^2enx^{1+m}(fx)^{-1+m}}{4m^2} - \frac{bde^2nx^{1+2m}(fx)}{3m^2}$$

Mathematica [**A**]
time = 0.11, size = 140, normalized size = 0.82

$$\frac{(fx)^m\left(12am(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m})-bn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m})+12bm(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m})\log(cx^n)\right)}{48fm^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] ((f*x)^m*(12*a*m*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m)) - b*
n*(48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)) + 12*b*m*(4*d^
3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))*Log[c*x^n]))/(48*f*m^2)
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.20, size = 806, normalized size = 4.71

method	result

risch	$\frac{b\left(e^{3} x^{3 m}+4 d\, e^{2} x^{2 m}+6 d^{2} e\, x^{m}+4 d^{3}\right) x\, \mathrm{e}^{\frac{(-1+m)\left(-i \pi \,\mathrm{csgn}(i f x)^{3}+i \pi \,\mathrm{csgn}(i f x)^{2} \mathrm{csgn}(i f)+i \pi \,\mathrm{csgn}(i f x)^{2} \mathrm{csgn}(i x)-i \pi \,\mathrm{csgn}(i f x) \mathrm{csgn}(i f) \mathrm{csgn}(i x)+\right.}{2}}}{4 m}$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)

[Out] 1/4*b*(e^3*(x^m)^3+4*d*e^2*(x^m)^2+6*d^2*e*x^m+4*d^3)*x/m*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/48*(24*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2*m+24*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2*m+12*ln(c)*b*e^3*(x^m)^3*m+48*a*d*e^2*(x^m)^2*m+72*a*d^2*e*x^m*m-16*b*d*e^2*n*(x^m)^2-36*b*d^2*e*n*x^m+48*a*d^3*m+48*ln(c)*b*d^3*m-48*b*d^3*n+24*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2*m-3*b*e^3*n*(x^m)^3+12*a*e^3*(x^m)^3*m-36*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m-24*I*Pi*b*d^3*csgn(I*c*x^n)^3*m+6*I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^m)^3*m-24*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^m)^2*m-24*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*m+24*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^m)^2*m+36*I*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m*m-6*I*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^3*m+36*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m+48*ln(c)*b*d*e^2*(x^m)^2*m+72*ln(c)*b*d^2*e*x^m*m-24*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m+6*I*Pi*b*e^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^3*m-6*I*Pi*b*e^3*csgn(I*c*x^n)^3*(x^m)^3*m-36*I*Pi*b*d^2*e*csgn(I*c*x^n)^3*x^m*m)*x/m^2*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))

Maxima [A]
time = 0.30, size = 259, normalized size = 1.51

$$-\frac{b d^{3} f^{m-1} n x^{m}}{m^{2}}+\frac{3 \, b d^{2} f^{m-1} e^{\left(2 \, m \log\left(x\right)+1\right)} \log\left(c x^{n}\right)}{2 \, m}+\frac{3 \, a d^{2} f^{m-1} e^{\left(2 \, m \log\left(x\right)+1\right)}}{2 \, m}-\frac{3 \, b d^{2} f^{m-1} n e^{\left(2 \, m \log\left(x\right)+1\right)}}{4 \, m^{2}}+\frac{\left(f x\right)^{m} b d^{3} \log\left(c x^{n}\right)}{f m}+\frac{b d f^{m-1} e^{\left(3 \, m \log\left(x\right)+2\right)} \log\left(c x^{n}\right)}{m}+\frac{\left(f x\right)^{m} a d^{3}}{f m}+\frac{a d f^{m-1} e^{\left(3 \, m \log\left(x\right)+2\right)}}{m}-\frac{b d f^{m-1} n e^{\left(3 \, m \log\left(x\right)+2\right)}}{3 \, m^{2}}+\frac{b f^{m-1} e^{\left(4 \, m \log\left(x\right)+3\right)} \log\left(c x^{n}\right)}{4 \, m}+\frac{a f^{m-1} e^{\left(4 \, m \log\left(x\right)+3\right)}}{4 \, m}-\frac{b f^{m-1} n e^{\left(4 \, m \log\left(x\right)+3\right)}}{16 \, m^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="maxima")

[Out] -b*d^3*f^(m - 1)*n*x^m/m^2 + 3/2*b*d^2*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)/m + 3/2*a*d^2*f^(m - 1)*e^(2*m*log(x) + 1)/m - 3/4*b*d^2*f^(m - 1)*n*e^(2*m*log(x) + 1)/m^2 + (f*x)^m*b*d^3*log(c*x^n)/(f*m) + b*d*f^(m - 1)*e^(3*m*log(x) + 2)*log(c*x^n)/m + (f*x)^m*a*d^3/(f*m) + a*d*f^(m - 1)*e^(3*m*log(x) + 2)/m - 1/3*b*d*f^(m - 1)*n*e^(3*m*log(x) + 2)/m^2 + 1/4*b*f^(m - 1)*e^(4*m*log(x) + 3)*log(c*x^n)/m + 1/4*a*f^(m - 1)*e^(4*m*log(x) + 3)/m - 1/16*b*f^(m - 1)*n*e^(4*m*log(x) + 3)/m^2

Fricas [A]
time = 0.36, size = 189, normalized size = 1.11

$$\frac{3 \,{\left(4 \, b m n e^{3} \log\left(x\right)+4 \, b m e^{3} \log\left(c\right)+{\left(4 \, a m-b n\right)} e^{3}\right)} f^{m-1} x^{4 \, m}+16 \,{\left(3 \, b d m n e^{2} \log\left(x\right)+3 \, b d m e^{2} \log\left(c\right)+{\left(3 \, a d m-b d n\right)} e^{2}\right)} f^{m-1} x^{3 \, m}+36 \,{\left(2 \, b d^{2} m n e \log\left(x\right)+2 \, b d^{2} m e \log\left(c\right)+{\left(2 \, a d^{2} m-b d^{2} n\right)} e\right)} f^{m-1} x^{2 \, m}+48 \,{\left(b d^{3} m n \log\left(x\right)+b d^{3} m \log\left(c\right)+a d^{3} m-b d^{3} n\right)} f^{m-1} x^{m}}{48 \, m^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/48*(3*(4*b*m*n*e^3*log(x) + 4*b*m*e^3*log(c) + (4*a*m - b*n)*e^3)*f^(m -
1)*x^(4*m) + 16*(3*b*d*m*n*e^2*log(x) + 3*b*d*m*e^2*log(c) + (3*a*d*m - b*d
*n)*e^2)*f^(m - 1)*x^(3*m) + 36*(2*b*d^2*m*n*e*log(x) + 2*b*d^2*m*e*log(c)
+ (2*a*d^2*m - b*d^2*n)*e)*f^(m - 1)*x^(2*m) + 48*(b*d^3*m*n*log(x) + b*d^3
*m*log(c) + a*d^3*m - b*d^3*n)*f^(m - 1)*x^m)/m^2
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(d+e*x**m)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3004 deep
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 335 vs. 2(159) = 318.
time = 3.95, size = 335, normalized size = 1.96

$$\frac{bd^3f^mnx^m\log(x)}{fm}+\frac{3\,bd^2f^mnx^{2\,m}e\log(x)}{2\,fm}+\frac{bd^3f^mx^m\log(c)}{fm}+\frac{3\,bd^2f^mx^{2\,m}e\log(c)}{2\,fm}+\frac{bdf^mnx^{3\,m}e^2\log(x)}{fm}+\frac{ad^3f^mx^m}{fm}-\frac{bd^3f^mnx^m}{fm^2}+\frac{3\,ad^2f^mx^{2\,m}e}{2\,fm}-\frac{3\,bd^2f^mnx^{2\,m}e}{4\,fm^2}+\frac{bdf^mx^{3\,m}e^2\log(c)}{fm}+\frac{bf^mnx^{4\,m}e^3\log(x)}{4\,fm}+\frac{adf^mx^{3\,m}e^2}{fm}-\frac{bdf^mnx^{3\,m}e^2}{3\,fm^2}+\frac{bf^mx^{4\,m}e^3\log(c)}{4\,fm}+\frac{af^mx^{4\,m}e^3}{4\,fm}-\frac{bf^mnx^{4\,m}e^3}{16\,fm^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*d^3*f^m*n*x^m*log(x)/(f*m) + 3/2*b*d^2*f^m*n*x^(2*m)*e*log(x)/(f*m) + b*d
^3*f^m*x^m*log(c)/(f*m) + 3/2*b*d^2*f^m*x^(2*m)*e*log(c)/(f*m) + b*d*f^m*n*
x^(3*m)*e^2*log(x)/(f*m) + a*d^3*f^m*x^m/(f*m) - b*d^3*f^m*n*x^m/(f*m^2) +
3/2*a*d^2*f^m*x^(2*m)*e/(f*m) - 3/4*b*d^2*f^m*n*x^(2*m)*e/(f*m^2) + b*d*f^m
*x^(3*m)*e^2*log(c)/(f*m) + 1/4*b*f^m*n*x^(4*m)*e^3*log(x)/(f*m) + a*d*f^m*
x^(3*m)*e^2/(f*m) - 1/3*b*d*f^m*n*x^(3*m)*e^2/(f*m^2) + 1/4*b*f^m*x^(4*m)*e
^3*log(c)/(f*m) + 1/4*a*f^m*x^(4*m)*e^3/(f*m) - 1/16*b*f^m*n*x^(4*m)*e^3/(f
*m^2)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(f\,x\right)}^{m-1}\,{\left(d+e\,x^m\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n)), x)
```

3.352 $\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=142

$$-\frac{bd^2nx(fx)^{-1+m}}{m^2}-\frac{bdenx^{1+m}(fx)^{-1+m}}{2m^2}-\frac{be^2nx^{1+2m}(fx)^{-1+m}}{9m^2}-\frac{bd^3nx^{1-m}(fx)^{-1+m}\log(x)}{3em}+\frac{x^{1-m}(fx)^{-1+m}}{}$$

```
[Out] -b*d^2*n*x*(f*x)^(-1+m)/m^2-1/2*b*d*e*n*x^(1+m)*(f*x)^(-1+m)/m^2-1/9*b*e^2*
n*x^(1+2*m)*(f*x)^(-1+m)/m^2-1/3*b*d^3*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/e/m+1/3
*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))/e/m
```

Rubi [A]
time = 0.14, antiderivative size = 142, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$, Rules used = {2377, 2376, 272, 45}

$$\frac{x^{1-m}(fx)^{m-1}(d+ex^m)^3(a+b\log(cx^n))}{3em}-\frac{bd^3nx^{1-m}\log(x)(fx)^{m-1}}{3em}-\frac{bd^2nx(fx)^{m-1}}{m^2}-\frac{bdenx^{m+1}(fx)^{m-1}}{2m^2}-\frac{be^2nx^{2m+1}(fx)^{m-1}}{9m^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d^2*n*x*(f*x)^(-1 + m))/m^2) - (b*d*e*n*x^(1 + m)*(f*x)^(-1 + m))/(2*m
^2) - (b*e^2*n*x^(1 + 2*m)*(f*x)^(-1 + m))/(9*m^2) - (b*d^3*n*x^(1 - m)*(f*
x)^(-1 + m)*Log[x])/(3*e*m) + (x^(1 - m)*(f*x)^(-1 + m)*(d + e*x^m)^3*(a +
b*Log[c*x^n]))/(3*e*m)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
```

```
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\left(x^{1-m}(fx)^{-1+m}\right)\int x^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{x^{1-m}(fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)}{3em}-\frac{(bnx^{1-m}(fx)^{-1-}}{3e}$$
$$=\frac{x^{1-m}(fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)}{3em}-\frac{(bnx^{1-m}(fx)^{-1-}}{}$$
$$=\frac{x^{1-m}(fx)^{-1+m}\left(d+ex^m\right)^3\left(a+b\log\left(cx^n\right)\right)}{3em}-\frac{(bnx^{1-m}(fx)^{-1-}}{}$$
$$=-\frac{bd^2nx(fx)^{-1+m}}{m^2}-\frac{bdenx^{1+m}(fx)^{-1+m}}{2m^2}-\frac{be^2nx^{1+2m}(fx)^{-1+}}{9m^2}$$

Mathematica [A]
time = 0.08, size = 101, normalized size = 0.71

$$\frac{(fx)^m\left(6am(3d^2+3dex^m+e^2x^{2m})-bn(18d^2+9dex^m+2e^2x^{2m})+6bm(3d^2+3dex^m+e^2x^{2m})\log\left(cx^n\right)\right)}{18fm^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] ((f*x)^m*(6*a*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - b*n*(18*d^2 + 9*d*e*x^m
 + 2*e^2*x^(2*m)) + 6*b*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m))*Log[c*x^n]))/(1
8*f*m^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 616, normalized size = 4.34

method	result

risch	$\frac{b(e^2x^{2m}+3de\,x^m+3d^2)x\,\mathrm{e}^{\frac{(-1+m)\left(-i\pi\mathrm{csgn}(ifx)^3+i\pi\mathrm{csgn}(ifx)^2\mathrm{csgn}(if)+i\pi\mathrm{csgn}(ifx)^2\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}(ifx)\mathrm{csgn}(if)\mathrm{csgn}(ix)+2\ln(x)+2\ln(f}{2}}}{3m}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*b*(e^2*(x^m)^2+3*d*e*x^m+3*d^2)*x/m*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3
+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)
*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/18*(3*I*Pi*b*e^2*csgn(I*c)
*csgn(I*c*x^n)^2*(x^m)^2*m+9*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2*m-3*I*Pi*
b*e^2*csgn(I*c*x^n)^3*(x^m)^2*m+3*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x
^m)^2*m-9*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^m*m-9*I*Pi*b*d^2*csgn(I*c*x^n)^3*m-9
*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m+9*I*Pi*b*d*e*csgn(I*x
^n)*csgn(I*c*x^n)^2*x^m*m+9*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m-3*I*
Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*m+9*I*Pi*b*d^2*csgn(I*
x^n)*csgn(I*c*x^n)^2*m-9*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m+6
*ln(c)*b*e^2*(x^m)^2*m+18*ln(c)*b*d*e*x^m*m+6*a*e^2*(x^m)^2*m-2*b*e^2*n*(x^
m)^2+18*ln(c)*b*d^2*m+18*a*d*e*x^m*m-9*b*d*e*n*x^m+18*a*d^2*m-18*b*d^2*n)*x
/m^2*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*
csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f
)))
```

Maxima [A]

time = 0.30, size = 186, normalized size = 1.31

$$-\frac{bd^2f^{m-1}nx^m}{m^2}+\frac{bdf^{m-1}e^{(2m\log(x)+1)}\log(cx^n)}{m}+\frac{adf^{m-1}e^{(2m\log(x)+1)}}{m}-\frac{bdf^{m-1}ne^{(2m\log(x)+1)}}{2m^2}+\frac{(fx)^m bd^2\log(cx^n)}{fm}+\frac{bf^{m-1}e^{(3m\log(x)+2)}\log(cx^n)}{3m}+\frac{(fx)^m ad^2}{fm}+\frac{af^{m-1}e^{(3m\log(x)+2)}}{3m}-\frac{bf^{m-1}ne^{(3m\log(x)+2)}}{9m^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d^2*f^(m - 1)*n*x^m/m^2 + b*d*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)/m
+ a*d*f^(m - 1)*e^(2*m*log(x) + 1)/m - 1/2*b*d*f^(m - 1)*n*e^(2*m*log(x) +
1)/m^2 + (f*x)^m*b*d^2*log(c*x^n)/(f*m) + 1/3*b*f^(m - 1)*e^(3*m*log(x) + 2
)*log(c*x^n)/m + (f*x)^m*a*d^2/(f*m) + 1/3*a*f^(m - 1)*e^(3*m*log(x) + 2)/m
 - 1/9*b*f^(m - 1)*n*e^(3*m*log(x) + 2)/m^2
```

Fricas [A]

time = 0.39, size = 135, normalized size = 0.95

$$\frac{2\left(3\,bmne^2\log(x)+3\,bme^2\log(c)+(3\,am-bn)e^2\right)f^{m-1}x^{3m}+9\left(2\,bdmne\log(x)+2\,bdme\log(c)+(2\,adm-bdn)e\right)f^{m-1}x^{2m}+18\left(bd^2mn\log(x)+bd^2m\log(c)+ad^2m-bd^2n\right)f^{m-1}x^m}{18\,m^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/18*(2*(3*b*m*n*e^2*log(x) + 3*b*m*e^2*log(c) + (3*a*m - b*n)*e^2)*f^(m -
1)*x^(3*m) + 9*(2*b*d*m*n*e*log(x) + 2*b*d*m*e*log(c) + (2*a*d*m - b*d*n)*e
)*f^(m - 1)*x^(2*m) + 18*(b*d^2*m*n*log(x) + b*d^2*m*log(c) + a*d^2*m - b*d
^2*n)*f^(m - 1)*x^m)/m^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1593 vs. $2(129) = 258$.
time = 40.51, size = 1593, normalized size = 11.22

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(d+e*x**m)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((zoo*(d + e)**2*(a*x - b*n*x + b*x*log(c*x**n)), Eq(f, 0) & Eq(m,
 0)), ((d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x),
 Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, Eq(m, 0)), (0**(m -
 1)*(4*a*d**2*m**4*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 12*a*d**2*m**
3*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 13*a*d**2*m**2*x/(4*m**4 + 12*
m**3 + 13*m**2 + 6*m + 1) + 6*a*d**2*m*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m
+ 1) + a*d**2*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 8*a*d*e*m**3*x*x**
m/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 16*a*d*e*m**2*x*x**m/(4*m**4 + 1
2*m**3 + 13*m**2 + 6*m + 1) + 10*a*d*e*m*x*x**m/(4*m**4 + 12*m**3 + 13*m**2
 + 6*m + 1) + 2*a*d*e*x*x**m/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 2*a*e
**2*m**3*x*x**(2*m)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 5*a*e**2*m**2*
x*x**(2*m)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 4*a*e**2*m*x*x**(2*m)/(
4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + a*e**2*x*x**(2*m)/(4*m**4 + 12*m**3
 + 13*m**2 + 6*m + 1) - 4*b*d**2*m**4*n*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m
 + 1) + 4*b*d**2*m**4*x*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1)
- 12*b*d**2*m**3*n*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 12*b*d**2*m**
3*x*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) - 13*b*d**2*m**2*n*x
/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 13*b*d**2*m**2*x*log(c*x**n)/(4*m
**4 + 12*m**3 + 13*m**2 + 6*m + 1) - 6*b*d**2*m*n*x/(4*m**4 + 12*m**3 + 13*
m**2 + 6*m + 1) + 6*b*d**2*m*x*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*
m + 1) - b*d**2*n*x/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + b*d**2*x*log(c
*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 8*b*d*e*m**3*x*x**m*log(c*x
**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) - 8*b*d*e*m**2*n*x*x**m/(4*m**4
 + 12*m**3 + 13*m**2 + 6*m + 1) + 16*b*d*e*m**2*x*x**m*log(c*x**n)/(4*m**4
+ 12*m**3 + 13*m**2 + 6*m + 1) - 8*b*d*e*m*n*x*x**m/(4*m**4 + 12*m**3 + 13*
m**2 + 6*m + 1) + 10*b*d*e*m*x*x**m*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2
 + 6*m + 1) - 2*b*d*e*n*x*x**m/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 2*b
*d*e*x*x**m*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 2*b*e**2*m
**3*x*x**(2*m)*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) - b*e**2*
m**2*n*x*x**(2*m)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 5*b*e**2*m**2*x*
x**(2*m)*log(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) - 2*b*e**2*m*n*
```

```
x*x**(2*m)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + 4*b*e**2*m*x*x**(2*m)*l
og(c*x**n)/(4*m**4 + 12*m**3 + 13*m**2 + 6*m + 1) - b*e**2*n*x*x**(2*m)/(4*
m**4 + 12*m**3 + 13*m**2 + 6*m + 1) + b*e**2*x*x**(2*m)*log(c*x**n)/(4*m**4
 + 12*m**3 + 13*m**2 + 6*m + 1)), Eq(f, 0)), (a*d**2*(f*x)**m/(f*m) + a*d*e
*x**m*(f*x)**m/(f*m) + a*e**2*x**(2*m)*(f*x)**m/(3*f*m) + b*d**2*(f*x)**m*l
og(c*x**n)/(f*m) - b*d**2*n*(f*x)**m/(f*m**2) + b*d*e*x**m*(f*x)**m*log(c*x
**n)/(f*m) - b*d*e*n*x**m*(f*x)**m/(2*f*m**2) + b*e**2*x**(2*m)*(f*x)**m*lo
g(c*x**n)/(3*f*m) - b*e**2*n*x**(2*m)*(f*x)**m/(9*f*m**2), True))
```

Giac [A]
time = 4.43, size = 241, normalized size = 1.70

$$\frac{bd^2f^mnx^m\log(x)}{fm}+\frac{bdf^mnx^{2m}e\log(x)}{fm}+\frac{bd^2f^mx^m\log(c)}{fm}+\frac{bdf^mx^{2m}e\log(c)}{fm}+\frac{bf^mnx^{3m}e^2\log(x)}{3fm}+\frac{ad^2f^mx^m}{fm}-\frac{bd^2f^mnx^m}{fm^2}+\frac{adf^mx^{2m}e}{fm}-\frac{bdf^mnx^{2m}e}{2fm^2}+\frac{bf^mx^{3m}e^2\log(c)}{3fm}+\frac{af^mx^{3m}e^2}{3fm}-\frac{bf^mnx^{3m}e^2}{9fm^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*d^2*f^m*n*x^m*log(x)/(f*m) + b*d*f^m*n*x^(2*m)*e*log(x)/(f*m) + b*d^2*f^m
*x^m*log(c)/(f*m) + b*d*f^m*x^(2*m)*e*log(c)/(f*m) + 1/3*b*f^m*n*x^(3*m)*e^
2*log(x)/(f*m) + a*d^2*f^m*x^m/(f*m) - b*d^2*f^m*n*x^m/(f*m^2) + a*d*f^m*x^
(2*m)*e/(f*m) - 1/2*b*d*f^m*n*x^(2*m)*e/(f*m^2) + 1/3*b*f^m*x^(3*m)*e^2*log
(c)/(f*m) + 1/3*a*f^m*x^(3*m)*e^2/(f*m) - 1/9*b*f^m*n*x^(3*m)*e^2/(f*m^2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^{m-1}\,(d+e\,x^m)^2\,(a+b\,\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n)), x)
```

3.353 $\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n))\, dx$

Optimal. Leaf size=90

$$-\frac{bdn(fx)^m}{fm^2}-\frac{benx^m(fx)^m}{4fm^2}+\frac{d(fx)^m(a+b\log(cx^n))}{fm}+\frac{ex^m(fx)^m(a+b\log(cx^n))}{2fm}$$

```
[Out] -b*d*n*(f*x)^m/f/m^2-1/4*b*e*n*x^m*(f*x)^m/f/m^2+d*(f*x)^m*(a+b*ln(c*x^n))/
f/m+1/2*e*x^m*(f*x)^m*(a+b*ln(c*x^n))/f/m
```

Rubi [A]
time = 0.08, antiderivative size = 113, normalized size of antiderivative = 1.26, number of steps used = 5, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2377, 2376, 272, 45}

$$\frac{x^{1-m}(fx)^{m-1}(d+ex^m)^2(a+b\log(cx^n))}{2em}-\frac{bd^2nx^{1-m}\log(x)(fx)^{m-1}}{2em}-\frac{bdnx(fx)^{m-1}}{m^2}-\frac{benx^{m+1}(fx)^{m-1}}{4m^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*d*n*x*(f*x)^(-1 + m))/m^2) - (b*e*n*x^(1 + m)*(f*x)^(-1 + m))/(4*m^2)
- (b*d^2*n*x^(1 - m)*(f*x)^(-1 + m)*Log[x])/(2*e*m) + (x^(1 - m)*(f*x)^(-1
+ m)*(d + e*x^m)^2*(a + b*Log[c*x^n]))/(2*e*m)
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\int (fx)^{-1+m} (d+ex^m)(a+b\log(cx^n))\,dx = \left(x^{1-m}(fx)^{-1+m}\right)\int x^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx$$

$$= \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))}{2em} - \frac{(bnx^{1-m}(fx)^{-1}}{2}$$

$$= \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))}{2em} - \frac{(bnx^{1-m}(fx)^{-1}}{}$$

$$= \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))}{2em} - \frac{(bnx^{1-m}(fx)^{-1}}{}$$

$$= -\frac{bdnx(fx)^{-1+m}}{m^2} - \frac{benx^{1+m}(fx)^{-1+m}}{4m^2} - \frac{bd^2nx^{1-m}(fx)^{-1+m}}{2em}$$

Mathematica [A]
time = 0.05, size = 61, normalized size = 0.68

$$\frac{(fx)^m(2am(2d+ex^m)-bn(4d+ex^m)+2bm(2d+ex^m)\log(cx^n))}{4fm^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n]),x]
[Out] ((f*x)^m*(2*a*m*(2*d + e*x^m) - b*n*(4*d + e*x^m) + 2*b*m*(2*d + e*x^m)*Log
[c*x^n]))/(4*f*m^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 425, normalized size = 4.72

method	result
risch	$\frac{b(e\,x^m+2d)x\,\mathrm{e}^{\frac{(-1+m)\left(-i\pi\,\mathrm{csgn}(ifx)^3+i\pi\,\mathrm{csgn}(ifx)^2\mathrm{csgn}(if)+i\pi\,\mathrm{csgn}(ifx)^2\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}(ifx)\mathrm{csgn}(if)\mathrm{csgn}(ix)+2\ln(x)+2\ln(f)\right)}{2}}\ln(x^n)}{2m}$ −

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(d+e*x^m)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*(e*x^m+2*d)*x/m*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^
2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*
x)+2*ln(x)+2*ln(f)))*ln(x^n)-1/4*(I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)*x^m*m-I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m-I*Pi*b*e*csgn(I*x^n)*csg
n(I*c*x^n)^2*x^m*m+I*Pi*b*e*csgn(I*c*x^n)^3*x^m*m+2*I*Pi*b*d*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*m-2*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*m-2*I*Pi*b*d*c
sgn(I*x^n)*csgn(I*c*x^n)^2*m+2*I*Pi*b*d*csgn(I*c*x^n)^3*m-2*ln(c)*b*e*x^m*m
-4*ln(c)*b*d*m-2*x^m*a*e*m+x^m*b*e*n-4*a*d*m+4*b*d*n)*x/m^2*exp(1/2*(-1+m)*
(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I
*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.30, size = 115, normalized size = 1.28

$$-\frac{bdf^{m-1}nx^m}{m^2}+\frac{bf^{m-1}e^{(2\,m\log(x)+1)}\log\left(cx^n\right)}{2\,m}+\frac{af^{m-1}e^{(2\,m\log(x)+1)}}{2\,m}-\frac{bf^{m-1}ne^{(2\,m\log(x)+1)}}{4\,m^2}+\frac{(fx)^m\,bd\log\left(cx^n\right)}{fm}+\frac{(fx)^m\,ad}{fm}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d*f^(m - 1)*n*x^m/m^2 + 1/2*b*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)/m
+ 1/2*a*f^(m - 1)*e^(2*m*log(x) + 1)/m - 1/4*b*f^(m - 1)*n*e^(2*m*log(x) +
1)/m^2 + (f*x)^m*b*d*log(c*x^n)/(f*m) + (f*x)^m*a*d/(f*m)
```

Fricas [A]
time = 0.36, size = 80, normalized size = 0.89

$$\frac{(2\,bmne\log(x)+2\,bme\log(c)+(2\,am-bn)e)f^{m-1}x^{2\,m}+4\,(bdmn\log(x)+bdm\log(c)+adm-bdn)f^{m-1}x^m}{4\,m^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/4*((2*b*m*n*e*log(x) + 2*b*m*e*log(c) + (2*a*m - b*n)*e)*f^(m - 1)*x^(2*m
) + 4*(b*d*m*n*log(x) + b*d*m*log(c) + a*d*m - b*d*n)*f^(m - 1)*x^m)/m^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 445 vs. 2(80) = 160.
time = 16.53, size = 445, normalized size = 4.94

$$\begin{cases} \tilde{\infty}(d+e)\left(ax-bnx+bx\log\left(cx^n\right)\right) & \text{for}\ f=0\wedge m=0 \\ \frac{(d+e)\left(\begin{cases} a\log(x) & \text{for}\ b=0 \\ -(-a-b\log(c))\log(x) & \text{for}\ n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right)}{f} & \text{for}\ m=0 \\ 0^{m-1}\left(\frac{adm^2x}{m^2+2m+1}+\frac{2admx}{m^2+2m+1}+\frac{adx}{m^2+2m+1}+\frac{aemxx^m}{m^2+2m+1}+\frac{aexx^m}{m^2+2m+1}-\frac{bdm^2nx}{m^2+2m+1}+\frac{bdm^2x\log(cx^n)}{m^2+2m+1}-\frac{2bdmnx}{m^2+2m+1}+\frac{2bdmx\log(cx^n)}{m^2+2m+1}-\frac{bdnx}{m^2+2m+1}+\frac{bdx\log(cx^n)}{m^2+2m+1}+\frac{bemxx^m\log(cx^n)}{m^2+2m+1}-\frac{benxx^m}{m^2+2m+1}+\frac{bexx^m\log(cx^n)}{m^2+2m+1}\right) & \text{for}\ f=0 \\ \frac{ad(fx)^m}{fm}+\frac{aex^m(fx)^m}{2fm}+\frac{bd(fx)^m\log(cx^n)}{fm}-\frac{bdn(fx)^m}{fm^2}+\frac{bex^m(fx)^m\log(cx^n)}{2fm}-\frac{benx^m(fx)^m}{4fm^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(d+e*x**m)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((zoo*(d + e)*(a*x - b*n*x + b*x*log(c*x**n)), Eq(f, 0) & Eq(m, 0)
), ((d + e)*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n,
 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, Eq(m, 0)), (0**(m - 1)*(a
*d*m**2*x/(m**2 + 2*m + 1) + 2*a*d*m*x/(m**2 + 2*m + 1) + a*d*x/(m**2 + 2*m
 + 1) + a*e*m*x*x**m/(m**2 + 2*m + 1) + a*e*x*x**m/(m**2 + 2*m + 1) - b*d*m
**2*n*x/(m**2 + 2*m + 1) + b*d*m**2*x*log(c*x**n)/(m**2 + 2*m + 1) - 2*b*d*
m*n*x/(m**2 + 2*m + 1) + 2*b*d*m*x*log(c*x**n)/(m**2 + 2*m + 1) - b*d*n*x/(
m**2 + 2*m + 1) + b*d*x*log(c*x**n)/(m**2 + 2*m + 1) + b*e*m*x*x**m*log(c*x
**n)/(m**2 + 2*m + 1) - b*e*n*x*x**m/(m**2 + 2*m + 1) + b*e*x*x**m*log(c*x*
*n)/(m**2 + 2*m + 1)), Eq(f, 0)), (a*d*(f*x)**m/(f*m) + a*e*x**m*(f*x)**m/(
2*f*m) + b*d*(f*x)**m*log(c*x**n)/(f*m) - b*d*n*(f*x)**m/(f*m**2) + b*e*x**
m*(f*x)**m*log(c*x**n)/(2*f*m) - b*e*n*x**m*(f*x)**m/(4*f*m**2), True))
```

Giac [A]
time = 4.09, size = 150, normalized size = 1.67

$$\frac{bdf^m nx^m \log(x)}{fm} + \frac{bf^m nx^{2m} e \log(x)}{2fm} + \frac{bdf^m x^m \log(c)}{fm} + \frac{bf^m x^{2m} e \log(c)}{2fm} + \frac{adf^m x^m}{fm} - \frac{bdf^m nx^m}{fm^2} + \frac{af^m x^{2m} e}{2fm} - \frac{bf^m nx^{2m} e}{4fm^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*d*f^m*n*x^m*log(x)/(f*m) + 1/2*b*f^m*n*x^(2*m)*e*log(x)/(f*m) + b*d*f^m*x
^m*log(c)/(f*m) + 1/2*b*f^m*x^(2*m)*e*log(c)/(f*m) + a*d*f^m*x^m/(f*m) - b*
d*f^m*n*x^m/(f*m^2) + 1/2*a*f^m*x^(2*m)*e/(f*m) - 1/4*b*f^m*n*x^(2*m)*e/(f*
m^2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^{m-1}\,(d+e\,x^m)\,\left(a+b\,\ln(c\,x^n)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n)), x)
```

3.354 $\int (fx)^{-1+m} (a+b\log(cx^n))\,dx$

Optimal. Leaf size=38

$$-\frac{bn(fx)^m}{fm^2}+\frac{(fx)^m(a+b\log(cx^n))}{fm}$$

```
[Out] -b*n*(f*x)^m/f/m^2+(f*x)^m*(a+b*ln(c*x^n))/f/m
```

Rubi [A]
time = 0.01, antiderivative size = 38, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2341}

$$\frac{(fx)^m(a+b\log(cx^n))}{fm}-\frac{bn(fx)^m}{fm^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*n*(f*x)^m)/(f*m^2)) + ((f*x)^m*(a + b*Log[c*x^n]))/(f*m)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx=-\frac{bn(fx)^m}{fm^2}+\frac{(fx)^m(a+b\log(cx^n))}{fm}$$

Mathematica [A]
time = 0.01, size = 29, normalized size = 0.76

$$\frac{(fx)^m(am-bn+bm\log(cx^n))}{fm^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(a + b*Log[c*x^n]),x]
```

```
[Out] ((f*x)^m*(a*m - b*n + b*m*Log[c*x^n]))/(f*m^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 281, normalized size = 7.39

method	result
risch	$\frac{bx\,\mathrm{e}^{\frac{(-1+m)\left(-i\pi \mathrm{csgn}(ifx)^3+i\pi \mathrm{csgn}(ifx)^2\mathrm{csgn}(if)+i\pi \mathrm{csgn}(ifx)^2\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}(ifx)\mathrm{csgn}(if)\mathrm{csgn}(ix)+2\ln(x)+2\ln(f)\right)}{2}}\ln(x^n)}{m}+\frac{\left(-i\pi b\,\mathrm{cs}\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b/m*x*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi
*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(
f)))*ln(x^n)+1/2*(-I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m+I*Pi*b*csgn
(I*c)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(I*
c*x^n)^3*m+2*b*ln(c)*m+2*a*m-2*b*n)/m^2*x*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)
^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*
x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.29, size = 48, normalized size = 1.26

$$-\frac{bf^{m-1}nx^m}{m^2}+\frac{(fx)^m\,b\log(cx^n)}{fm}+\frac{(fx)^m\,a}{fm}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b*log(c*x^n)/(f*m) + (f*x)^m*a/(f*m)
```

Fricas [A]
time = 0.36, size = 42, normalized size = 1.11

$$\frac{(bmnx\log(x)+bmx\log(c)+(am-bn)x)e^{((m-1)\log(f)+(m-1)\log(x))}}{m^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] (b*m*n*x*log(x) + b*m*x*log(c) + (a*m - b*n)*x)*e^((m - 1)*log(f) + (m - 1)
*log(x))/m^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 119 vs. $2(31)=62$.

time = 6.49, size = 119, normalized size = 3.13

$$\begin{cases} \tilde{\infty}(ax - bnx + bx\log(cx^n)) & \text{for } f = 0 \wedge m = 0 \\ 0^{m-1}(ax - bnx + bx\log(cx^n)) & \text{for } f = 0 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{for } m = 0 \\ \frac{a(fx)^m}{fm} + \frac{b(fx)^m\log(cx^n)}{fm} - \frac{bn(fx)^m}{fm^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((zoo*(a*x - b*n*x + b*x*log(c*x**n)), Eq(f, 0) & Eq(m, 0)), (0**(
m - 1)*(a*x - b*n*x + b*x*log(c*x**n)), Eq(f, 0)), (Piecewise((a*log(x), Eq
(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b
*n), True))/f, Eq(m, 0)), (a*(f*x)**m/(f*m) + b*(f*x)**m*log(c*x**n)/(f*m)
- b*n*(f*x)**m/(f*m**2), True))
```

Giac [A]
time = 4.77, size = 64, normalized size = 1.68

$$\frac{bf^mnx^m\log(x)}{fm} + \frac{bf^mx^m\log(c)}{fm} + \frac{af^mx^m}{fm} - \frac{bf^mnx^m}{fm^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^m*n*x^m*log(x)/(f*m) + b*f^m*x^m*log(c)/(f*m) + a*f^m*x^m/(f*m) - b*f^m
*n*x^m/(f*m^2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int (f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^(m - 1)*(a + b*log(c*x^n)), x)
```

3.355 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx$

Optimal. Leaf size=77

$$\frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{ex^m}{d}\right)}{em}+\frac{bnx^{1-m}(fx)^{-1+m}\mathrm{Li}_2\left(-\frac{ex^m}{d}\right)}{em^2}$$

```
[Out] x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))*ln(1+e*x^m/d)/e/m+b*n*x^(1-m)*(f*x)^(-
1+m)*polylog(2,-e*x^m/d)/e/m^2
```

Rubi [A]
time = 0.13, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2377, 2375, 2438}

$$\frac{bnx^{1-m}(fx)^{m-1}\mathrm{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2}+\frac{x^{1-m}(fx)^{m-1}\log\left(\frac{ex^m}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)}{em}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m),x]
```

```
[Out] (x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])*Log[1 + (e*x^m)/d])/(e*m) + (b
*n*x^(1 - m)*(f*x)^(-1 + m)*PolyLog[2, -((e*x^m)/d)])/(e*m^2)
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{(fx)^{-1+m} (a + b\log(cx^n))}{d + ex^m} dx = \left(x^{1-m}(fx)^{-1+m}\right) \int \frac{x^{-1+m}(a + b\log(cx^n))}{d + ex^m} dx$$
$$= \frac{x^{1-m}(fx)^{-1+m} (a + b\log(cx^n)) \log\left(1 + \frac{ex^m}{d}\right)}{em} - \frac{(bnx^{1-m}(fx)^{-1+m}) \int \frac{\log}{}}{em}$$
$$= \frac{x^{1-m}(fx)^{-1+m} (a + b\log(cx^n)) \log\left(1 + \frac{ex^m}{d}\right)}{em} + \frac{bnx^{1-m}(fx)^{-1+m}\text{Li}_2\left(-\frac{e}{}\right.}{em^2}$$

Mathematica [A]
time = 0.09, size = 141, normalized size = 1.83

$$\frac{x^{-m}(fx)^m \left(-bm^2n\log^2(x) + am\log(d - dx^m) + bm\log(cx^n)\log(d - dx^m) - bn\log\left(-\frac{ex^m}{d}\right)\log(d + ex^m) + m\log(x)\left(am + bm\log(cx^n) - bn\log(d - dx^m) + bn\log(d + ex^m)\right) - bn\text{Li}_2\left(1 + \frac{ex^m}{d}\right)\right)}{efm^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m),x]
```

```
[Out] ((f*x)^m*(-(b*m^2*n*Log[x]^2) + a*m*Log[d - d*x^m] + b*m*Log[c*x^n]*Log[d -
 d*x^m] - b*n*Log[-((e*x^m)/d)]*Log[d + e*x^m] + m*Log[x]*(a*m + b*m*Log[c*
x^n] - b*n*Log[d - d*x^m] + b*n*Log[d + e*x^m]) - b*n*PolyLog[2, 1 + (e*x^m
)/d]))/(e*f*m^2*x^m)
```

Maple [F]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m} (a + b\ln(c\,x^n))}{d + e\,x^m} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m),x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="maxima")
```

```
[Out] a*f^(m - 1)*e^(-1)*log((d + e^(m*log(x) + 1))*e^(-1))/m + b*integrate((f^m*
x^m*log(c) + f^m*x^m*log(x^n))/(d*f*x + f*x*e^(m*log(x) + 1)), x)
```

Fricas [A]
time = 0.36, size = 79, normalized size = 1.03

$$\frac{\left(bf^{m-1}mn\log\left(x\right)\log\left(\frac{x^{m}e+d}{d}\right)+bf^{m-1}n\mathrm{Li}_2\left(-\frac{x^{m}e+d}{d}+1\right)+\left(bm\log\left(c\right)+am\right)f^{m-1}\log\left(x^{m}e+d\right)\right)e^{(-1)}}{m^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="fricas")
```

```
[Out] (b*f^(m - 1)*m*n*log(x)*log((x^m*e + d)/d) + b*f^(m - 1)*n*dilog(-(x^m*e +
d)/d + 1) + (b*m*log(c) + a*m)*f^(m - 1)*log(x^m*e + d))*e^(-1)/m^2
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)}{d+ex^m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m),x)
```

```
[Out] Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^(m - 1)/(x^m*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int\frac{(f\,x)^{m-1}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+e\,x^m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m),x)
```

```
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m), x)
```

3.356 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$

Optimal. Leaf size=69

$$\frac{(fx)^m\,(a+b\log{(cx^n)})}{dfm\,(d+ex^m)}-\frac{bnx^{-m}(fx)^m\log{(d+ex^m)}}{defm^2}$$

```
[Out] (f*x)^m*(a+b*ln(c*x^n))/d/f/m/(d+e*x^m)-b*n*(f*x)^m*ln(d+e*x^m)/d/e/f/m^2/(
x^m)
```

Rubi [A]
time = 0.07, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2373, 274, 266}

$$\frac{(fx)^m\,(a+b\log{(cx^n)})}{dfm\,(d+ex^m)}-\frac{bnx^{-m}(fx)^m\log{(d+ex^m)}}{defm^2}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^2,x]
```

```
[Out] ((f*x)^m*(a + b*Log[c*x^n]))/(d*f*m*(d + e*x^m)) - (b*n*(f*x)^m*Log[d + e*x
^m])/(d*e*f*m^2*x^m)
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 274

```
Int[((c_)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[c^Int
Part[m]*((c*x)^FracPart[m]/x^FracPart[m]), Int[x^m*(a + b*x^n)^p, x], x] /;
 FreeQ[{a, b, c, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)} - \frac{(bn)\int \frac{(fx)^{-1+m}}{d+ex^m}\,dx}{dm}$$
$$= \frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)} - \frac{(bnx^{-m}(fx)^m)\int \frac{x^{-1+m}}{d+ex^m}\,dx}{dfm}$$
$$= \frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)} - \frac{bnx^{-m}(fx)^m\log(d+ex^m)}{defm^2}$$

Mathematica [A]
time = 0.07, size = 89, normalized size = 1.29

$$-\frac{x^{-m}(fx)^m(adm - bmn(d+ex^m)\log(x) + bdm\log(cx^n) + bdn\log(d+ex^m) + benx^m\log(d+ex^m))}{defm^2(d+ex^m)}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^2,x]
```

```
[Out] -((((f*x)^m*(a*d*m - b*m*n*(d + e*x^m)*Log[x] + b*d*m*Log[c*x^n] + b*d*n*Log
[d + e*x^m] + b*e*n*x^m*Log[d + e*x^m]))/(d*e*f*m^2*x^m*(d + e*x^m)))
```

Maple [F]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m}(a+b\ln(c\,x^n))}{(d+e\,x^m)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m)^2,x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m)^2,x)
```

Maxima [A]
time = 0.36, size = 108, normalized size = 1.57

$$bf^m n\left(\frac{(m\log(x)+2)e^{(-1)}}{dfm^2} - \frac{e^{(-1)}\log\left(de + e^{(m\log(x)+2)}\right)}{dfm^2}\right) - \frac{bf^m\log(cx^n)}{dfme + fme^{(m\log(x)+2)}} - \frac{af^m}{dfme + fme^{(m\log(x)+2)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="maxima")
```

```
[Out] b*f^m*n*((m*log(x) + 2)*e^(-1)/(d*f*m^2) - e^(-1)*log(d*e + e^(m*log(x) + 2
))/(d*f*m^2)) - b*f^m*log(c*x^n)/(d*f*m*e + f*m*e^(m*log(x) + 2)) - a*f^m/(
d*f*m*e + f*m*e^(m*log(x) + 2))
```

Fricas [A]
time = 0.38, size = 92, normalized size = 1.33

$$\frac{bf^{m-1}mnx^{m}e\log(x) - (bdm\log(c) + adm)f^{m-1} - (bf^{m-1}nx^{m}e + bdf^{m-1}n)\log(x^{m}e + d)}{dm^{2}x^{m}e^{2} + d^{2}m^{2}e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="fricas")
[Out] (b*f^(m - 1)*m*n*x^m*e*log(x) - (b*d*m*log(c) + a*d*m)*f^(m - 1) - (b*f^(m
- 1)*n*x^m*e + b*d*f^(m - 1)*n)*log(x^m*e + d))/(d*m^2*x^m*e^2 + d^2*m^2*e)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{m-1}\,(a + b\log(cx^{n}))}{(d + ex^{m})^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**2,x)
[Out] Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m)**2, x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 206 vs. 2(70) = 140.
time = 7.41, size = 206, normalized size = 2.99

$$\frac{bf^{m}mnxx^{m}e\log(x)}{dfm^{2}xx^{m}e^{2} + d^{2}fm^{2}xe} - \frac{bf^{m}nxx^{m}e\log(x^{m}e + d)}{dfm^{2}xx^{m}e^{2} + d^{2}fm^{2}xe} - \frac{bdf^{m}nx\log(x^{m}e + d)}{dfm^{2}xx^{m}e^{2} + d^{2}fm^{2}xe} - \frac{bdf^{m}mx\log(c)}{dfm^{2}xx^{m}e^{2} + d^{2}fm^{2}xe} - \frac{adf^{m}mx}{dfm^{2}xx^{m}e^{2} + d^{2}fm^{2}xe}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="giac")
[Out] b*f^m*m*n*x*x^m*e*log(x)/(d*f*m^2*x*x^m*e^2 + d^2*f*m^2*x*e) - b*f^m*n*x*x^
m*e*log(x^m*e + d)/(d*f*m^2*x*x^m*e^2 + d^2*f*m^2*x*e) - b*d*f^m*n*x*log(x^
m*e + d)/(d*f*m^2*x*x^m*e^2 + d^2*f*m^2*x*e) - b*d*f^m*m*x*log(c)/(d*f*m^2*
x*x^m*e^2 + d^2*f*m^2*x*e) - a*d*f^m*m*x/(d*f*m^2*x*x^m*e^2 + d^2*f*m^2*x*e
)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(f\,x)^{m-1}\,(a + b\,\ln(c\,x^{n}))}{(d + e\,x^{m})^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^2,x)
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^2, x)
```

3.357 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$

Optimal. Leaf size=150

$$\frac{bnx^{1-m}(fx)^{-1+m}}{2dem^2(d+ex^m)}+\frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{2d^2em}-\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{2em(d+ex^m)^2}-\frac{bnx^{1-m}(fx)^{-1+m}\log(d+e\ldots}{2d^2em^2}$$

```
[Out] 1/2*b*n*x^(1-m)*(f*x)^(-1+m)/d/e/m^2/(d+e*x^m)+1/2*b*n*x^(1-m)*(f*x)^(-1+m)
*ln(x)/d^2/e/m-1/2*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/e/m/(d+e*x^m)^2-1/2
*b*n*x^(1-m)*(f*x)^(-1+m)*ln(d+e*x^m)/d^2/e/m^2
```

Rubi [A]
time = 0.15, antiderivative size = 150, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$, Rules used = {2377, 2376, 272, 46}

$$-\frac{x^{1-m}(fx)^{m-1}(a+b\log(cx^n))}{2em(d+ex^m)^2}-\frac{bnx^{1-m}(fx)^{m-1}\log(d+ex^m)}{2d^2em^2}+\frac{bnx^{1-m}\log(x)(fx)^{m-1}}{2d^2em}+\frac{bnx^{1-m}(fx)^{m-1}}{2dem^2(d+ex^m)}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^3,x]
```

```
[Out] (b*n*x^(1 - m)*(f*x)^(-1 + m))/(2*d*e*m^2*(d + e*x^m)) + (b*n*x^(1 - m)*(f*
x)^(-1 + m)*Log[x])/(2*d^2*e*m) - (x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^
n]))/(2*e*m*(d + e*x^m)^2) - (b*n*x^(1 - m)*(f*x)^(-1 + m)*Log[d + e*x^m])/
(2*d^2*e*m^2)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
```

```
e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\begin{aligned}\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx &= \left(x^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{2em(d+ex^m)^2}+\frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\int \frac{1}{x(d+ex^m)^2}\,dx}{2em}\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{2em(d+ex^m)^2}+\frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\mathrm{Subst}\left(\int \frac{1}{x(d+ex)^2}\right.}{2em^2}\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{2em(d+ex^m)^2}+\frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\mathrm{Subst}\left(\int\left(\frac{1}{d^2x}-\right.\right.}{2em^2}\\ &= \frac{bnx^{1-m}(fx)^{-1+m}}{2dem^2(d+ex^m)}+\frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{2d^2em}-\frac{x^{1-m}(fx)^{-1+m}(a+b\log}{2em(d+ex^m)^2}\end{aligned}$$

Mathematica [A]
time = 0.09, size = 137, normalized size = 0.91

$$\frac{x^{-m}(fx)^m\left(-ad^2m+bd^2n+bdenx^m+bmn(d+ex^m)^2\log(x)-bd^2m\log(cx^n)-bd^2n\log(d+ex^m)-2bdenx^m\log(d+ex^m)-be^2nx^{2m}\log(d+ex^m)\right)}{2d^2efm^2(d+ex^m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^3,x]
[Out] ((f*x)^m*(-(a*d^2*m) + b*d^2*n + b*d*e*n*x^m + b*m*n*(d + e*x^m)^2*Log[x] -
 b*d^2*m*Log[c*x^n] - b*d^2*n*Log[d + e*x^m] - 2*b*d*e*n*x^m*Log[d + e*x^m]
 - b*e^2*n*x^(2*m)*Log[d + e*x^m]))/(2*d^2*e*f*m^2*x^m*(d + e*x^m)^2)
```

Maple [F]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m}(a+b\ln(c\,x^n))}{(d+e\,x^m)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m)^3,x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m)^3,x)
```

Maxima [A]
time = 0.31, size = 165, normalized size = 1.10

$$\frac{1}{2}\,bf^{m}n\left(\frac{1}{\left(d^{2}fme+dfme^{(m\log(x)+2)}\right)m}+\frac{(m\log(x)+2)e^{(-1)}}{d^{2}fm^{2}}-\frac{e^{(-1)}\log\left(de+e^{(m\log(x)+2)}\right)}{d^{2}fm^{2}}\right)-\frac{bf^{m}\log(cx^{n})}{2\left(d^{2}fme+2\,dfme^{(m\log(x)+2)}+fme^{(2\,m\log(x)+3)}\right)}-\frac{af^{m}}{2\left(d^{2}fme+2\,dfme^{(m\log(x)+2)}+fme^{(2\,m\log(x)+3)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="maxima")
```

```
[Out] 1/2*b*f^m*n*(1/((d^2*f*m*e + d*f*m*e^(m*log(x) + 2))*m) + (m*log(x) + 2)*e^
(-1)/(d^2*f*m^2) - e^(-1)*log(d*e + e^(m*log(x) + 2))/(d^2*f*m^2)) - 1/2*b*
f^m*log(c*x^n)/(d^2*f*m*e + 2*d*f*m*e^(m*log(x) + 2) + f*m*e^(2*m*log(x) +
3)) - 1/2*a*f^m/(d^2*f*m*e + 2*d*f*m*e^(m*log(x) + 2) + f*m*e^(2*m*log(x) +
 3))
```

Fricas [A]
time = 0.35, size = 168, normalized size = 1.12

$$\frac{bf^{m-1}mnx^{2\,m}e^{2}\log(x)+(2\,bdmne\log(x)+bdne)f^{m-1}x^{m}-(bd^{2}m\log(c)+ad^{2}m-bd^{2}n)f^{m-1}-(2\,bdf^{m-1}nx^{m}e+bd^{2}f^{m-1}n+bf^{m-1}nx^{2\,m}e^{2})\log(x^{m}e+d)}{2\left(2\,d^{3}m^{2}x^{m}e^{2}+d^{4}m^{2}e+d^{2}m^{2}x^{2\,m}e^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(b*f^(m - 1)*m*n*x^(2*m)*e^2*log(x) + (2*b*d*m*n*e*log(x) + b*d*n*e)*f^
(m - 1)*x^m - (b*d^2*m*log(c) + a*d^2*m - b*d^2*n)*f^(m - 1) - (2*b*d*f^(m
- 1)*n*x^m*e + b*d^2*f^(m - 1)*n + b*f^(m - 1)*n*x^(2*m)*e^2)*log(x^m*e + d
))/(2*d^3*m^2*x^m*e^2 + d^4*m^2*e + d^2*m^2*x^(2*m)*e^3)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**3,x)
```

```
[Out] Timed out
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 628 vs. 2(141) = 282.
time = 5.05, size = 628, normalized size = 4.19

$$\frac{bdf^{m}mnx^{2}x^{m}e\log(x)}{2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}}-\frac{bdf^{m}nx^{2}x^{m}e\log(x^{m}e+d)}{2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}}+\frac{bf^{m}mnx^{2}x^{2\,m}e^{2}\log(x)}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}+\frac{bdf^{m}nx^{2}x^{m}e}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}-\frac{bd^{2}f^{m}nx^{2}\log(x^{m}e+d)}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}-\frac{bf^{m}nx^{2}x^{2\,m}e^{2}\log(x^{m}e+d)}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}-\frac{bd^{2}f^{m}mx^{2}\log(c)}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}-\frac{ad^{2}f^{m}mx^{2}}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}+\frac{bd^{2}f^{m}nx^{2}}{2\left(2\,d^{3}fm^{2}x^{2}x^{m}e^{2}+d^{4}fm^{2}x^{2}e+d^{2}fm^{2}x^{2}x^{2\,m}e^{3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="giac")
```

```
[Out] b*d*f^m*m*n*x^2*x^m*e*log(x)/(2*d^3*f*m^2*x^2*x^m*e^2 + d^4*f*m^2*x^2*e + d
^2*f*m^2*x^2*x^(2*m)*e^3) - b*d*f^m*n*x^2*x^m*e*log(x^m*e + d)/(2*d^3*f*m^2
*x^2*x^m*e^2 + d^4*f*m^2*x^2*e + d^2*f*m^2*x^2*x^(2*m)*e^3) + 1/2*b*f^m*m*n
*x^2*x^(2*m)*e^2*log(x)/(2*d^3*f*m^2*x^2*x^m*e^2 + d^4*f*m^2*x^2*e + d^2*f*
m^2*x^2*x^(2*m)*e^3) + 1/2*b*d*f^m*n*x^2*x^m*e/(2*d^3*f*m^2*x^2*x^m*e^2 + d
^4*f*m^2*x^2*e + d^2*f*m^2*x^2*x^(2*m)*e^3) - 1/2*b*d^2*f^m*n*x^2*log(x^m*e
 + d)/(2*d^3*f*m^2*x^2*x^m*e^2 + d^4*f*m^2*x^2*e + d^2*f*m^2*x^2*x^(2*m)*e^
3) - 1/2*b*f^m*n*x^2*x^(2*m)*e^2*log(x^m*e + d)/(2*d^3*f*m^2*x^2*x^m*e^2 +
d^4*f*m^2*x^2*e + d^2*f*m^2*x^2*x^(2*m)*e^3) - 1/2*b*d^2*f^m*m*x^2*log(c)/(
2*d^3*f*m^2*x^2*x^m*e^2 + d^4*f*m^2*x^2*e + d^2*f*m^2*x^2*x^(2*m)*e^3) - 1/
2*a*d^2*f^m*m*x^2/(2*d^3*f*m^2*x^2*x^m*e^2 + d^4*f*m^2*x^2*e + d^2*f*m^2*x^
2*x^(2*m)*e^3) + 1/2*b*d^2*f^m*n*x^2/(2*d^3*f*m^2*x^2*x^m*e^2 + d^4*f*m^2*x
^2*e + d^2*f*m^2*x^2*x^(2*m)*e^3)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{(d+e\,x^m)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^3,x)
```

```
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^3, x)
```

3.358 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$

Optimal. Leaf size=188

$$\frac{bnx^{1-m}(fx)^{-1+m}}{6dem^2\left(d+ex^m\right)^2}+\frac{bnx^{1-m}(fx)^{-1+m}}{3d^2em^2\left(d+ex^m\right)}+\frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{3d^3em}-\frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{3em\left(d+ex^m\right)^3}-\frac{bnx^{1-n}}{}$$

```
[Out] 1/6*b*n*x^(1-m)*(f*x)^(-1+m)/d/e/m^2/(d+e*x^m)^2+1/3*b*n*x^(1-m)*(f*x)^(-1+
m)/d^2/e/m^2/(d+e*x^m)+1/3*b*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/d^3/e/m-1/3*x^(1-
m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/e/m/(d+e*x^m)^3-1/3*b*n*x^(1-m)*(f*x)^(-1+m
)*ln(d+e*x^m)/d^3/e/m^2
```

Rubi [A]

time = 0.16, antiderivative size = 188, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$, Rules used = {2377, 2376, 272, 46}

$$-\frac{x^{1-m}(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)}{3em\left(d+ex^m\right)^3}-\frac{bnx^{1-m}(fx)^{m-1}\log\left(d+ex^m\right)}{3d^3em^2}+\frac{bnx^{1-m}\log(x)(fx)^{m-1}}{3d^3em}+\frac{bnx^{1-m}(fx)^{m-1}}{3d^2em^2\left(d+ex^m\right)}+\frac{bnx^{1-m}(fx)^{m-1}}{6dem^2\left(d+ex^m\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^4,x]
```

```
[Out] (b*n*x^(1 - m)*(f*x)^(-1 + m))/(6*d*e*m^2*(d + e*x^m)^2) + (b*n*x^(1 - m)*(
f*x)^(-1 + m))/(3*d^2*e*m^2*(d + e*x^m)) + (b*n*x^(1 - m)*(f*x)^(-1 + m)*Lo
g[x])/(3*d^3*e*m) - (x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(3*e*m*(d
 + e*x^m)^3) - (b*n*x^(1 - m)*(f*x)^(-1 + m)*Log[d + e*x^m])/(3*d^3*e*m^2)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
```

```
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\begin{aligned}\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx &= \left(x^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3em(d+ex^m)^3}+\frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\int \frac{1}{x(d+ex^m)^3}\,dx}{3em}\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3em(d+ex^m)^3}+\frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\operatorname{Subst}\left(\int \frac{1}{x(d+ex)^3}\right.}{3em^2}\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3em(d+ex^m)^3}+\frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\operatorname{Subst}\left(\int \left(\frac{1}{d^3x}-\right.\right.}{}\\ &= \frac{bnx^{1-m}(fx)^{-1+m}}{6dem^2(d+ex^m)^2}+\frac{bnx^{1-m}(fx)^{-1+m}}{3d^2em^2(d+ex^m)}+\frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{3d^3em}-\frac{x^{1-}}{}\end{aligned}$$

Mathematica [A]
time = 0.09, size = 178, normalized size = 0.95

$$\frac{x^{-m}(fx)^m\left(-2ad^3m+3bd^3n+5bd^2enx^m+2bde^2nx^{2m}+2bmn(d+ex^m)^3\log(x)-2bd^3m\log(cx^n)-2bd^3n\log(d+ex^m)-6bd^2enx^m\log(d+ex^m)-6bde^2nx^{2m}\log(d+ex^m)-2be^3nx^{3m}\log(d+ex^m)\right)}{6d^3efm^2(d+ex^m)^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^4,x]
```

```
[Out] ((f*x)^m*(-2*a*d^3*m + 3*b*d^3*n + 5*b*d^2*e*n*x^m + 2*b*d*e^2*n*x^(2*m) +
2*b*m*n*(d + e*x^m)^3*Log[x] - 2*b*d^3*m*Log[c*x^n] - 2*b*d^3*n*Log[d + e*x
^m] - 6*b*d^2*e*n*x^m*Log[d + e*x^m] - 6*b*d*e^2*n*x^(2*m)*Log[d + e*x^m] -
 2*b*e^3*n*x^(3*m)*Log[d + e*x^m]))/(6*d^3*e*f*m^2*x^m*(d + e*x^m)^3)
```

Maple [F]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m}(a+b\ln(c\,x^n))}{(d+e\,x^m)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m)^4,x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))/(d+e*x^m)^4,x)
```

Maxima [A]
time = 0.30, size = 228, normalized size = 1.21

$$\frac{1}{6}\,bf^{m}n\left(\frac{3\,de+2\,e^{(m\log(x)+2)}}{(d^{4}fme^{2}+2\,d^{3}fme^{(m\log(x)+3)}+d^{2}fme^{(2\,m\log(x)+4)})m}+\frac{2\,(m\log\left(x\right)+2)e^{(-1)}}{d^{3}fm^{2}}-\frac{2\,e^{(-1)}\log\left(de+e^{(m\log(x)+2)}\right)}{d^{3}fm^{2}}\right)-\frac{bf^{m}\log\left(cx^{n}\right)}{3\,(d^{3}fme+3\,d^{2}fme^{(m\log(x)+2)}+3\,dfme^{(2\,m\log(x)+3)}+fme^{(3\,m\log(x)+4)})}-\frac{af^{m}}{3\,(d^{3}fme+3\,d^{2}fme^{(m\log(x)+2)}+3\,dfme^{(2\,m\log(x)+3)}+fme^{(3\,m\log(x)+4)})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="maxima")
```

```
[Out] 1/6*b*f^m*n*((3*d*e + 2*e^(m*log(x) + 2))/((d^4*f*m*e^2 + 2*d^3*f*m*e^(m*lo
g(x) + 3) + d^2*f*m*e^(2*m*log(x) + 4))*m) + 2*(m*log(x) + 2)*e^(-1)/(d^3*f
*m^2) - 2*e^(-1)*log(d*e + e^(m*log(x) + 2))/(d^3*f*m^2)) - 1/3*b*f^m*log(c
*x^n)/(d^3*f*m*e + 3*d^2*f*m*e^(m*log(x) + 2) + 3*d*f*m*e^(2*m*log(x) + 3)
+ f*m*e^(3*m*log(x) + 4)) - 1/3*a*f^m/(d^3*f*m*e + 3*d^2*f*m*e^(m*log(x) +
2) + 3*d*f*m*e^(2*m*log(x) + 3) + f*m*e^(3*m*log(x) + 4))
```

Fricas [A]
time = 0.36, size = 239, normalized size = 1.27

$$\frac{2\,bf^{m-1}mnx^{3\,m}e^{3}\log\left(x\right)+2\,(3\,bdmne^{2}\log\left(x\right)+bdne^{2})f^{m-1}x^{2\,m}+(6\,bd^{2}mne\log\left(x\right)+5\,bd^{2}ne)f^{m-1}x^{m}-(2\,bd^{3}m\log\left(c\right)+2\,ad^{3}m-3\,bd^{3}n)f^{m-1}-2\,(3\,bd^{2}f^{m-1}nx^{m}e+bd^{3}f^{m-1}n+3\,bdf^{m-1}nx^{2\,m}e^{2}+bf^{m-1}nx^{3\,m}e^{3})\log\left(x^{m}e+d\right)}{6\,(3\,d^{5}m^{2}x^{m}e^{2}+d^{6}m^{2}e+3\,d^{4}m^{2}x^{2\,m}e^{3}+d^{3}m^{2}x^{3\,m}e^{4})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="fricas")
```

```
[Out] 1/6*(2*b*f^(m - 1)*m*n*x^(3*m)*e^3*log(x) + 2*(3*b*d*m*n*e^2*log(x) + b*d*n
*e^2)*f^(m - 1)*x^(2*m) + (6*b*d^2*m*n*e*log(x) + 5*b*d^2*n*e)*f^(m - 1)*x^
m - (2*b*d^3*m*log(c) + 2*a*d^3*m - 3*b*d^3*n)*f^(m - 1) - 2*(3*b*d^2*f^(m
- 1)*n*x^m*e + b*d^3*f^(m - 1)*n + 3*b*d*f^(m - 1)*n*x^(2*m)*e^2 + b*f^(m -
 1)*n*x^(3*m)*e^3)*log(x^m*e + d))/(3*d^5*m^2*x^m*e^2 + d^6*m^2*e + 3*d^4*m
^2*x^(2*m)*e^3 + d^3*m^2*x^(3*m)*e^4)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**4,x)
```

```
[Out] Timed out
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 1080 vs. $2(177) = 354$.
time = 7.82, size = 1080, normalized size = 5.74

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="giac")
```

```
[Out] b*d^2*f^m*m*n*x^3*x^m*e*log(x)/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e +
 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) - b*d^2*f^m*n*x^3
*x^m*e*log(x^m*e + d)/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3*d^4*f*
m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) + b*d*f^m*m*n*x^3*x^(2*m)*
e^2*log(x)/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3*d^4*f*m^2*x^3*x^(
2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) + 5/6*b*d^2*f^m*n*x^3*x^m*e/(3*d^5*f*
m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2
*x^3*x^(3*m)*e^4) - 1/3*b*d^3*f^m*n*x^3*log(x^m*e + d)/(3*d^5*f*m^2*x^3*x^m
*e^2 + d^6*f*m^2*x^3*e + 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m
)*e^4) - b*d*f^m*n*x^3*x^(2*m)*e^2*log(x^m*e + d)/(3*d^5*f*m^2*x^3*x^m*e^2
+ d^6*f*m^2*x^3*e + 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4
) - 1/3*b*d^3*f^m*m*x^3*log(c)/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e +
 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) + 1/3*b*f^m*m*n*x
^3*x^(3*m)*e^3*log(x)/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3*d^4*f*
m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) - 1/3*a*d^3*f^m*m*x^3/(3*d
^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*
f*m^2*x^3*x^(3*m)*e^4) + 1/2*b*d^3*f^m*n*x^3/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6
*f*m^2*x^3*e + 3*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) + 1
/3*b*d*f^m*n*x^3*x^(2*m)*e^2/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3
*d^4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4) - 1/3*b*f^m*n*x^3*x
^(3*m)*e^3*log(x^m*e + d)/(3*d^5*f*m^2*x^3*x^m*e^2 + d^6*f*m^2*x^3*e + 3*d^
4*f*m^2*x^3*x^(2*m)*e^3 + d^3*f*m^2*x^3*x^(3*m)*e^4)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(f\,x)^{m-1}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\left(d+e\,x^m\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^4,x)
```

```
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^4, x)
```

3.359 $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$

Optimal. Leaf size=372

$$\frac{2b^2d^3n^2x(fx)^{-1+m}}{m^3}+\frac{3b^2d^2en^2x^{1+m}(fx)^{-1+m}}{4m^3}+\frac{2b^2de^2n^2x^{1+2m}(fx)^{-1+m}}{9m^3}+\frac{b^2e^3n^2x^{1+3m}(fx)^{-1+m}}{32m^3}+\frac{b^2d^4n^2x^{1-}}{}$$

```
[Out] 2*b^2*d^3*n^2*x*(f*x)^(-1+m)/m^3+3/4*b^2*d^2*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3
+2/9*b^2*d*e^2*n^2*x^(1+2*m)*(f*x)^(-1+m)/m^3+1/32*b^2*e^3*n^2*x^(1+3*m)*(f
*x)^(-1+m)/m^3+1/4*b^2*d^4*n^2*x^(1-m)*(f*x)^(-1+m)*ln(x)^2/e/m-2*b*d^3*n*x
*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-3/2*b*d^2*e*n*x^(1+m)*(f*x)^(-1+m)*(a+b*l
n(c*x^n))/m^2-2/3*b*d*e^2*n*x^(1+2*m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-1/8*
b*e^3*n*x^(1+3*m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-1/2*b*d^4*n*x^(1-m)*(f*x
)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+1/4*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^4*(a+
b*ln(c*x^n))^2/e/m
```

Rubi [A]

time = 0.34, antiderivative size = 372, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.241$, Rules used = {2377, 2376, 272, 45, 2372, 14, 2338}

$$-\frac{bd^4nx^{1-m}\log(x)(fx)^{m-1}(a+b\log(cx^n))}{2em}-\frac{2bd^3nx(fx)^{m-1}(a+b\log(cx^n))}{m^2}-\frac{3bd^2enx^{m+1}(fx)^{m-1}(a+b\log(cx^n))}{2m^2}-\frac{2bde^2nx^{2m+1}(fx)^{m-1}(a+b\log(cx^n))}{3m^2}+\frac{x^{1-m}(fx)^{m-1}(d+ex^m)^4(a+b\log(cx^n))^2}{4em}-\frac{be^3nx^{3m+1}(fx)^{m-1}(a+b\log(cx^n))}{8m^2}+\frac{b^2d^4n^2x^{1-m}\log^2(x)(fx)^{m-1}}{4em}+\frac{2b^2d^3n^2x(fx)^{m-1}}{m^3}+\frac{3b^2d^2en^2x^{m+1}(fx)^{m-1}}{4m^3}+\frac{2b^2de^2n^2x^{2m+1}(fx)^{m-1}}{9m^3}+\frac{b^2e^3n^2x^{3m+1}(fx)^{m-1}}{32m^3}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b^2*d^3*n^2*x*(f*x)^(-1 + m))/m^3 + (3*b^2*d^2*e*n^2*x^(1 + m)*(f*x)^(-1
 + m))/(4*m^3) + (2*b^2*d*e^2*n^2*x^(1 + 2*m)*(f*x)^(-1 + m))/(9*m^3) + (b^
2*e^3*n^2*x^(1 + 3*m)*(f*x)^(-1 + m))/(32*m^3) + (b^2*d^4*n^2*x^(1 - m)*(f*
x)^(-1 + m)*Log[x]^2)/(4*e*m) - (2*b*d^3*n*x*(f*x)^(-1 + m)*(a + b*Log[c*x^
n]))/m^2 - (3*b*d^2*e*n*x^(1 + m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(2*m^2
) - (2*b*d*e^2*n*x^(1 + 2*m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(3*m^2) - (
b*e^3*n*x^(1 + 3*m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(8*m^2) - (b*d^4*n*x
^(1 - m)*(f*x)^(-1 + m)*Log[x]*(a + b*Log[c*x^n]))/(2*e*m) + (x^(1 - m)*(f*
x)^(-1 + m)*(d + e*x^m)^4*(a + b*Log[c*x^n])^2)/(4*e*m)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
```

```
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx = \left(x^{1-m}(fx)^{-1+m}\right) \int x^{-1+m}(d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$$

$$= \frac{x^{1-m}(fx)^{-1+m} (d+ex^m)^4 (a+b\log(cx^n))^2}{4em} - \frac{(bnx^{1-m}(fx)}{}$$

$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{48d^3ex^m}{m} + \frac{36d^2e^2x^{2m}}{m} + \frac{16de^3x^{3m}}{m} + \frac{3e^4x^{4m}}{m}\right.}{24em}$$

$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{48d^3ex^m}{m} + \frac{36d^2e^2x^{2m}}{m} + \frac{16de^3x^{3m}}{m} + \frac{3e^4x^{4m}}{m}\right.}{24em}$$

$$= \frac{b^2d^4n^2x^{1-m}(fx)^{-1+m} \log^2(x)}{4em} - \frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{48d^3ex^m}{m} \right.}{}$$

$$= \frac{2b^2d^3n^2x(fx)^{-1+m}}{m^3} + \frac{3b^2d^2en^2x^{1+m}(fx)^{-1+m}}{4m^3} + \frac{2b^2de^2n^2x}{9}$$

Mathematica [A]
time = 0.17, size = 285, normalized size = 0.77

$$\frac{(fx)^m \left(72a^2m^2(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m}) - 12abmn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m}) + b^2n^2(576d^3+216d^2ex^m+64de^2x^{2m}+9e^3x^{3m}) + 12bm(12am(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m}) - bn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m}))\log(cx^n) + 72b^2m^2(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m})\log^2(cx^n)\right)}{288fm^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2,x]
```

```
[Out] ((f*x)^m*(72*a^2*m^2*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))
- 12*a*b*m*n*(48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)) + b
^2*n^2*(576*d^3 + 216*d^2*e*x^m + 64*d*e^2*x^(2*m) + 9*e^3*x^(3*m)) + 12*b*
m*(12*a*m*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m)) - b*n*(48*d
^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)))*Log[c*x^n] + 72*b^2*
m^2*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))*Log[c*x^n]^2))/(2
88*f*m^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.44, size = 4156, normalized size = 11.17

method	result	size
risch	Expression too large to display	4156

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*b^2*(e^3*(x^m)^3+4*d*e^2*(x^m)^2+6*d^2*e*x^m+4*d^3)*x/m*exp(1/2*(-1+m)*
(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I
```

```
*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)^2+1/24*b
*(24*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2*m+24*I*Pi*b*d^3*csgn(I*x^n)*csgn(
I*c*x^n)^2*m+12*ln(c)*b*e^3*(x^m)^3*m+48*a*d*e^2*(x^m)^2*m+72*a*d^2*e*x^m*m
-16*b*d*e^2*n*(x^m)^2-36*b*d^2*e*n*x^m+48*a*d^3*m+48*ln(c)*b*d^3*m-48*b*d^3
*n+24*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2*m-3*b*e^3*n*(x^m)^3+12
*a*e^3*(x^m)^3*m-36*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m-
24*I*Pi*b*d^3*csgn(I*c*x^n)^3*m+6*I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x
^m)^3*m-24*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^m)^2*m-24*I*Pi*b*d*e^2*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*m+24*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x
^n)^2*(x^m)^2*m+36*I*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m*m-6*I*Pi*b*
e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^3*m+36*I*Pi*b*d^2*e*csgn(I*c)
*csgn(I*c*x^n)^2*x^m*m+48*ln(c)*b*d*e^2*(x^m)^2*m+72*ln(c)*b*d^2*e*x^m*m-24
*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m+6*I*Pi*b*e^3*csgn(I*c)*cs
gn(I*c*x^n)^2*(x^m)^3*m-6*I*Pi*b*e^3*csgn(I*c*x^n)^3*(x^m)^3*m-36*I*Pi*b*d^
2*e*csgn(I*c*x^n)^3*x^m*m)*x/m^2*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*c
sgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I
*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/288*(18*I*Pi*b^2*e^3*m*n*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^3+288*I*Pi*ln(c)*b^2*d*e^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2*(x^m)^2*m^2-72*I*Pi*a*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*(x^m)^3*m^2-72*Pi^2*b^2*d*e^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*
(x^m)^2*m^2+144*Pi^2*b^2*d*e^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*(x^m
)^2*m^2+96*I*Pi*b^2*d*e^2*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2-4
32*I*Pi*a*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m^2-576*a*b*d^3*m
*n+72*a^2*e^3*(x^m)^3*m^2+9*b^2*e^3*n^2*(x^m)^3-576*ln(c)*b^2*d^3*m*n+576*l
n(c)*a*b*d^3*m^2-288*I*Pi*ln(c)*b^2*d*e^2*csgn(I*c*x^n)^3*(x^m)^2*m^2+216*I
*Pi*b^2*d^2*e*m*n*csgn(I*c*x^n)^3*x^m-432*I*Pi*ln(c)*b^2*d^2*e*csgn(I*c*x^n
)^3*x^m*m^2+144*Pi^2*b^2*d^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*m^2+28
8*a^2*d^3*m^2-72*I*Pi*ln(c)*b^2*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^
m)^3*m^2+288*I*Pi*ln(c)*b^2*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2*m^2+36*
Pi^2*b^2*e^3*csgn(I*x^n)*csgn(I*c*x^n)^5*(x^m)^3*m^2+64*b^2*d*e^2*n^2*(x^m)
^2+216*b^2*d^2*e*n^2*x^m+72*ln(c)^2*b^2*e^3*(x^m)^3*m^2+288*a^2*d*e^2*(x^m)
^2*m^2+432*a^2*d^2*e*x^m*m^2-192*ln(c)*b^2*d*e^2*m*n*(x^m)^2-432*ln(c)*b^2*
d^2*e*m*n*x^m+864*ln(c)*a*b*d^2*e*x^m*m^2+576*b^2*d^3*n^2+432*I*Pi*ln(c)*b^
2*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m^2+432*I*Pi*ln(c)*b^2*d^2*e*csgn(I*x
^n)*csgn(I*c*x^n)^2*x^m*m^2-72*I*Pi*ln(c)*b^2*e^3*csgn(I*c*x^n)^3*(x^m)^3*m
^2-72*I*Pi*a*b*e^3*csgn(I*c*x^n)^3*(x^m)^3*m^2+216*Pi^2*b^2*d^2*e*csgn(I*x^
n)*csgn(I*c*x^n)^5*x^m*m^2-108*Pi^2*b^2*d^2*e*csgn(I*c)^2*csgn(I*c*x^n)^4*x
^m*m^2-288*I*Pi*a*b*d^3*csgn(I*c*x^n)^3*m^2+288*I*Pi*b^2*d^3*m*n*csgn(I*c*x
^n)^3+288*I*Pi*a*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2*m^2-288*I*Pi*b^2
*d^3*m*n*csgn(I*c)*csgn(I*c*x^n)^2-288*I*Pi*b^2*d^3*m*n*csgn(I*x^n)*csgn(I*
c*x^n)^2+18*I*Pi*b^2*e^3*m*n*csgn(I*c*x^n)^3*(x^m)^3-432*Pi^2*b^2*d^2*e*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x^m*m^2-108*Pi^2*b^2*d^2*e*csgn(I*c)^2*c
sgn(I*x^n)^2*csgn(I*c*x^n)^2*x^m*m^2-96*I*Pi*b^2*d*e^2*m*n*csgn(I*x^n)*csgn
(I*c*x^n)^2*(x^m)^2+576*ln(c)*a*b*d*e^2*(x^m)^2*m^2-288*Pi^2*b^2*d^3*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*m^2+288*I*Pi*a*b*d^3*csgn(I*x^n)*csgn(I*c*x
```

```
^n)^2*m^2+36*Pi^2*b^2*e^3*csgn(I*c)*csgn(I*c*x^n)^5*(x^m)^3*m^2-18*Pi^2*b^2
*e^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4*(x^m)^3*m^2-36*a*b*e^3*m*n*(x^m)^3-36*ln
(c)*b^2*e^3*m*n*(x^m)^3+288*ln(c)^2*b^2*d*e^2*(x^m)^2*m^2+144*ln(c)*a*b*e^3
*(x^m)^3*m^2+432*ln(c)^2*b^2*d^2*e*x^m*m^2-432*I*Pi*a*b*d^2*e*csgn(I*c*x^n)
^3*x^m*m^2+72*I*Pi*a*b*e^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^3*m^2-288*I*Pi*l
n(c)*b^2*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m^2+216*Pi^2*b^2*d^2*e*csg
n(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x^m*m^2+144*Pi^2*b^2*d*e^2*csgn(I*c)*c
sgn(I*c*x^n)^5*(x^m)^2*m^2-72*Pi^2*b^2*d*e^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4*
(x^m)^2*m^2+144*Pi^2*b^2*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^5*(x^m)^2*m^2+36*P
i^2*b^2*e^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*(x^m)^3*m^2-72*Pi^2*b^2
*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*(x^m)^3*m^2-108*Pi^2*b^2*d^2*e*c
sgn(I*c*x^n)^6*x^m*m^2-72*Pi^2*b^2*d^3*csgn(I*c)^2*csgn(I*c*x^n)^4*m^2+144*
Pi^2*b^2*d^3*csgn(I*c)*csgn(I*c*x^n)^5*m^2-72*Pi^2*b^2*d^3*csgn(I*x^n)^2*cs
gn(I*c*x^n)^4*m^2-216*I*Pi*b^2*d^2*e*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m+14
4*Pi^2*b^2*d*e^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*(x^m)^2*m^2+216*I*
Pi*b^2*d^2*e*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m-288*I*Pi*ln(c)*b^2
*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*m^2-432*I*Pi*ln(c)*b^2*d
^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m^2-18*I*Pi*b^2*e^3*m*n*csgn(I
*c)*csgn(I*c*x^n)^2*(x^m)^3-288*I*Pi*a*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)*m^2+216*Pi^2*b^2*d^2*e*csgn(I*c)*csgn(I*x...
```

Maxima [A]
time = 0.31, size = 585, normalized size = 1.57

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="maxima"
)
```

```
[Out] 3/2*b^2*d^2*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)^2/m - 2*(f^(m - 1)*n*x^
m*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d^3 - 2*a*b*d^3*f^(m - 1)*n*x
^m/m^2 - 3/4*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/
m^3)*b^2*d^2*e + 3*a*b*d^2*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)/m + (f*x
)^m*b^2*d^3*log(c*x^n)^2/(f*m) + b^2*d*f^(m - 1)*e^(3*m*log(x) + 2)*log(c*x
^n)^2/m - 2/9*(3*f^(m - 1)*n*x^(3*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(3*m)
/m^3)*b^2*d*e^2 + 3/2*a^2*d^2*f^(m - 1)*e^(2*m*log(x) + 1)/m - 3/2*a*b*d^2*
f^(m - 1)*n*e^(2*m*log(x) + 1)/m^2 + 2*(f*x)^m*a*b*d^3*log(c*x^n)/(f*m) + 2
*a*b*d*f^(m - 1)*e^(3*m*log(x) + 2)*log(c*x^n)/m + 1/4*b^2*f^(m - 1)*e^(4*m
*log(x) + 3)*log(c*x^n)^2/m + (f*x)^m*a^2*d^3/(f*m) - 1/32*(4*f^(m - 1)*n*x
^(4*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(4*m)/m^3)*b^2*e^3 + a^2*d*f^(m - 1
)*e^(3*m*log(x) + 2)/m - 2/3*a*b*d*f^(m - 1)*n*e^(3*m*log(x) + 2)/m^2 + 1/2
*a*b*f^(m - 1)*e^(4*m*log(x) + 3)*log(c*x^n)/m + 1/4*a^2*f^(m - 1)*e^(4*m*l
og(x) + 3)/m - 1/8*a*b*f^(m - 1)*n*e^(4*m*log(x) + 3)/m^2
```

Fricas [A]

time = 0.39, size = 570, normalized size = 1.53

$$\frac{9\left(8b^2m^2n^2e^3\log(x)^2+8b^2m^2e^3\log(c)^2+4(4abm^2-b^2mn)e^3\log(c)+(8a^2m^2-4abmn+b^2n^2)e^3+4(4b^2m^2ne^3\log(c)+(4abm^2n-b^2mn^2)e^3)\log(x)\right)f^{m-1}x^{4m}+32\left(9b^2dm^2n^2e^2\log(x)^2+9b^2dm^2e^2\log(c)^2+6(3abdm^2-b^2dmn)e^2\log(c)+(9a^2dm^2-6abdmn+2b^2dn^2)e^2+6(3b^2dm^2ne^2\log(c)+(3abdm^2n-b^2dmn^2)e^2)\log(x)\right)f^{m-1}x^{3m}+216\left(2b^2d^2m^2n^2e\log(x)^2+2b^2d^2m^2e\log(c)^2+2(2abd^2m^2-b^2d^2mn)e\log(c)+(2a^2d^2m^2-2abd^2mn+b^2d^2n^2)e+2(2b^2d^2m^2ne\log(c)+(2abd^2m^2n-b^2d^2mn^2)e)\log(x)\right)f^{m-1}x^{2m}+288\left(b^2d^3m^2n^2\log(x)^2+b^2d^3m^2\log(c)^2+a^2d^3m^2-2abd^3mn+2b^2d^3n^2+2(abd^3m^2-b^2d^3mn)\log(c)+2(b^2d^3m^2n\log(c)+abd^3m^2n-b^2d^3mn^2)\log(x)\right)f^{m-1}x^m}{288m^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="fricas"
)
```

```
[Out] 1/288*(9*(8*b^2*m^2*n^2*e^3*log(x)^2 + 8*b^2*m^2*e^3*log(c)^2 + 4*(4*a*b*m^
2 - b^2*m*n)*e^3*log(c) + (8*a^2*m^2 - 4*a*b*m*n + b^2*n^2)*e^3 + 4*(4*b^2*
m^2*n*e^3*log(c) + (4*a*b*m^2*n - b^2*m*n^2)*e^3)*log(x))*f^(m - 1)*x^(4*m)
 + 32*(9*b^2*d*m^2*n^2*e^2*log(x)^2 + 9*b^2*d*m^2*e^2*log(c)^2 + 6*(3*a*b*d
*m^2 - b^2*d*m*n)*e^2*log(c) + (9*a^2*d*m^2 - 6*a*b*d*m*n + 2*b^2*d*n^2)*e^
2 + 6*(3*b^2*d*m^2*n*e^2*log(c) + (3*a*b*d*m^2*n - b^2*d*m*n^2)*e^2)*log(x)
)*f^(m - 1)*x^(3*m) + 216*(2*b^2*d^2*m^2*n^2*e*log(x)^2 + 2*b^2*d^2*m^2*e*l
og(c)^2 + 2*(2*a*b*d^2*m^2 - b^2*d^2*m*n)*e*log(c) + (2*a^2*d^2*m^2 - 2*a*b
*d^2*m*n + b^2*d^2*n^2)*e + 2*(2*b^2*d^2*m^2*n*e*log(c) + (2*a*b*d^2*m^2*n
- b^2*d^2*m*n^2)*e)*log(x))*f^(m - 1)*x^(2*m) + 288*(b^2*d^3*m^2*n^2*log(x)
^2 + b^2*d^3*m^2*log(c)^2 + a^2*d^3*m^2 - 2*a*b*d^3*m*n + 2*b^2*d^3*n^2 + 2
*(a*b*d^3*m^2 - b^2*d^3*m*n)*log(c) + 2*(b^2*d^3*m^2*n*log(c) + a*b*d^3*m^2
*n - b^2*d^3*m*n^2)*log(x))*f^(m - 1)*x^m)/m^3
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(d+e*x**m)**3*(a+b*ln(c*x**n))**2,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 5006 deep
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 985 vs. 2(350) = 700.
time = 7.28, size = 985, normalized size = 2.65

$$\frac{b^2d^3f^mn^2x^m\log(x)^2}{fm}+\frac{3b^2d^2f^mn^2x^{2m}e\log(x)^2}{2fm}+\frac{2b^2d^3f^mnx^m\log(c)\log(x)}{fm}+\frac{3b^2d^2f^mnx^{2m}e\log(c)\log(x)}{fm}+\frac{b^2df^mn^2x^{3m}e^2\log(x)^2}{fm}+\frac{b^2d^3f^mx^m\log(c)^2}{fm}+\frac{3b^2d^2f^mx^{2m}e\log(c)^2}{2fm}+\frac{2abd^3f^mnx^m\log(x)}{fm}-\frac{2b^2d^3f^mn^2x^m\log(x)}{fm^2}+ \ldots$$ [illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] b^2*d^3*f^m*n^2*x^m*log(x)^2/(f*m) + 3/2*b^2*d^2*f^m*n^2*x^(2*m)*e*log(x)^2
/(f*m) + 2*b^2*d^3*f^m*n*x^m*log(c)*log(x)/(f*m) + 3*b^2*d^2*f^m*n*x^(2*m)*
e*log(c)*log(x)/(f*m) + b^2*d*f^m*n^2*x^(3*m)*e^2*log(x)^2/(f*m) + b^2*d^3*
f^m*x^m*log(c)^2/(f*m) + 3/2*b^2*d^2*f^m*x^(2*m)*e*log(c)^2/(f*m) + 2*a*b*d
```

```
^3*f^m*n*x^m*log(x)/(f*m) - 2*b^2*d^3*f^m*n^2*x^m*log(x)/(f*m^2) + 3*a*b*d^
2*f^m*n*x^(2*m)*e*log(x)/(f*m) - 3/2*b^2*d^2*f^m*n^2*x^(2*m)*e*log(x)/(f*m^
2) + 2*b^2*d*f^m*n*x^(3*m)*e^2*log(c)*log(x)/(f*m) + 1/4*b^2*f^m*n^2*x^(4*m
)*e^3*log(x)^2/(f*m) + 2*a*b*d^3*f^m*x^m*log(c)/(f*m) - 2*b^2*d^3*f^m*n*x^m
*log(c)/(f*m^2) + 3*a*b*d^2*f^m*x^(2*m)*e*log(c)/(f*m) - 3/2*b^2*d^2*f^m*n*
x^(2*m)*e*log(c)/(f*m^2) + b^2*d*f^m*x^(3*m)*e^2*log(c)^2/(f*m) + 2*a*b*d*f
^m*n*x^(3*m)*e^2*log(x)/(f*m) - 2/3*b^2*d*f^m*n^2*x^(3*m)*e^2*log(x)/(f*m^2
) + 1/2*b^2*f^m*n*x^(4*m)*e^3*log(c)*log(x)/(f*m) + a^2*d^3*f^m*x^m/(f*m) -
 2*a*b*d^3*f^m*n*x^m/(f*m^2) + 2*b^2*d^3*f^m*n^2*x^m/(f*m^3) + 3/2*a^2*d^2*
f^m*x^(2*m)*e/(f*m) - 3/2*a*b*d^2*f^m*n*x^(2*m)*e/(f*m^2) + 3/4*b^2*d^2*f^m
*n^2*x^(2*m)*e/(f*m^3) + 2*a*b*d*f^m*x^(3*m)*e^2*log(c)/(f*m) - 2/3*b^2*d*f
^m*n*x^(3*m)*e^2*log(c)/(f*m^2) + 1/4*b^2*f^m*x^(4*m)*e^3*log(c)^2/(f*m) +
1/2*a*b*f^m*n*x^(4*m)*e^3*log(x)/(f*m) - 1/8*b^2*f^m*n^2*x^(4*m)*e^3*log(x)
/(f*m^2) + a^2*d*f^m*x^(3*m)*e^2/(f*m) - 2/3*a*b*d*f^m*n*x^(3*m)*e^2/(f*m^2
) + 2/9*b^2*d*f^m*n^2*x^(3*m)*e^2/(f*m^3) + 1/2*a*b*f^m*x^(4*m)*e^3*log(c)/
(f*m) - 1/8*b^2*f^m*n*x^(4*m)*e^3*log(c)/(f*m^2) + 1/4*a^2*f^m*x^(4*m)*e^3/
(f*m) - 1/8*a*b*f^m*n*x^(4*m)*e^3/(f*m^2) + 1/32*b^2*f^m*n^2*x^(4*m)*e^3/(f
*m^3)
```

Mupad [**F**]

time = 0.00, size = -1, normalized size = -0.00

$$\int {\left (f\,x\right)}^{m-1}\,{\left (d+e\,x^m\right)}^3\,{\left (a+b\,\ln \left (c\,x^n\right)\right)}^2 \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n))^2,x)
```

```
[Out] int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n))^2, x)
```

3.360 $\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$

Optimal. Leaf size=298

$$\frac{2b^2d^2n^2x(fx)^{-1+m}}{m^3}+\frac{b^2den^2x^{1+m}(fx)^{-1+m}}{2m^3}+\frac{2b^2e^2n^2x^{1+2m}(fx)^{-1+m}}{27m^3}+\frac{b^2d^3n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{3em}-\frac{2bd^2nx}{}$$

```
[Out] 2*b^2*d^2*n^2*x*(f*x)^(-1+m)/m^3+1/2*b^2*d*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3+2
/27*b^2*e^2*n^2*x^(1+2*m)*(f*x)^(-1+m)/m^3+1/3*b^2*d^3*n^2*x^(1-m)*(f*x)^(-
1+m)*ln(x)^2/e/m-2*b*d^2*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-b*d*e*n*x^(1+
m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-2/9*b*e^2*n*x^(1+2*m)*(f*x)^(-1+m)*(a+b
*ln(c*x^n))/m^2-2/3*b*d^3*n*x^(1-m)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+
1/3*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))^2/e/m
```

Rubi [A]
time = 0.30, antiderivative size = 298, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.276$, Rules used = {2377, 2376, 272, 45, 2372, 12, 14, 2338}

$$-\frac{2bd^3nx^{1-m}\log(x)(fx)^{m-1}(a+b\log(cx^n))}{3em}-\frac{2bd^2nx(fx)^{m-1}(a+b\log(cx^n))}{m^2}-\frac{bdenx^{m+1}(fx)^{m-1}(a+b\log(cx^n))}{m^2}+\frac{x^{1-m}(fx)^{m-1}(d+ex^m)^3(a+b\log(cx^n))^2}{3em}-\frac{2be^2nx^{2m+1}(fx)^{m-1}(a+b\log(cx^n))}{9m^2}+\frac{b^2d^3n^2x^{1-m}\log^2(x)(fx)^{m-1}}{3em}+\frac{2b^2d^2n^2x(fx)^{m-1}}{m^3}+\frac{b^2den^2x^{m+1}(fx)^{m-1}}{2m^3}+\frac{2b^2e^2n^2x^{2m+1}(fx)^{m-1}}{27m^3}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b^2*d^2*n^2*x*(f*x)^(-1 + m))/m^3 + (b^2*d*e*n^2*x^(1 + m)*(f*x)^(-1 + m
))/(2*m^3) + (2*b^2*e^2*n^2*x^(1 + 2*m)*(f*x)^(-1 + m))/(27*m^3) + (b^2*d^3
*n^2*x^(1 - m)*(f*x)^(-1 + m)*Log[x]^2)/(3*e*m) - (2*b*d^2*n*x*(f*x)^(-1 +
m)*(a + b*Log[c*x^n]))/m^2 - (b*d*e*n*x^(1 + m)*(f*x)^(-1 + m)*(a + b*Log[c
*x^n]))/m^2 - (2*b*e^2*n*x^(1 + 2*m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(9*
m^2) - (2*b*d^3*n*x^(1 - m)*(f*x)^(-1 + m)*Log[x]*(a + b*Log[c*x^n]))/(3*e*
m) + (x^(1 - m)*(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2)/(3*e*m)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
```

```
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx = \left(x^{1-m}(fx)^{-1+m}\right) \int x^{-1+m}(d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$$

$$= \frac{x^{1-m}(fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2}{3em} - \frac{(2bnx^{1-m}(fx)}{}$$

$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{18d^2ex^m}{m} + \frac{9de^2x^{2m}}{m} + \frac{2e^3x^{3m}}{m} + 6d^3\log(x)\right)}{9em}$$

$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{18d^2ex^m}{m} + \frac{9de^2x^{2m}}{m} + \frac{2e^3x^{3m}}{m} + 6d^3\log(x)\right)}{9em}$$

$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{18d^2ex^m}{m} + \frac{9de^2x^{2m}}{m} + \frac{2e^3x^{3m}}{m} + 6d^3\log(x)\right)}{9em}$$

$$= \frac{2b^2d^2n^2x(fx)^{-1+m}}{m^3} + \frac{b^2den^2x^{1+m}(fx)^{-1+m}}{2m^3} + \frac{2b^2e^2n^2x^{1+2m}(}{27m^3}$$

$$= \frac{2b^2d^2n^2x(fx)^{-1+m}}{m^3} + \frac{b^2den^2x^{1+m}(fx)^{-1+m}}{2m^3} + \frac{2b^2e^2n^2x^{1+2m}(}{27m^3}$$

Mathematica [A]
time = 0.14, size = 207, normalized size = 0.69

$$\frac{(fx)^m \left(18a^2m^2(3d^2+3dex^m+e^2x^{2m}) - 6abmn(18d^2+9dex^m+2e^2x^{2m}) + b^2n^2(108d^2+27dex^m+4e^2x^{2m}) + 6bm(6am(3d^2+3dex^m+e^2x^{2m}) - bn(18d^2+9dex^m+2e^2x^{2m}))\log(cx^n) + 18b^2m^2(3d^2+3dex^m+e^2x^{2m})\log^2(cx^n)\right)}{54fm^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n])^2,x]
```

```
[Out] ((f*x)^m*(18*a^2*m^2*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - 6*a*b*m*n*(18*d^2
+ 9*d*e*x^m + 2*e^2*x^(2*m)) + b^2*n^2*(108*d^2 + 27*d*e*x^m + 4*e^2*x^(2*m
)) + 6*b*m*(6*a*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - b*n*(18*d^2 + 9*d*e*x
^m + 2*e^2*x^(2*m)))*Log[c*x^n] + 18*b^2*m^2*(3*d^2 + 3*d*e*x^m + e^2*x^(2*
m))*Log[c*x^n]^2))/(54*f*m^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 3038, normalized size = 10.19

method	result	size
risch	Expression too large to display	3038

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*b^2*(e^2*(x^m)^2+3*d*e*x^m+3*d^2)*x/m*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)
^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*
x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)^2+1/9*b*(3*I*Pi*b*e^2*csgn
(I*c)*csgn(I*c*x^n)^2*(x^m)^2*m+9*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2*m-3*
I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^m)^2*m+3*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)
^2*(x^m)^2*m-9*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^m*m-9*I*Pi*b*d^2*csgn(I*c*x^n)^
3*m-9*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m+9*I*Pi*b*d*e*csg
n(I*x^n)*csgn(I*c*x^n)^2*x^m*m+9*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m
-3*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*m+9*I*Pi*b*d^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2*m-9*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*m+6*ln(c)*b*e^2*(x^m)^2*m+18*ln(c)*b*d*e*x^m*m+6*a*e^2*(x^m)^2*m-2*b*e^2*
n*(x^m)^2+18*ln(c)*b*d^2*m+18*a*d*e*x^m*m-9*b*d*e*n*x^m+18*a*d^2*m-18*b*d^2
*n)*x/m^2*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+
I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2
*ln(f)))*ln(x^n)+1/108*(-9*Pi^2*b^2*e^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4*(x^m)
^2*m^2-9*Pi^2*b^2*e^2*csgn(I*c)^2*csgn(I*c*x^n)^4*(x^m)^2*m^2+18*Pi^2*b^2*e
^2*csgn(I*x^n)*csgn(I*c*x^n)^5*(x^m)^2*m^2-27*Pi^2*b^2*d*e*csgn(I*c*x^n)^6*
x^m*m^2-108*I*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m^2+108*I*Pi*b
^2*d^2*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+108*ln(c)^2*b^2*d*e*x^m*m^2+
72*ln(c)*a*b*e^2*(x^m)^2*m^2-24*ln(c)*b^2*e^2*m*n*(x^m)^2-24*a*b*e^2*m*n*(x
^m)^2+108*ln(c)^2*b^2*d^2*m^2-12*I*Pi*b^2*e^2*m*n*csgn(I*x^n)*csgn(I*c*x^n)
^2*(x^m)^2-108*I*Pi*a*b*d*e*csgn(I*c*x^n)^3*x^m*m^2-216*a*b*d^2*m*n-216*ln(
c)*b^2*d^2*m*n+216*ln(c)*a*b*d^2*m^2+216*b^2*d^2*n^2+108*a^2*d^2*m^2+8*b^2*
e^2*n^2*(x^m)^2+36*a^2*e^2*(x^m)^2*m^2+54*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x
^n)*csgn(I*c*x^n)^3*m^2-27*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*
x^n)^2*m^2+54*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*m^2-27*P
i^2*b^2*d*e*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x^m*m^2+18*Pi^2*b^2*e
^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*(x^m)^2*m^2+108*I*Pi*ln(c)*b^2*d
^2*csgn(I*c)*csgn(I*c*x^n)^2*m^2-36*Pi^2*b^2*e^2*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)^4*(x^m)^2*m^2-27*Pi^2*b^2*d^2*csgn(I*c*x^n)^6*m^2-36*I*Pi*ln(c)*b
^2*e^2*csgn(I*c*x^n)^3*(x^m)^2*m^2-27*Pi^2*b^2*d*e*csgn(I*c)^2*csgn(I*c*x^n
)^4*x^m*m^2-108*I*Pi*b^2*d^2*m*n*csgn(I*c)*csgn(I*c*x^n)^2+54*Pi^2*b^2*d^2*
csgn(I*x^n)*csgn(I*c*x^n)^5*m^2-9*Pi^2*b^2*e^2*csgn(I*c*x^n)^6*(x^m)^2*m^2+
108*I*Pi*a*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m*m^2+108*I*Pi*ln(c)*b^2*d*e
*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m*m^2-27*Pi^2*b^2*d^2*csgn(I*c)^2*csgn(I*c*x
^n)^4*m^2+54*b^2*d*e*n^2*x^m+108*a^2*d*e*x^m*m^2+36*ln(c)^2*b^2*e^2*(x^m)^2
*m^2-27*Pi^2*b^2*d^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4*m^2+54*Pi^2*b^2*d*e*csgn
(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x^m*m^2+54*Pi^2*b^2*d*e*csgn(I*c)*csgn(
I*x^n)^2*csgn(I*c*x^n)^3*x^m*m^2-108*Pi^2*b^2*d*e*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4*x^m*m^2+54*I*Pi*b^2*d*e*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*x^m-108*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*m^2+18*Pi^2*b^
2*e^2*csgn(I*c)*csgn(I*c*x^n)^5*(x^m)^2*m^2+36*I*Pi*ln(c)*b^2*e^2*csgn(I*x^
n)*csgn(I*c*x^n)^2*(x^m)^2*m^2-108*I*Pi*ln(c)*b^2*d*e*csgn(I*c*x^n)^3*x^m*m
^2+54*Pi^2*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^5*m^2+54*Pi^2*b^2*d*e*csgn(I*x^n
)*csgn(I*c*x^n)^5*x^m*m^2+36*I*Pi*a*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2
```

```
*m^2+36*I*Pi*a*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^m)^2*m^2+12*I*Pi*b^2*e^
2*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2+108*I*Pi*a*b*d*e*csgn(I*c
)*csgn(I*c*x^n)^2*x^m*m^2-108*I*Pi*a*b*d^2*csgn(I*c*x^n)^3*m^2+108*I*Pi*b^2
*d^2*m*n*csgn(I*c*x^n)^3-108*I*Pi*ln(c)*b^2*d^2*csgn(I*c*x^n)^3*m^2+108*I*P
i*ln(c)*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*m^2+108*I*Pi*a*b*d^2*csgn(I*c)*
csgn(I*c*x^n)^2*m^2+108*I*Pi*a*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*m^2+12*I*P
i*b^2*e^2*m*n*csgn(I*c*x^n)^3*(x^m)^2-108*I*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*m^2-108*I*Pi*b^2*d^2*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2-
36*I*Pi*a*b*e^2*csgn(I*c*x^n)^3*(x^m)^2*m^2-108*I*Pi*ln(c)*b^2*d*e*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m^2-108*I*Pi*a*b*d*e*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)*x^m*m^2-54*I*Pi*b^2*d*e*m*n*csgn(I*c)*csgn(I*c*x^n)^2*x^m-54*
I*Pi*b^2*d*e*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m-9*Pi^2*b^2*e^2*csgn(I*c)^2
*csgn(I*x^n)^2*csgn(I*c*x^n)^2*(x^m)^2*m^2+18*Pi^2*b^2*e^2*csgn(I*c)^2*csgn
(I*x^n)*csgn(I*c*x^n)^3*(x^m)^2*m^2+54*I*Pi*b^2*d*e*m*n*csgn(I*c*x^n)^3*x^m
+36*I*Pi*ln(c)*b^2*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2*m^2+54*Pi^2*b^2*d*
e*csgn(I*c)*csgn(I*c*x^n)^5*x^m*m^2-27*Pi^2*b^2*d*e*csgn(I*x^n)^2*csgn(I*c*
x^n)^4*x^m*m^2-36*I*Pi*a*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*
m^2-36*I*Pi*ln(c)*b^2*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^m)^2*m^2+1
08*I*Pi*ln(c)*b^2*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m^2-12*I*Pi*b^2*e^2*m*n
*csgn(I*c)*csgn(I*c*x^n)^2*(x^m)^2+216*ln(c)*a*b*d*e*x^m*m^2-108*ln(c)*b^2*
d*e*m*n*x^m-108*a*b*d*e*m*n*x^m)*x/m^3*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+
I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2...
```

Maxima [A]
time = 0.29, size = 425, normalized size = 1.43

$$\frac{b^2 d f^{m-1} e^{(2m\log(x)+1)}\log(cx^n)^2}{m} - 2\left(\frac{f^{m-1} n x^m \log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2d^2 - \frac{2abd^2f^{m-1}nx^m}{m^2} - \frac{1}{2}\left(\frac{2f^{m-1}nx^{2m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{2m}}{m^3}\right)b^2de + \frac{2abdf^{m-1}e^{(2m\log(x)+1)}\log(cx^n)}{m} + \frac{(fx)^m b^2d^2\log(cx^n)^2}{fm} + \frac{b^2f^{m-1}e^{(3m\log(x)+2)}\log(cx^n)^2}{3m} - \frac{2}{27}\left(\frac{3f^{m-1}nx^{3m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{3m}}{m^3}\right)b^2e^2 + \frac{a^2df^{m-1}e^{(2m\log(x)+1)}}{m} - \frac{abdf^{m-1}ne^{(2m\log(x)+1)}}{m^2} + \frac{2(fx)^m abd^2\log(cx^n)}{fm} + \frac{2abf^{m-1}e^{(3m\log(x)+2)}\log(cx^n)}{3m} + \frac{(fx)^m a^2d^2}{fm} + \frac{a^2f^{m-1}e^{(3m\log(x)+2)}}{3m} - \frac{2abf^{m-1}ne^{(3m\log(x)+2)}}{9m^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima"
)
```

```
[Out] b^2*d*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)^2/m - 2*(f^(m - 1)*n*x^m*log(
c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d^2 - 2*a*b*d^2*f^(m - 1)*n*x^m/m^2
 - 1/2*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/m^3)*b
^2*d*e + 2*a*b*d*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)/m + (f*x)^m*b^2*d^
2*log(c*x^n)^2/(f*m) + 1/3*b^2*f^(m - 1)*e^(3*m*log(x) + 2)*log(c*x^n)^2/m
 - 2/27*(3*f^(m - 1)*n*x^(3*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(3*m)/m^3)*b
^2*e^2 + a^2*d*f^(m - 1)*e^(2*m*log(x) + 1)/m - a*b*d*f^(m - 1)*n*e^(2*m*lo
g(x) + 1)/m^2 + 2*(f*x)^m*a*b*d^2*log(c*x^n)/(f*m) + 2/3*a*b*f^(m - 1)*e^(3
*m*log(x) + 2)*log(c*x^n)/m + (f*x)^m*a^2*d^2/(f*m) + 1/3*a^2*f^(m - 1)*e^(
3*m*log(x) + 2)/m - 2/9*a*b*f^(m - 1)*n*e^(3*m*log(x) + 2)/m^2
```

Fricas [A]
time = 0.39, size = 411, normalized size = 1.38

$$\frac{2\left(9b^2m^2n^2e^2\log(x)^2 + 9b^2m^2e^2\log(c)^2 + 6\left(3abm^2 - b^2mn\right)e^2\log(c) + \left(9a^2m^2 - 6abmn + 2b^2n^2\right)e^2 + 6\left(3b^2m^2ne^2\log(c) + \left(3abm^2n - b^2mn^2\right)e^2\right)\log(x)\right)f^{m-1}x^{3m} + 27\left(2b^2dm^2n^2e\log(x)^2 + 2b^2dm^2e\log(c)^2 + 2\left(2abdm^2 - b^2dmn\right)e\log(c) + \left(2a^2dm^2 - 2abdmn + b^2dn^2\right)e + 2\left(2b^2dm^2ne\log(c) + \left(2abdm^2n - b^2dmn^2\right)e\right)\log(x)\right)f^{m-1}x^{2m} + 54\left(b^2d^2m^2n^2\log(x)^2 + b^2d^2m^2\log(c)^2 + a^2d^2m^2 - 2abd^2mn + 2b^2d^2n^2 + 2\left(abd^2m^2 - b^2d^2mn\right)\log(c) + 2\left(b^2d^2m^2n\log(c) + abd^2m^2n - b^2d^2mn^2\right)\log(x)\right)f^{m-1}x^m}{54m^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas"
)
```

```
[Out] 1/54*(2*(9*b^2*m^2*n^2*e^2*log(x)^2 + 9*b^2*m^2*e^2*log(c)^2 + 6*(3*a*b*m^2
 - b^2*m*n)*e^2*log(c) + (9*a^2*m^2 - 6*a*b*m*n + 2*b^2*n^2)*e^2 + 6*(3*b^2
*m^2*n*e^2*log(c) + (3*a*b*m^2*n - b^2*m*n^2)*e^2)*log(x))*f^(m - 1)*x^(3*m
) + 27*(2*b^2*d*m^2*n^2*e*log(x)^2 + 2*b^2*d*m^2*e*log(c)^2 + 2*(2*a*b*d*m^
2 - b^2*d*m*n)*e*log(c) + (2*a^2*d*m^2 - 2*a*b*d*m*n + b^2*d*n^2)*e + 2*(2*
b^2*d*m^2*n*e*log(c) + (2*a*b*d*m^2*n - b^2*d*m*n^2)*e)*log(x))*f^(m - 1)*x
^(2*m) + 54*(b^2*d^2*m^2*n^2*log(x)^2 + b^2*d^2*m^2*log(c)^2 + a^2*d^2*m^2
- 2*a*b*d^2*m*n + 2*b^2*d^2*n^2 + 2*(a*b*d^2*m^2 - b^2*d^2*m*n)*log(c) + 2*
(b^2*d^2*m^2*n*log(c) + a*b*d^2*m^2*n - b^2*d^2*m*n^2)*log(x))*f^(m - 1)*x^
m)/m^3
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(d+e*x**m)**2*(a+b*ln(c*x**n))**2,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3004 deep
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 715 vs. 2(284) = 568.
time = 7.72, size = 715, normalized size = 2.40

$$\frac{b^2d^2f^mn^2x^m\log(x)^2}{fm}+\frac{b^2df^mn^2x^{2m}e\log(x)^2}{fm}+\frac{2b^2d^2f^mnx^m\log(c)\log(x)}{fm}+\frac{2b^2df^mnx^{2m}e\log(c)\log(x)}{fm}+\frac{b^2f^mn^2x^{3m}e^2\log(x)^2}{3fm}+\frac{b^2d^2f^mx^m\log(c)^2}{fm}+\frac{b^2df^mx^{2m}e\log(c)^2}{fm}+\frac{2abd^2f^mnx^m\log(x)}{fm}-\frac{2b^2d^2f^mn^2x^m\log(x)}{fm^2}+\frac{2abdf^mnx^{2m}e\log(x)}{fm}-\frac{b^2df^mn^2x^{2m}e\log(x)}{fm^2}+\frac{2b^2f^mnx^{3m}e^2\log(c)\log(x)}{3fm}+\frac{2abd^2f^mx^m\log(c)}{fm}-\frac{2b^2d^2f^mnx^m\log(c)}{fm^2}+\frac{2abdf^mx^{2m}e\log(c)}{fm}-\frac{b^2df^mnx^{2m}e\log(c)}{fm^2}+\frac{b^2f^mx^{3m}e^2\log(c)^2}{3fm}+\frac{2abf^mnx^{3m}e^2\log(x)}{3fm}-\frac{2b^2f^mn^2x^{3m}e^2\log(x)}{9fm^2}+\frac{a^2d^2f^mx^m}{fm}-\frac{2abd^2f^mnx^m}{fm^2}+\frac{2b^2d^2f^mn^2x^m}{fm^3}+\frac{a^2df^mx^{2m}e}{fm}-\frac{abdf^mnx^{2m}e}{fm^2}+\frac{b^2df^mn^2x^{2m}e}{2fm^3}+\frac{2abf^mx^{3m}e^2\log(c)}{3fm}-\frac{2b^2f^mnx^{3m}e^2\log(c)}{9fm^2}+\frac{a^2f^mx^{3m}e^2}{3fm}-\frac{2abf^mnx^{3m}e^2}{9fm^2}+\frac{2b^2f^mn^2x^{3m}e^2}{27fm^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] b^2*d^2*f^m*n^2*x^m*log(x)^2/(f*m) + b^2*d*f^m*n^2*x^(2*m)*e*log(x)^2/(f*m)
 + 2*b^2*d^2*f^m*n*x^m*log(c)*log(x)/(f*m) + 2*b^2*d*f^m*n*x^(2*m)*e*log(c)
*log(x)/(f*m) + 1/3*b^2*f^m*n^2*x^(3*m)*e^2*log(x)^2/(f*m) + b^2*d^2*f^m*x^
m*log(c)^2/(f*m) + b^2*d*f^m*x^(2*m)*e*log(c)^2/(f*m) + 2*a*b*d^2*f^m*n*x^m
*log(x)/(f*m) - 2*b^2*d^2*f^m*n^2*x^m*log(x)/(f*m^2) + 2*a*b*d*f^m*n*x^(2*m
)*e*log(x)/(f*m) - b^2*d*f^m*n^2*x^(2*m)*e*log(x)/(f*m^2) + 2/3*b^2*f^m*n*x
^(3*m)*e^2*log(c)*log(x)/(f*m) + 2*a*b*d^2*f^m*x^m*log(c)/(f*m) - 2*b^2*d^2
*f^m*n*x^m*log(c)/(f*m^2) + 2*a*b*d*f^m*x^(2*m)*e*log(c)/(f*m) - b^2*d*f^m*
n*x^(2*m)*e*log(c)/(f*m^2) + 1/3*b^2*f^m*x^(3*m)*e^2*log(c)^2/(f*m) + 2/3*a
*b*f^m*n*x^(3*m)*e^2*log(x)/(f*m) - 2/9*b^2*f^m*n^2*x^(3*m)*e^2*log(x)/(f*m
^2) + a^2*d^2*f^m*x^m/(f*m) - 2*a*b*d^2*f^m*n*x^m/(f*m^2) + 2*b^2*d^2*f^m*n
```

```
^2*x^m/(f*m^3) + a^2*d*f^m*x^(2*m)*e/(f*m) - a*b*d*f^m*n*x^(2*m)*e/(f*m^2)
+ 1/2*b^2*d*f^m*n^2*x^(2*m)*e/(f*m^3) + 2/3*a*b*f^m*x^(3*m)*e^2*log(c)/(f*m
) - 2/9*b^2*f^m*n*x^(3*m)*e^2*log(c)/(f*m^2) + 1/3*a^2*f^m*x^(3*m)*e^2/(f*m
) - 2/9*a*b*f^m*n*x^(3*m)*e^2/(f*m^2) + 2/27*b^2*f^m*n^2*x^(3*m)*e^2/(f*m^3
)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^{m-1}\,(d+e\,x^m)^2\,(a+b\,\ln (c\,x^n))^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n))^2,x)
[Out] int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n))^2, x)
```

3.361 $\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n))^2 \, dx$

Optimal. Leaf size=226

$$\frac{2b^2dn^2x(fx)^{-1+m}}{m^3}+\frac{b^2en^2x^{1+m}(fx)^{-1+m}}{4m^3}+\frac{b^2d^2n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{2em}-\frac{2bdnx(fx)^{-1+m}(a+b\log(cx^n))}{m^2}$$

```
[Out] 2*b^2*d*n^2*x*(f*x)^(-1+m)/m^3+1/4*b^2*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3+1/2*b
^2*d^2*n^2*x^(1-m)*(f*x)^(-1+m)*ln(x)^2/e/m-2*b*d*n*x*(f*x)^(-1+m)*(a+b*ln(
c*x^n))/m^2-1/2*b*e*n*x^(1+m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-b*d^2*n*x^(1
-m)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+1/2*x^(1-m)*(f*x)^(-1+m)*(d+e*x^
m)^2*(a+b*ln(c*x^n))^2/e/m
```

Rubi [A]

time = 0.20, antiderivative size = 226, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 8, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.296$, Rules used = {2377, 2376, 272, 45, 2372, 12, 14, 2338}

$$-\frac{bd^2nx^{1-m}\log(x)(fx)^{m-1}(a+b\log(cx^n))}{em}+\frac{x^{1-m}(fx)^{m-1}(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{2bdnx(fx)^{m-1}(a+b\log(cx^n))}{m^2}-\frac{benx^{m+1}(fx)^{m-1}(a+b\log(cx^n))}{2m^2}+\frac{b^2d^2n^2x^{1-m}\log^2(x)(fx)^{m-1}}{2em}+\frac{2b^2dn^2x(fx)^{m-1}}{m^3}+\frac{b^2en^2x^{m+1}(fx)^{m-1}}{4m^3}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b^2*d*n^2*x*(f*x)^(-1 + m))/m^3 + (b^2*e*n^2*x^(1 + m)*(f*x)^(-1 + m))/(
4*m^3) + (b^2*d^2*n^2*x^(1 - m)*(f*x)^(-1 + m)*Log[x]^2)/(2*e*m) - (2*b*d*n
*x*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/m^2 - (b*e*n*x^(1 + m)*(f*x)^(-1 + m)
*(a + b*Log[c*x^n]))/(2*m^2) - (b*d^2*n*x^(1 - m)*(f*x)^(-1 + m)*Log[x]*(a
+ b*Log[c*x^n]))/(e*m) + (x^(1 - m)*(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log
[c*x^n])^2)/(2*e*m)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
```

```
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rubi steps

$$\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n))^2 \, dx = \left(x^{1-m}(fx)^{-1+m}\right) \int x^{-1+m}(d+ex^m) (a+b\log(cx^n))^2 \, dx$$
$$= \frac{x^{1-m}(fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2}{2em} - \frac{(bnx^{1-m}(fx)}{}$$
$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{4dex^m}{m} + \frac{e^2x^{2m}}{m} + 2d^2\log(x)\right) (a+b\log(}{2em}$$
$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{4dex^m}{m} + \frac{e^2x^{2m}}{m} + 2d^2\log(x)\right) (a+b\log(}{2em}$$
$$= -\frac{bnx^{1-m}(fx)^{-1+m} \left(\frac{4dex^m}{m} + \frac{e^2x^{2m}}{m} + 2d^2\log(x)\right) (a+b\log(}{2em}$$
$$= \frac{2b^2dn^2x(fx)^{-1+m}}{m^3} + \frac{b^2en^2x^{1+m}(fx)^{-1+m}}{4m^3} - \frac{bnx^{1-m}(fx)^{-1+}}{}$$
$$= \frac{2b^2dn^2x(fx)^{-1+m}}{m^3} + \frac{b^2en^2x^{1+m}(fx)^{-1+m}}{4m^3} + \frac{b^2d^2n^2x^{1-m}(fx)}{2em}$$

Mathematica [A]
time = 0.09, size = 125, normalized size = 0.55

$$\frac{(fx)^m \left(2a^2m^2(2d+ex^m) - 2abmn(4d+ex^m) + b^2n^2(8d+ex^m) - 2bm(-2am(2d+ex^m) + bn(4d+ex^m))\log(cx^n) + 2b^2m^2(2d+ex^m)\log^2(cx^n)\right)}{4fm^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] ((f*x)^m*(2*a^2*m^2*(2*d + e*x^m) - 2*a*b*m*n*(4*d + e*x^m) + b^2*n^2*(8*d
+ e*x^m) - 2*b*m*(-2*a*m*(2*d + e*x^m) + b*n*(4*d + e*x^m))*Log[c*x^n] + 2*
b^2*m^2*(2*d + e*x^m)*Log[c*x^n]^2))/(4*f*m^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.19, size = 1919, normalized size = 8.49

method	result	size
risch	Expression too large to display	1919

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(d+e*x^m)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b^2*(e*x^m+2*d)*x/m*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x
)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(
```

```
I*x)+2*ln(x)+2*ln(f)))*ln(x^n)^2-1/2*b*(I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)*x^m*m-I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m-I*Pi*b*e*csgn(I*x^
n)*csgn(I*c*x^n)^2*x^m*m+I*Pi*b*e*csgn(I*c*x^n)^3*x^m*m+2*I*Pi*b*d*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*m-2*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*m-2*I*Pi
*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*m+2*I*Pi*b*d*csgn(I*c*x^n)^3*m-2*ln(c)*b*e
*x^m*m-4*ln(c)*b*d*m-2*x^m*a*e*m+x^m*b*e*n-4*a*d*m+4*b*d*n)*x/m^2*exp(1/2*(
-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*
csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/
8*(-2*Pi^2*b^2*d*csgn(I*c*x^n)^6*m^2+4*ln(c)^2*b^2*e*x^m*m^2+4*I*Pi*a*b*e*c
sgn(I*c)*csgn(I*c*x^n)^2*x^m*m^2+4*I*Pi*a*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x
^m*m^2+8*ln(c)^2*b^2*d*m^2+16*b^2*d*n^2-16*ln(c)*b^2*d*m*n+16*ln(c)*a*b*d*m
^2+4*I*Pi*ln(c)*b^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m*m^2+4*Pi^2*b^2*d*csgn
(I*x^n)*csgn(I*c*x^n)^5*m^2-Pi^2*b^2*e*csgn(I*c*x^n)^6*x^m*m^2-2*Pi^2*b^2*d
*csgn(I*c)^2*csgn(I*c*x^n)^4*m^2+2*b^2*e*n^2*x^m+4*a^2*e*x^m*m^2+8*a^2*d*m^
2+8*I*Pi*b^2*d*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-16*a*b*d*m*n+4*I*Pi*
ln(c)*b^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^m*m^2+2*I*Pi*b^2*e*m*n*csgn(I*c*x^n
)^3*x^m+8*I*Pi*a*b*d*csgn(I*c)*csgn(I*c*x^n)^2*m^2-8*I*Pi*a*b*d*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*m^2+4*Pi^2*b^2*d*csgn(I*c)*csgn(I*c*x^n)^5*m^2+2*P
i^2*b^2*e*csgn(I*c)*csgn(I*c*x^n)^5*x^m*m^2-Pi^2*b^2*e*csgn(I*x^n)^2*csgn(I
*c*x^n)^4*x^m*m^2-4*Pi^2*b^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x^m*m^
2-8*I*Pi*b^2*d*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*ln(c)*b^2*e*csgn(I*c*
x^n)^3*x^m*m^2-4*I*Pi*a*b*e*csgn(I*c*x^n)^3*x^m*m^2+4*Pi^2*b^2*d*csgn(I*c)*
csgn(I*x^n)^2*csgn(I*c*x^n)^3*m^2+8*I*Pi*a*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*
m^2-8*I*Pi*b^2*d*m*n*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b^2*e*m*n*csgn(I*c)*c
sgn(I*c*x^n)^2*x^m-2*I*Pi*b^2*e*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x^m+2*Pi^2*
b^2*e*csgn(I*x^n)*csgn(I*c*x^n)^5*x^m*m^2+8*I*Pi*b^2*d*m*n*csgn(I*c*x^n)^3-
8*I*Pi*ln(c)*b^2*d*csgn(I*c*x^n)^3*m^2-8*I*Pi*a*b*d*csgn(I*c*x^n)^3*m^2-4*a
*b*e*m*n*x^m-4*I*Pi*ln(c)*b^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m^2
-4*I*Pi*a*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m*m^2-8*I*Pi*ln(c)*b^2*
d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m^2-2*Pi^2*b^2*d*csgn(I*x^n)^2*csgn(I
*c*x^n)^4*m^2-8*Pi^2*b^2*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*m^2-2*Pi^2
*b^2*d*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*m^2+4*Pi^2*b^2*d*csgn(I*c)
^2*csgn(I*x^n)*csgn(I*c*x^n)^3*m^2-Pi^2*b^2*e*csgn(I*c)^2*csgn(I*c*x^n)^4*x
^m*m^2+2*I*Pi*b^2*e*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^m+8*ln(c)*a*b
*e*x^m*m^2+8*I*Pi*ln(c)*b^2*d*csgn(I*c)*csgn(I*c*x^n)^2*m^2+8*I*Pi*ln(c)*b^
2*d*csgn(I*x^n)*csgn(I*c*x^n)^2*m^2-Pi^2*b^2*e*csgn(I*c)^2*csgn(I*x^n)^2*cs
gn(I*c*x^n)^2*x^m*m^2+2*Pi^2*b^2*e*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*
x^m*m^2+2*Pi^2*b^2*e*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*x^m*m^2-4*ln(c
)*b^2*e*m*n*x^m)*x/m^3*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)
^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I
*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]

time = 0.30, size = 266, normalized size = 1.18

$$\frac{b^2f^{m-1}e^{(2m\log(x)+1)}\log(cx^n)^2}{2m}-2\left(\frac{f^{m-1}nx^m\log(cx^n)}{m^2}-\frac{f^{m-1}n^2x^m}{m^3}\right)b^2d-\frac{2abdf^{m-1}nx^m}{m^2}-\frac{1}{4}\left(\frac{2f^{m-1}nx^{2m}\log(cx^n)}{m^2}-\frac{f^{m-1}n^2x^{2m}}{m^3}\right)b^2e+\frac{abf^{m-1}e^{(2m\log(x)+1)}\log(cx^n)}{m}+\frac{(fx)^m b^2d\log(cx^n)^2}{fm}+\frac{a^2f^{m-1}e^{(2m\log(x)+1)}}{2m}-\frac{abf^{m-1}ne^{(2m\log(x)+1)}}{2m^2}+\frac{2(fx)^m abd\log(cx^n)}{fm}+\frac{(fx)^m a^2d}{fm}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/2*b^2*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)^2/m - 2*(f^(m - 1)*n*x^m*lo
g(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d - 2*a*b*d*f^(m - 1)*n*x^m/m^2 -
 1/4*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/m^3)*b^2
*e + a*b*f^(m - 1)*e^(2*m*log(x) + 1)*log(c*x^n)/m + (f*x)^m*b^2*d*log(c*x^
n)^2/(f*m) + 1/2*a^2*f^(m - 1)*e^(2*m*log(x) + 1)/m - 1/2*a*b*f^(m - 1)*n*e
^(2*m*log(x) + 1)/m^2 + 2*(f*x)^m*a*b*d*log(c*x^n)/(f*m) + (f*x)^m*a^2*d/(f
*m)
```

Fricas [A]
time = 0.40, size = 250, normalized size = 1.11

$$\frac{\left(2\,b^2m^2n^2e\log\left(x\right)^2+2\,b^2m^2e\log\left(c\right)^2+2\left(2\,abm^2-b^2mn\right)e\log\left(c\right)+\left(2\,a^2m^2-2\,abmn+b^2n^2\right)e+2\left(2\,b^2m^2ne\log\left(c\right)+\left(2\,abm^2n-b^2mn^2\right)e\right)\log\left(x\right)\right)f^{m-1}x^{2m}+4\left(b^2dm^2n^2\log\left(x\right)^2+b^2dm^2\log\left(c\right)^2+a^2dm^2-2\,abdmn+2\,b^2dn^2+2\left(abdm^2-b^2dmn\right)\log\left(c\right)+2\left(b^2dm^2n\log\left(c\right)+abdm^2n-b^2dmn^2\right)\log\left(x\right)\right)f^{m-1}x^m}{4\,m^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/4*((2*b^2*m^2*n^2*e*log(x)^2 + 2*b^2*m^2*e*log(c)^2 + 2*(2*a*b*m^2 - b^2*
m*n)*e*log(c) + (2*a^2*m^2 - 2*a*b*m*n + b^2*n^2)*e + 2*(2*b^2*m^2*n*e*log(
c) + (2*a*b*m^2*n - b^2*m*n^2)*e)*log(x))*f^(m - 1)*x^(2*m) + 4*(b^2*d*m^2*
n^2*log(x)^2 + b^2*d*m^2*log(c)^2 + a^2*d*m^2 - 2*a*b*d*m*n + 2*b^2*d*n^2 +
 2*(a*b*d*m^2 - b^2*d*m*n)*log(c) + 2*(b^2*d*m^2*n*log(c) + a*b*d*m^2*n - b
^2*d*m*n^2)*log(x))*f^(m - 1)*x^m)/m^3
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1535 vs. $2(212) = 424$.
time = 47.98, size = 1535, normalized size = 6.79

$$\begin{cases} \tilde{\infty}\left(d+e\right)\left(a^2x-2abnx+2abx\log\left(cx^n\right)+2b^2n^2x-2b^2nx\log\left(cx^n\right)+b^2x\log\left(cx^n\right)^2\right) & \text{for}\ f=0\wedge m=0 \\ \frac{\left(d+e\right)\left(\begin{cases}\frac{a^2\log\left(cx^n\right)+ab\log\left(cx^n\right)^2+\frac{b^2\log\left(cx^n\right)^3}{3}}{n} & \text{for}\ n\neq 0\\ \left(a^2+2ab\log\left(c\right)+b^2\log\left(c\right)^2\right)\log\left(x\right) & \text{otherwise}\end{cases}\right)}{f} & \text{for}\ m=0 \\ 0^{m-1}\left(\text{[illegible]}\right) & \text{for}\ f=0 \\ \frac{a^2d(fx)^m}{fm}+\frac{a^2ex^m(fx)^m}{2fm}+\frac{2abd(fx)^m\log\left(cx^n\right)}{fm}-\frac{2abdn(fx)^m}{fm^2}+\frac{abex^m(fx)^m\log\left(cx^n\right)}{fm}-\frac{abenx^m(fx)^m}{2fm^2}+\frac{b^2d(fx)^m\log\left(cx^n\right)^2}{fm}-\frac{2b^2dn(fx)^m\log\left(cx^n\right)}{fm^2}+\frac{2b^2dn^2(fx)^m}{fm^3}+\frac{b^2ex^m(fx)^m\log\left(cx^n\right)^2}{2fm}-\frac{b^2enx^m(fx)^m\log\left(cx^n\right)}{2fm^2}+\frac{b^2en^2x^m(fx)^m}{4fm^3} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(d+e*x**m)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] Piecewise((zoo*(d + e)*(a**2*x - 2*a*b*n*x + 2*a*b*x*log(c*x**n) + 2*b**2*n
**2*x - 2*b**2*n*x*log(c*x**n) + b**2*x*log(c*x**n)**2), Eq(f, 0) & Eq(m, 0
)), ((d + e)*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c
*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x),
True))/f, Eq(m, 0)), (0**(m - 1)*(a**2*d*m**3*x/(m**3 + 3*m**2 + 3*m + 1) +
 3*a**2*d*m**2*x/(m**3 + 3*m**2 + 3*m + 1) + 3*a**2*d*m*x/(m**3 + 3*m**2 +
3*m + 1) + a**2*d*x/(m**3 + 3*m**2 + 3*m + 1) + a**2*e*m**2*x*x**m/(m**3 +
3*m**2 + 3*m + 1) + 2*a**2*e*m*x*x**m/(m**3 + 3*m**2 + 3*m + 1) + a**2*e*x*
x**m/(m**3 + 3*m**2 + 3*m + 1) - 2*a*b*d*m**3*n*x/(m**3 + 3*m**2 + 3*m + 1)
 + 2*a*b*d*m**3*x*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) - 6*a*b*d*m**2*n*x/
```

```
(m**3 + 3*m**2 + 3*m + 1) + 6*a*b*d*m**2*x*log(c*x**n)/(m**3 + 3*m**2 + 3*m
 + 1) - 6*a*b*d*m*n*x/(m**3 + 3*m**2 + 3*m + 1) + 6*a*b*d*m*x*log(c*x**n)/(
m**3 + 3*m**2 + 3*m + 1) - 2*a*b*d*n*x/(m**3 + 3*m**2 + 3*m + 1) + 2*a*b*d*
x*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + 2*a*b*e*m**2*x*x**m*log(c*x**n)/(
m**3 + 3*m**2 + 3*m + 1) - 2*a*b*e*m*n*x*x**m/(m**3 + 3*m**2 + 3*m + 1) + 4
*a*b*e*m*x*x**m*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) - 2*a*b*e*n*x*x**m/(m
**3 + 3*m**2 + 3*m + 1) + 2*a*b*e*x*x**m*log(c*x**n)/(m**3 + 3*m**2 + 3*m +
 1) + 2*b**2*d*m**3*n**2*x/(m**3 + 3*m**2 + 3*m + 1) - 2*b**2*d*m**3*n*x*lo
g(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + b**2*d*m**3*x*log(c*x**n)**2/(m**3 +
3*m**2 + 3*m + 1) + 6*b**2*d*m**2*n**2*x/(m**3 + 3*m**2 + 3*m + 1) - 6*b**2
*d*m**2*n*x*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + 3*b**2*d*m**2*x*log(c*x
**n)**2/(m**3 + 3*m**2 + 3*m + 1) + 6*b**2*d*m*n**2*x/(m**3 + 3*m**2 + 3*m
+ 1) - 6*b**2*d*m*n*x*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + 3*b**2*d*m*x*
log(c*x**n)**2/(m**3 + 3*m**2 + 3*m + 1) + 2*b**2*d*n**2*x/(m**3 + 3*m**2 +
 3*m + 1) - 2*b**2*d*n*x*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + b**2*d*x*l
og(c*x**n)**2/(m**3 + 3*m**2 + 3*m + 1) + b**2*e*m**2*x*x**m*log(c*x**n)**2
/(m**3 + 3*m**2 + 3*m + 1) - 2*b**2*e*m*n*x*x**m*log(c*x**n)/(m**3 + 3*m**2
 + 3*m + 1) + 2*b**2*e*m*x*x**m*log(c*x**n)**2/(m**3 + 3*m**2 + 3*m + 1) +
2*b**2*e*n**2*x*x**m/(m**3 + 3*m**2 + 3*m + 1) - 2*b**2*e*n*x*x**m*log(c*x*
*n)/(m**3 + 3*m**2 + 3*m + 1) + b**2*e*x*x**m*log(c*x**n)**2/(m**3 + 3*m**2
 + 3*m + 1)), Eq(f, 0)), (a**2*d*(f*x)**m/(f*m) + a**2*e*x**m*(f*x)**m/(2*f
*m) + 2*a*b*d*(f*x)**m*log(c*x**n)/(f*m) - 2*a*b*d*n*(f*x)**m/(f*m**2) + a*
b*e*x**m*(f*x)**m*log(c*x**n)/(f*m) - a*b*e*n*x**m*(f*x)**m/(2*f*m**2) + b*
*2*d*(f*x)**m*log(c*x**n)**2/(f*m) - 2*b**2*d*n*(f*x)**m*log(c*x**n)/(f*m**
2) + 2*b**2*d*n**2*(f*x)**m/(f*m**3) + b**2*e*x**m*(f*x)**m*log(c*x**n)**2/
(2*f*m) - b**2*e*n*x**m*(f*x)**m*log(c*x**n)/(2*f*m**2) + b**2*e*n**2*x**m*
(f*x)**m/(4*f*m**3), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 445 vs. 2(218) = 436.
time = 8.65, size = 445, normalized size = 1.97

$$\frac{b^2df^mn^2x^m\log(x)^2}{fm}+\frac{b^2f^mn^2x^{2m}e\log(x)^2}{2fm}+\frac{2b^2df^mnx^m\log(c)\log(x)}{fm}+\frac{b^2f^mnx^{2m}e\log(c)\log(x)}{fm}+\frac{b^2df^mx^m\log(c)^2}{fm}+\frac{b^2f^mx^{2m}e\log(c)^2}{2fm}+\frac{2abdf^mnx^m\log(x)}{fm}-\frac{2b^2df^mn^2x^m\log(x)}{fm^2}+\frac{abf^mnx^{2m}e\log(x)}{fm}-\frac{b^2f^mn^2x^{2m}e\log(x)}{2fm^2}+\frac{2abdf^mx^m\log(c)}{fm}-\frac{2b^2df^mnx^m\log(c)}{fm^2}+\frac{abf^mx^{2m}e\log(c)}{fm}-\frac{b^2f^mnx^{2m}e\log(c)}{2fm^2}+\frac{a^2df^mx^m}{fm}-\frac{2abdf^mnx^m}{fm^2}+\frac{2b^2df^mn^2x^m}{fm^3}+\frac{a^2f^mx^{2m}e}{2fm}-\frac{abf^mnx^{2m}e}{2fm^2}+\frac{b^2f^mn^2x^{2m}e}{4fm^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] b^2*d*f^m*n^2*x^m*log(x)^2/(f*m) + 1/2*b^2*f^m*n^2*x^(2*m)*e*log(x)^2/(f*m)
 + 2*b^2*d*f^m*n*x^m*log(c)*log(x)/(f*m) + b^2*f^m*n*x^(2*m)*e*log(c)*log(x
)/(f*m) + b^2*d*f^m*x^m*log(c)^2/(f*m) + 1/2*b^2*f^m*x^(2*m)*e*log(c)^2/(f*
m) + 2*a*b*d*f^m*n*x^m*log(x)/(f*m) - 2*b^2*d*f^m*n^2*x^m*log(x)/(f*m^2) +
a*b*f^m*n*x^(2*m)*e*log(x)/(f*m) - 1/2*b^2*f^m*n^2*x^(2*m)*e*log(x)/(f*m^2)
 + 2*a*b*d*f^m*x^m*log(c)/(f*m) - 2*b^2*d*f^m*n*x^m*log(c)/(f*m^2) + a*b*f^
m*x^(2*m)*e*log(c)/(f*m) - 1/2*b^2*f^m*n*x^(2*m)*e*log(c)/(f*m^2) + a^2*d*f
^m*x^m/(f*m) - 2*a*b*d*f^m*n*x^m/(f*m^2) + 2*b^2*d*f^m*n^2*x^m/(f*m^3) + 1/
```

```
2*a^2*f^m*x^(2*m)*e/(f*m) - 1/2*a*b*f^m*n*x^(2*m)*e/(f*m^2) + 1/4*b^2*f^m*n
^2*x^(2*m)*e/(f*m^3)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^{m-1}\,(d+e\,x^m)\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n))^2,x)
[Out] int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n))^2, x)
```

3.362 $\int (fx)^{-1+m} (a+b\log(cx^n))^2 \, dx$

Optimal. Leaf size=69

$$\frac{2b^2n^2(fx)^m}{fm^3} - \frac{2bn(fx)^m (a+b\log(cx^n))}{fm^2} + \frac{(fx)^m (a+b\log(cx^n))^2}{fm}$$

```
[Out] 2*b^2*n^2*(f*x)^m/f/m^3-2*b*n*(f*x)^m*(a+b*ln(c*x^n))/f/m^2+(f*x)^m*(a+b*ln
(c*x^n))^2/f/m
```

Rubi [A]
time = 0.03, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2342, 2341}

$$-\frac{2bn(fx)^m (a+b\log(cx^n))}{fm^2} + \frac{(fx)^m (a+b\log(cx^n))^2}{fm} + \frac{2b^2n^2(fx)^m}{fm^3}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*b^2*n^2*(f*x)^m)/(f*m^3) - (2*b*n*(f*x)^m*(a + b*Log[c*x^n]))/(f*m^2) +
((f*x)^m*(a + b*Log[c*x^n])^2)/(f*m)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int (fx)^{-1+m} (a+b\log(cx^n))^2 \, dx &= \frac{(fx)^m (a+b\log(cx^n))^2}{fm} - \frac{(2bn)\int (fx)^{-1+m} (a+b\log(cx^n)) \, dx}{m} \\
&= \frac{2b^2n^2(fx)^m}{fm^3} - \frac{2bn(fx)^m (a+b\log(cx^n))}{fm^2} + \frac{(fx)^m (a+b\log(cx^n))^2}{fm}
\end{aligned}$$

Mathematica [A]
time = 0.02, size = 67, normalized size = 0.97

$$\frac{(fx)^m\left(a^2m^2-2abmn+2b^2n^2+2bm(am-bn)\log\left(cx^n\right)+b^2m^2\log^2\left(cx^n\right)\right)}{fm^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] ((f*x)^m*(a^2*m^2 - 2*a*b*m*n + 2*b^2*n^2 + 2*b*m*(a*m - b*n)*Log[c*x^n] +
b^2*m^2*Log[c*x^n]^2))/(f*m^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 1008, normalized size = 14.61

method	result	size
risch	Expression too large to display	1008

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] b^2/m*x*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*
Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*l
n(f)))*ln(x^n)^2+b*(-I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m+I*Pi*b*cs
gn(I*c)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(
I*c*x^n)^3*m+2*b*ln(c)*m+2*a*m-2*b*n)/m^2*x*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*
x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*
f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)+1/4*(4*a^2*m^2+8*ln(c)*a
*b*m^2-8*ln(c)*b^2*m*n+8*b^2*n^2-Pi^2*b^2*m^2*csgn(I*c*x^n)^6-8*a*b*m*n+4*I
*Pi*b^2*m*n*csgn(I*c*x^n)^3-Pi^2*b^2*m^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^2+2*Pi^2*b^2*m^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-Pi^2*b^2*m^2
*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*m^2*csgn(I*c)*csgn(I*c*x^n)^5-Pi^2*
b^2*m^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*m^2*csgn(I*x^n)*csgn(I*c*x
^n)^5-4*I*Pi*ln(c)*b^2*m^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*a*b*m
^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*b^2*m*n*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+4*ln(c)^2*b^2*m^2+4*I*Pi*a*b*m^2*csgn(I*c)*csgn(I*c*x^n)^2+4
*I*Pi*a*b*m^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*b^2*m*n*csgn(I*c)*csgn(I*c
*x^n)^2-4*I*Pi*b^2*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2+2*Pi^2*b^2*m^2*csgn(I*c)
*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2*m^2*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)^4-4*I*Pi*ln(c)*b^2*m^2*csgn(I*c*x^n)^3-4*I*Pi*a*b*m^2*csgn(I*c*x^n)^
3+4*I*Pi*ln(c)*b^2*m^2*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*b^2*m^2*csgn(
I*x^n)*csgn(I*c*x^n)^2)/m^3*x*exp(1/2*(-1+m)*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn
(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)
*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.30, size = 117, normalized size = 1.70

$$-2\left(\frac{f^{m-1}nx^m\log\left(cx^n\right)}{m^2}-\frac{f^{m-1}n^2x^m}{m^3}\right)b^2-\frac{2\,abf^{m-1}nx^m}{m^2}+\frac{\left(fx\right)^m b^2\log\left(cx^n\right)^2}{fm}+\frac{2\left(fx\right)^m ab\log\left(cx^n\right)}{fm}+\frac{\left(fx\right)^m a^2}{fm}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] -2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2 - 2*a*b*f^(
m - 1)*n*x^m/m^2 + (f*x)^m*b^2*log(c*x^n)^2/(f*m) + 2*(f*x)^m*a*b*log(c*x^n
)/(f*m) + (f*x)^m*a^2/(f*m)
```

Fricas [A]
time = 0.35, size = 124, normalized size = 1.80

$$\frac{\left(b^2m^2n^2x\log\left(x\right)^2+b^2m^2x\log\left(c\right)^2+2\left(abm^2-b^2mn\right)x\log\left(c\right)+\left(a^2m^2-2\,abmn+2\,b^2n^2\right)x+2\left(b^2m^2nx\log\left(c\right)+\left(abm^2n-b^2mn^2\right)x\right)\log\left(x\right)\right)e^{\left((m-1)\log(f)+(m-1)\log(x)\right)}}{m^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] (b^2*m^2*n^2*x*log(x)^2 + b^2*m^2*x*log(c)^2 + 2*(a*b*m^2 - b^2*m*n)*x*log(
c) + (a^2*m^2 - 2*a*b*m*n + 2*b^2*n^2)*x + 2*(b^2*m^2*n*x*log(c) + (a*b*m^2
*n - b^2*m*n^2)*x)*log(x))*e^((m - 1)*log(f) + (m - 1)*log(x))/m^3
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 311 vs. 2(63) = 126.
time = 16.34, size = 311, normalized size = 4.51

$$\begin{cases}\tilde{\infty}\left(a^2x-2abnx+2abx\log\left(cx^n\right)+2b^2n^2x-2b^2nx\log\left(cx^n\right)+b^2x\log\left(cx^n\right)^2\right) & \text{for } f=0\wedge m=0\\ 0^{m-1}\left(a^2x-2abnx+2abx\log\left(cx^n\right)+2b^2n^2x-2b^2nx\log\left(cx^n\right)+b^2x\log\left(cx^n\right)^2\right) & \text{for } f=0\\ \frac{\begin{cases}\frac{a^2\log\left(cx^n\right)+ab\log\left(cx^n\right)^2+\frac{b^2\log\left(cx^n\right)^3}{3}}{n} & \text{for } n\neq 0\\ \left(a^2+2ab\log\left(c\right)+b^2\log\left(c\right)^2\right)\log\left(x\right) & \text{otherwise}\end{cases}}{f} & \text{for } m=0\\ \frac{a^2(fx)^m}{fm}+\frac{2ab(fx)^m\log\left(cx^n\right)}{fm}-\frac{2abn(fx)^m}{fm^2}+\frac{b^2(fx)^m\log\left(cx^n\right)^2}{fm}-\frac{2b^2n(fx)^m\log\left(cx^n\right)}{fm^2}+\frac{2b^2n^2(fx)^m}{fm^3} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] Piecewise((zoo*(a**2*x - 2*a*b*n*x + 2*a*b*x*log(c*x**n) + 2*b**2*n**2*x -
2*b**2*n*x*log(c*x**n) + b**2*x*log(c*x**n)**2), Eq(f, 0) & Eq(m, 0)), (0**
(m - 1)*(a**2*x - 2*a*b*n*x + 2*a*b*x*log(c*x**n) + 2*b**2*n**2*x - 2*b**2*
n*x*log(c*x**n) + b**2*x*log(c*x**n)**2), Eq(f, 0)), (Piecewise(((a**2*log(
c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2
```

```
+ 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))/f, Eq(m, 0)), (a**2*(f*x)**
m/(f*m) + 2*a*b*(f*x)**m*log(c*x**n)/(f*m) - 2*a*b*n*(f*x)**m/(f*m**2) + b*
*2*(f*x)**m*log(c*x**n)**2/(f*m) - 2*b**2*n*(f*x)**m*log(c*x**n)/(f*m**2) +
 2*b**2*n**2*(f*x)**m/(f*m**3), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 198 vs. $2(69) = 138$.
time = 4.79, size = 198, normalized size = 2.87

$$\frac{b^2 f^m n^2 x^m \log(x)^2}{fm} + \frac{2\, b^2 f^m n x^m \log(c) \log(x)}{fm} + \frac{b^2 f^m x^m \log(c)^2}{fm} + \frac{2\, abf^m n x^m \log(x)}{fm} - \frac{2\, b^2 f^m n^2 x^m \log(x)}{fm^2} + \frac{2\, abf^m x^m \log(c)}{fm} - \frac{2\, b^2 f^m n x^m \log(c)}{fm^2} + \frac{a^2 f^m x^m}{fm} - \frac{2\, abf^m n x^m}{fm^2} + \frac{2\, b^2 f^m n^2 x^m}{fm^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] b^2*f^m*n^2*x^m*log(x)^2/(f*m) + 2*b^2*f^m*n*x^m*log(c)*log(x)/(f*m) + b^2*
f^m*x^m*log(c)^2/(f*m) + 2*a*b*f^m*n*x^m*log(x)/(f*m) - 2*b^2*f^m*n^2*x^m*l
og(x)/(f*m^2) + 2*a*b*f^m*x^m*log(c)/(f*m) - 2*b^2*f^m*n*x^m*log(c)/(f*m^2)
 + a^2*f^m*x^m/(f*m) - 2*a*b*f^m*n*x^m/(f*m^2) + 2*b^2*f^m*n^2*x^m/(f*m^3)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^{m-1}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(m - 1)*(a + b*log(c*x^n))^2,x)
```

```
[Out] int((f*x)^(m - 1)*(a + b*log(c*x^n))^2, x)
```

3.363 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$

Optimal. Leaf size=129

$$\frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\log\left(1+\frac{ex^m}{d}\right)}{em}+\frac{2bnx^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)\mathrm{Li}_2\left(-\frac{ex^m}{d}\right)}{em^2}-\frac{2b^2n^2x^{1-m}(}{}$$

```
[Out] x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2*ln(1+e*x^m/d)/e/m+2*b*n*x^(1-m)*(f*x
)^(-1+m)*(a+b*ln(c*x^n))*polylog(2,-e*x^m/d)/e/m^2-2*b^2*n^2*x^(1-m)*(f*x)^
(-1+m)*polylog(3,-e*x^m/d)/e/m^3
```

Rubi [A]
time = 0.20, antiderivative size = 129, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$, Rules used = {2377, 2375, 2421, 6724}

$$\frac{2bnx^{1-m}(fx)^{m-1}\mathrm{PolyLog}\left(2,-\frac{ex^m}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{em^2}-\frac{2b^2n^2x^{1-m}(fx)^{m-1}\mathrm{PolyLog}\left(3,-\frac{ex^m}{d}\right)}{em^3}+\frac{x^{1-m}(fx)^{m-1}\log\left(\frac{ex^m}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2}{em}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m),x]
```

```
[Out] (x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2*Log[1 + (e*x^m)/d])/(e*m) +
(2*b*n*x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])*PolyLog[2, -((e*x^m)/d)]
)/(e*m^2) - (2*b^2*n^2*x^(1 - m)*(f*x)^(-1 + m)*PolyLog[3, -((e*x^m)/d)])/(
e*m^3)
```

Rule 2375

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Dist[b*f^m*n*(p/(e*r)), Int[Log[1 + e*(x^r/d)]*((a + b
*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &&
 EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
```

```
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{d+ex^m}\,dx = \left(x^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log\left(cx^n\right))^2}{d+ex^m}\,dx$$

$$= \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\log\left(1+\frac{ex^m}{d}\right)}{em} - \frac{(2bnx^{1-m}(fx)^{-1+m})}{}$$

$$= \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\log\left(1+\frac{ex^m}{d}\right)}{em} + \frac{2bnx^{1-m}(fx)^{-1+m}\,(a}{}$$

$$= \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2\log\left(1+\frac{ex^m}{d}\right)}{em} + \frac{2bnx^{1-m}(fx)^{-1+m}\,(a}{}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 502 vs. 2(129) = 258.
time = 0.15, size = 502, normalized size = 3.89

$$\frac{x^{-m}(fx)^m\left(3a^2m^3\log(x)-6abm^3n\log^2(x)+4b^2m^3n^2\log^3(x)+6abm^3\log(x)\log\left(cx^n\right)-6b^2m^3n\log^2(x)\log\left(cx^n\right)+3b^2m^3\log(x)\log^2\left(cx^n\right)+3b^2m^2n^2\log^2(x)\log\left(1+\frac{dx^{-m}}{e}\right)+3a^2m^2\log\left(d-dx^m\right)-6abm^2n\log(x)\log\left(d-dx^m\right)+3b^2m^2n^2\log^2(x)\log\left(d-dx^m\right)+6abm^2\log\left(cx^n\right)\log\left(d-dx^m\right)-6b^2m^2n\log(x)\log\left(cx^n\right)\log\left(d-dx^m\right)+3b^2m^2\log^2\left(cx^n\right)\log\left(d-dx^m\right)+6abm^2n\log(x)\log\left(d+ex^m\right)-6b^2m^2n^2\log^2(x)\log\left(d+ex^m\right)-6abmn\log\left(-\frac{ex^m}{d}\right)\log\left(d+ex^m\right)+6b^2mn^2\log(x)\log\left(-\frac{ex^m}{d}\right)\log\left(d+ex^m\right)+6b^2m^2n\log(x)\log\left(cx^n\right)\log\left(d+ex^m\right)-6b^2mn\log\left(-\frac{ex^m}{d}\right)\log\left(cx^n\right)\log\left(d+ex^m\right)-6b^2mn^2\log(x)\text{Li}_2\left(-\frac{dx^{-m}}{e}\right)-6bmn\left(a-bn\log(x)+b\log\left(cx^n\right)\right)\text{Li}_2\left(1+\frac{ex^m}{d}\right)-6b^2n^2\text{Li}_3\left(-\frac{dx^{-m}}{e}\right)\right)}{3efm^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m),x]
```

```
[Out] ((f*x)^m*(3*a^2*m^3*Log[x] - 6*a*b*m^3*n*Log[x]^2 + 4*b^2*m^3*n^2*Log[x]^3
+ 6*a*b*m^3*Log[x]*Log[c*x^n] - 6*b^2*m^3*n*Log[x]^2*Log[c*x^n] + 3*b^2*m^3
*Log[x]*Log[c*x^n]^2 + 3*b^2*m^2*n^2*Log[x]^2*Log[1 + d/(e*x^m)] + 3*a^2*m^
2*Log[d - d*x^m] - 6*a*b*m^2*n*Log[x]*Log[d - d*x^m] + 3*b^2*m^2*n^2*Log[x]
^2*Log[d - d*x^m] + 6*a*b*m^2*Log[c*x^n]*Log[d - d*x^m] - 6*b^2*m^2*n*Log[x
]*Log[c*x^n]*Log[d - d*x^m] + 3*b^2*m^2*Log[c*x^n]^2*Log[d - d*x^m] + 6*a*b
*m^2*n*Log[x]*Log[d + e*x^m] - 6*b^2*m^2*n^2*Log[x]^2*Log[d + e*x^m] - 6*a*
b*m*n*Log[-((e*x^m)/d)]*Log[d + e*x^m] + 6*b^2*m*n^2*Log[x]*Log[-((e*x^m)/d
)]*Log[d + e*x^m] + 6*b^2*m^2*n*Log[x]*Log[c*x^n]*Log[d + e*x^m] - 6*b^2*m*
n*Log[-((e*x^m)/d)]*Log[c*x^n]*Log[d + e*x^m] - 6*b^2*m*n^2*Log[x]*PolyLog[
2, -(d/(e*x^m))] - 6*b*m*n*(a - b*n*Log[x] + b*Log[c*x^n])*PolyLog[2, 1 + (
e*x^m)/d] - 6*b^2*n^2*PolyLog[3, -(d/(e*x^m))]))/(3*e*f*m^3*x^m)
```

Maple [F]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m} (a+b\ln(c\,x^n))^2}{d+e\,x^m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m),x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="maxima")
```

```
[Out] a^2*f^(m - 1)*e^(-1)*log((d + e^(m*log(x) + 1))*e^(-1))/m + integrate((b^2*
f^m*x^m*log(x^n)^2 + 2*(b^2*f^m*log(c) + a*b*f^m)*x^m*log(x^n) + (b^2*f^m*l
og(c)^2 + 2*a*b*f^m*log(c))*x^m)/(d*f*x + f*x*e^(m*log(x) + 1)), x)
```

Fricas [A]
time = 0.43, size = 181, normalized size = 1.40

$$-\frac{\left(2\,b^2 f^{m-1} n^2 \mathrm{polylog}\left(3, -\frac{x^m e}{d}\right) - 2\left(b^2 m n^2 \log(x) + b^2 m n \log(c) + abmn\right) f^{m-1} \mathrm{Li}_2\left(-\frac{x^m e+d}{d}+1\right) - \left(b^2 m^2 \log(c)^2 + 2\,abm^2 \log(c) + a^2 m^2\right) f^{m-1} \log(x^m e + d) - \left(b^2 m^2 n^2 \log(x)^2 + 2\left(b^2 m^2 n \log(c) + abm^2 n\right)\log(x)\right) f^{m-1} \log\left(\frac{x^m e+d}{d}\right)\right) e^{(-1)}}{m^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="fricas")
```

```
[Out] -(2*b^2*f^(m - 1)*n^2*polylog(3, -x^m*e/d) - 2*(b^2*m*n^2*log(x) + b^2*m*n*
log(c) + a*b*m*n)*f^(m - 1)*dilog(-(x^m*e + d)/d + 1) - (b^2*m^2*log(c)^2 +
 2*a*b*m^2*log(c) + a^2*m^2)*f^(m - 1)*log(x^m*e + d) - (b^2*m^2*n^2*log(x)
^2 + 2*(b^2*m^2*n*log(c) + a*b*m^2*n)*log(x))*f^(m - 1)*log((x^m*e + d)/d))
*e^(-1)/m^3
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{m-1} (a+b\log(cx^n))^2}{d+ex^m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m),x)
```

```
[Out] Integral((f*x)**(m - 1)*(a + b*log(c*x**n))**2/(d + e*x**m), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(x^m*e + d), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(f\,x)^{m-1}\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{d+e\,x^m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m),x)
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m), x)
```

3.364 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$

Optimal. Leaf size=138

$$-\frac{x^{1-m}(fx)^{-1+m}\,(a+b\log{(cx^n)})^2}{em\,(d+ex^m)}-\frac{2bnx^{1-m}(fx)^{-1+m}\,(a+b\log{(cx^n)})\log\left(1+\frac{dx^{-m}}{e}\right)}{dem^2}+\frac{2b^2n^2x^{1-m}(fx)^{-1+m}}{dem^3}$$

```
[Out] -x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)-2*b*n*x^(1-m)*(f*x)^(
-1+m)*(a+b*ln(c*x^n))*ln(1+d/e/(x^m))/d/e/m^2+2*b^2*n^2*x^(1-m)*(f*x)^(-1+m
)*polylog(2,-d/e/(x^m))/d/e/m^3
```

Rubi [A]
time = 0.22, antiderivative size = 138, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$, Rules used = {2377, 2376, 2379, 2438}

$$\frac{2b^2n^2x^{1-m}(fx)^{m-1}\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dem^3}-\frac{2bnx^{1-m}(fx)^{m-1}\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log{(cx^n)})}{dem^2}-\frac{x^{1-m}(fx)^{m-1}(a+b\log{(cx^n)})^2}{em\,(d+ex^m)}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^2,x]
```

```
[Out] -((x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(e*m*(d + e*x^m))) - (2*b
*n*x^(1 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*e*m^2
) + (2*b^2*n^2*x^(1 - m)*(f*x)^(-1 + m)*PolyLog[2, -(d/(e*x^m))])/(d*e*m^3)
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
```

```
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx &= \left(x^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{em(d+ex^m)} + \frac{\left(2bnx^{1-m}(fx)^{-1+m}\right)\int \frac{a+b\log(cx^n)}{x(d+ex^m)}}{em}\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{em(d+ex^m)} - \frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n}{dem^2}\\ &= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{em(d+ex^m)} - \frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n}{dem^2}\end{aligned}$$

Mathematica [A]
time = 0.28, size = 157, normalized size = 1.14

$$\frac{x^{-m}(fx)^m\left(-\frac{m^2(a+b\log(cx^n))^2}{d+ex^m}-\frac{2abmn\log(d-dx^m)}{d}+\frac{2b^2mn(n\log(x)-\log(cx^n))\log(d-dx^m)}{d}+\frac{2b^2n^2\left(\frac{1}{2}m^2\log^2(x)+\left(-m\log(x)+\log\left(-\frac{ex^m}{d}\right)\right)\log(d+ex^m)+\mathrm{Li}_2\left(1+\frac{ex^m}{d}\right)\right)}{d}\right)}{efm^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^2,x]
```

```
[Out] ((f*x)^m*(-((m^2*(a + b*Log[c*x^n])^2)/(d + e*x^m)) - (2*a*b*m*n*Log[d - d*
x^m])/d + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d + (2*b^2*n^2
*((m^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^m] + Pol
yLog[2, 1 + (e*x^m)/d]))/d))/(e*f*m^3*x^m)
```

Maple [F]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m}(a+b\ln(c\,x^n))^2}{(d+e\,x^m)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m)^2,x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m)^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="maxima"
)
```

```
[Out] 2*a*b*f^m*n*((m*log(x) + 2)*e^(-1)/(d*f*m^2) - e^(-1)*log(d*e + e^(m*log(x)
 + 2))/(d*f*m^2)) - (f^m*log(x^n)^2/(d*f*m*e + f*m*e^(m*log(x) + 2)) - inte
grate((f^m*m*e^(m*log(x) + 1)*log(c)^2 + 2*(d*f^m*n + (f^m*m*log(c) + f^m*n
)*e^(m*log(x) + 1))*log(x^n))/(d^2*f*m*x*e + 2*d*f*m*x*e^(m*log(x) + 2) + f
*m*x*e^(2*m*log(x) + 3)), x))*b^2 - 2*a*b*f^m*log(c*x^n)/(d*f*m*e + f*m*e^(
m*log(x) + 2)) - a^2*f^m/(d*f*m*e + f*m*e^(m*log(x) + 2))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 276 vs. $2(133) = 266$.
time = 0.37, size = 276, normalized size = 2.00

$$\frac{\left(b^2m^2n^2e\log\left(x\right)^2+2\left(b^2m^2ne\log\left(c\right)+abm^2ne\right)\log\left(x\right)\right)f^{m-1}x^m-\left(b^2dm^2\log\left(c\right)^2+2\,abdm^2\log\left(c\right)+a^2dm^2\right)f^{m-1}-2\left(b^2f^{m-1}n^2x^me+b^2df^{m-1}n^2\right)\mathrm{Li}_2\left(-\frac{x^me+d}{d}+1\right)-2\left(\left(b^2mne\log\left(c\right)+abmne\right)f^{m-1}x^m+\left(b^2dmn\log\left(c\right)+abdmn\right)f^{m-1}\right)\log\left(x^me+d\right)-2\left(b^2f^{m-1}mn^2x^me\log\left(x\right)+b^2df^{m-1}mn^2\log\left(x\right)\right)\log\left(\frac{x^me+d}{d}\right)}{dm^3x^me^2+d^2m^3e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="fricas"
)
```

```
[Out] ((b^2*m^2*n^2*e*log(x)^2 + 2*(b^2*m^2*n*e*log(c) + a*b*m^2*n*e)*log(x))*f^(
m - 1)*x^m - (b^2*d*m^2*log(c)^2 + 2*a*b*d*m^2*log(c) + a^2*d*m^2)*f^(m - 1
) - 2*(b^2*f^(m - 1)*n^2*x^m*e + b^2*d*f^(m - 1)*n^2)*dilog(-(x^m*e + d)/d
+ 1) - 2*((b^2*m*n*e*log(c) + a*b*m*n*e)*f^(m - 1)*x^m + (b^2*d*m*n*log(c)
+ a*b*d*m*n)*f^(m - 1))*log(x^m*e + d) - 2*(b^2*f^(m - 1)*m*n^2*x^m*e*log(x
) + b^2*d*f^(m - 1)*m*n^2*log(x))*log((x^m*e + d)/d))/(d*m^3*x^m*e^2 + d^2*
m^3*e)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**2,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(x^m*e + d)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^2,x)
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^2, x)
```

3.365 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$

Optimal. Leaf size=214

$$-\frac{bnx(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{d^2m^2\left(d+ex^m\right)}-\frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{2em\left(d+ex^m\right)^2}-\frac{bnx^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)\log\left(1\right.}{d^2em^2}$$

```
[Out] -b*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d^2/m^2/(d+e*x^m)-1/2*x^(1-m)*(f*x)^(-1
+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)^2-b*n*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^
n))*ln(1+d/e/(x^m))/d^2/e/m^2+b^2*n^2*x^(1-m)*(f*x)^(-1+m)*ln(d+e*x^m)/d^2/
e/m^3+b^2*n^2*x^(1-m)*(f*x)^(-1+m)*polylog(2,-d/e/(x^m))/d^2/e/m^3
```

Rubi [A]
time = 0.34, antiderivative size = 214, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.241$, Rules used = {2377, 2376, 2391, 2379, 2438, 2373, 266}

$$\frac{b^2n^2x^{1-m}(fx)^{m-1}\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{d^2em^3}-\frac{bnx^{1-m}(fx)^{m-1}\log\left(\frac{dx^{-m}}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^2em^2}-\frac{bnx(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)}{d^2m^2\left(d+ex^m\right)}-\frac{x^{1-m}(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)^2}{2em\left(d+ex^m\right)^2}+\frac{b^2n^2x^{1-m}(fx)^{m-1}\log\left(d+ex^m\right)}{d^2em^3}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^3,x]
```

```
[Out] -((b*n*x*(f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d^2*m^2*(d + e*x^m))) - (x^(1
- m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(2*e*m*(d + e*x^m)^2) - (b*n*x^(1
 - m)*(f*x)^(-1 + m)*(a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d^2*e*m^2) + (
b^2*n^2*x^(1 - m)*(f*x)^(-1 + m)*Log[d + e*x^m])/(d^2*e*m^3) + (b^2*n^2*x^(
1 - m)*(f*x)^(-1 + m)*PolyLog[2, -(d/(e*x^m))])/(d^2*e*m^3)
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
```

```
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{\left(d+ex^m\right)^3}\,dx = \left(x^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{\left(d+ex^m\right)^3}\,dx$$

$$= -\frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{2em\left(d+ex^m\right)^2} + \frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\int \frac{a+b\log(cx^n)}{x(d+ex^m)^2}\,dx}{em}$$

$$= -\frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{2em\left(d+ex^m\right)^2} - \frac{\left(bnx^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log(}{(d+ex^m)^2}}{dm}$$

$$= -\frac{bnx(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{d^2m^2\left(d+ex^m\right)} - \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{2em\left(d+ex^m\right)^2} - \frac{b}{}$$

$$= -\frac{bnx(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{d^2m^2\left(d+ex^m\right)} - \frac{x^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)^2}{2em\left(d+ex^m\right)^2} - \frac{b}{}$$

Mathematica [A]
time = 0.22, size = 207, normalized size = 0.97

$$\frac{x^{-m}(fx)^m\left(\frac{2bmn(a+b\log(cx^n))}{d(d+ex^m)}-\frac{m^2(a+b\log(cx^n))^2}{(d+ex^m)^2}-\frac{2abmn\log(d-dx^m)}{d^2}+\frac{2b^2n^2\log(d-dx^m)}{d^2}+\frac{2b^2mn(n\log(x)-\log(cx^n))\log(d-dx^m)}{d^2}+\frac{2b^2n^2\left(\frac{1}{2}m^2\log^2(x)+\left(-m\log(x)+\log\left(-\frac{ex^m}{d}\right)\right)\log(d+ex^m)+\mathrm{Li}_2\left(1+\frac{ex^m}{d}\right)\right)}{d^2}\right)}{2efm^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^3,x]
```

```
[Out] ((f*x)^m*((2*b*m*n*(a + b*Log[c*x^n]))/(d*(d + e*x^m)) - (m^2*(a + b*Log[c*
x^n])^2)/(d + e*x^m)^2 - (2*a*b*m*n*Log[d - d*x^m])/d^2 + (2*b^2*n^2*Log[d
- d*x^m])/d^2 + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d^2 + (2
*b^2*n^2*((m^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^
m] + PolyLog[2, 1 + (e*x^m)/d]))/d^2))/(2*e*f*m^3*x^m)
```

Maple [F]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m}\left(a+b\ln\left(c\,x^n\right)\right)^2}{\left(d+e\,x^m\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m)^3,x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m)^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="maxima"
)
```

```
[Out] a*b*f^m*n*(1/((d^2*f*m*e + d*f*m*e^(m*log(x) + 2))*m) + (m*log(x) + 2)*e^(-
1)/(d^2*f*m^2) - e^(-1)*log(d*e + e^(m*log(x) + 2))/(d^2*f*m^2)) - 1/2*(f^m
*log(x^n)^2/(d^2*f*m*e + 2*d*f*m*e^(m*log(x) + 2) + f*m*e^(2*m*log(x) + 3))
 - 2*integrate((f^m*m*e^(m*log(x) + 1)*log(c)^2 + (d*f^m*n + (2*f^m*m*log(c
) + f^m*n)*e^(m*log(x) + 1))*log(x^n))/(d^3*f*m*x*e + 3*d^2*f*m*x*e^(m*log(
x) + 2) + 3*d*f*m*x*e^(2*m*log(x) + 3) + f*m*x*e^(3*m*log(x) + 4)), x))*b^2
 - a*b*f^m*log(c*x^n)/(d^2*f*m*e + 2*d*f*m*e^(m*log(x) + 2) + f*m*e^(2*m*lo
g(x) + 3)) - 1/2*a^2*f^m/(d^2*f*m*e + 2*d*f*m*e^(m*log(x) + 2) + f*m*e^(2*m
*log(x) + 3))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 539 vs. $2(208) = 416$.
time = 0.37, size = 539, normalized size = 2.52

$$\frac{\left(b^2m^2n^2e^2\log\left(x\right)^2+2\left(b^2m^2ne^2\log\left(c\right)+\left(abm^2n-b^2mn^2\right)e^2\right)\log\left(x\right)\right)f^{m-1}x^{2m}+2\left(b^2dm^2n^2e\log\left(x\right)^2+b^2dmne\log\left(c\right)+abdmne+\left(2b^2dm^2ne\log\left(c\right)+\left(2abdm^2n-b^2dmn^2\right)e\right)\log\left(x\right)\right)f^{m-1}x^m-\left(b^2d^2m^2\log\left(c\right)^2+a^2d^2m^2-2abd^2mn+2\left(abd^2m^2-b^2d^2mn\right)\log\left(c\right)\right)f^{m-1}-2\left(2b^2df^{m-1}n^2x^me+b^2d^2f^{m-1}n^2+b^2f^{m-1}n^2x^{2m}e^2\right){\rm Li}_2\left(-\frac{x^me+d}{d}+1\right)-2\left(\left(b^2mne^2\log\left(c\right)+\left(abmn-b^2n^2\right)e^2\right)f^{m-1}x^{2m}+2\left(b^2dmne\log\left(c\right)+\left(abdmn-b^2dn^2\right)e\right)f^{m-1}x^m+\left(b^2d^2mn\log\left(c\right)+abd^2mn-b^2d^2n^2\right)f^{m-1}\right)\log\left(x^me+d\right)-2\left(2b^2df^{m-1}mn^2x^me\log\left(x\right)+b^2d^2f^{m-1}mn^2\log\left(x\right)+b^2f^{m-1}mn^2x^{2m}e^2\log\left(x\right)\right)\log\left(\frac{x^me+d}{d}\right)}{2\left(2d^3m^3x^me^2+d^4m^3e+d^2m^3x^{2m}e^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="fricas"
)
```

```
[Out] 1/2*((b^2*m^2*n^2*e^2*log(x)^2 + 2*(b^2*m^2*n*e^2*log(c) + (a*b*m^2*n - b^2
*m*n^2)*e^2)*log(x))*f^(m - 1)*x^(2*m) + 2*(b^2*d*m^2*n^2*e*log(x)^2 + b^2*
d*m*n*e*log(c) + a*b*d*m*n*e + (2*b^2*d*m^2*n*e*log(c) + (2*a*b*d*m^2*n - b
^2*d*m*n^2)*e)*log(x))*f^(m - 1)*x^m - (b^2*d^2*m^2*log(c)^2 + a^2*d^2*m^2
- 2*a*b*d^2*m*n + 2*(a*b*d^2*m^2 - b^2*d^2*m*n)*log(c))*f^(m - 1) - 2*(2*b^
2*d*f^(m - 1)*n^2*x^m*e + b^2*d^2*f^(m - 1)*n^2 + b^2*f^(m - 1)*n^2*x^(2*m)
*e^2)*dilog(-(x^m*e + d)/d + 1) - 2*((b^2*m*n*e^2*log(c) + (a*b*m*n - b^2*n
^2)*e^2)*f^(m - 1)*x^(2*m) + 2*(b^2*d*m*n*e*log(c) + (a*b*d*m*n - b^2*d*n^2
)*e)*f^(m - 1)*x^m + (b^2*d^2*m*n*log(c) + a*b*d^2*m*n - b^2*d^2*n^2)*f^(m
- 1))*log(x^m*e + d) - 2*(2*b^2*d*f^(m - 1)*m*n^2*x^m*e*log(x) + b^2*d^2*f^
(m - 1)*m*n^2*log(x) + b^2*f^(m - 1)*m*n^2*x^(2*m)*e^2*log(x))*log((x^m*e +
 d)/d))/(2*d^3*m^3*x^m*e^2 + d^4*m^3*e + d^2*m^3*x^(2*m)*e^3)
```

Sympy [F(-1)] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**3,x)
```

```
[Out] Timed out
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(x^m*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(f\,x)^{m-1}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{\left(d+e\,x^m\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^3,x)
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^3, x)
```

3.366 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$

Optimal. Leaf size=346

$$-\frac{b^2n^2x^{1-m}(fx)^{-1+m}}{3d^2em^3\left(d+ex^m\right)}-\frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(x)}{3d^3em^2}+\frac{bnx^{1-m}(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{3dem^2\left(d+ex^m\right)^2}-\frac{2bnx(fx)^{-1+m}\left(a+\right.}{3d^3m^2\left(d+\right.}$$

```
[Out] -1/3*b^2*n^2*x^(1-m)*(f*x)^(-1+m)/d^2/e/m^3/(d+e*x^m)-1/3*b^2*n^2*x^(1-m)*(
f*x)^(-1+m)*ln(x)/d^3/e/m^2+1/3*b*n*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d/
e/m^2/(d+e*x^m)^2-2/3*b*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d^3/m^2/(d+e*x^m)-
1/3*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)^3-2/3*b*n*x^(1-m)*
(f*x)^(-1+m)*(a+b*ln(c*x^n))*ln(1+d/e/(x^m))/d^3/e/m^2+b^2*n^2*x^(1-m)*(f*x
)^(-1+m)*ln(d+e*x^m)/d^3/e/m^3+2/3*b^2*n^2*x^(1-m)*(f*x)^(-1+m)*polylog(2,-
d/e/(x^m))/d^3/e/m^3
```

Rubi [A]

time = 0.47, antiderivative size = 346, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.310$, Rules used = {2377, 2376, 2391, 2379, 2438, 2373, 266, 272, 46}

$$\frac{2b^2n^2x^{1-m}(fx)^{m-1}\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{3d^3em^3}-\frac{2bnx^{1-m}(fx)^{m-1}\log\left(\frac{dx^{-m}}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{3d^3em^2}-\frac{2bnx(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)}{3d^3m^2\left(d+ex^m\right)}+\frac{bnx^{1-m}(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)}{3dem^2\left(d+ex^m\right)^2}-\frac{x^{1-m}(fx)^{m-1}\left(a+b\log\left(cx^n\right)\right)^2}{3em\left(d+ex^m\right)^3}+\frac{b^2n^2x^{1-m}(fx)^{m-1}\log\left(d+ex^m\right)}{d^3em^3}-\frac{b^2n^2x^{1-m}\log(x)(fx)^{m-1}}{3d^3em^2}-\frac{b^2n^2x^{1-m}(fx)^{m-1}}{3d^2em^3\left(d+ex^m\right)}$$

Antiderivative was successfully verified.

```
[In] Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^4,x]
```

```
[Out] -1/3*(b^2*n^2*x^(1 - m)*(f*x)^(-1 + m))/(d^2*e*m^3*(d + e*x^m)) - (b^2*n^2*
x^(1 - m)*(f*x)^(-1 + m)*Log[x])/(3*d^3*e*m^2) + (b*n*x^(1 - m)*(f*x)^(-1 +
 m)*(a + b*Log[c*x^n]))/(3*d*e*m^2*(d + e*x^m)^2) - (2*b*n*x*(f*x)^(-1 + m)
*(a + b*Log[c*x^n]))/(3*d^3*m^2*(d + e*x^m)) - (x^(1 - m)*(f*x)^(-1 + m)*(a
 + b*Log[c*x^n])^2)/(3*e*m*(d + e*x^m)^3) - (2*b*n*x^(1 - m)*(f*x)^(-1 + m)
*(a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(3*d^3*e*m^2) + (b^2*n^2*x^(1 - m)*
(f*x)^(-1 + m)*Log[d + e*x^m])/(d^3*e*m^3) + (2*b^2*n^2*x^(1 - m)*(f*x)^(-1
 + m)*PolyLog[2, -(d/(e*x^m))])/(3*d^3*e*m^3)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2377

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Dist[(f*x)^m/x^m, Int[x^m*(d + e*x^r)^q
*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \left(x^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$$

$$= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{3em(d+ex^m)^3} + \frac{\left(2bnx^{1-m}(fx)^{-1+m}\right)\int \frac{a+b\log(cx^n)}{x(d+ex^m)^3}}{3em}$$

$$= -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{3em(d+ex^m)^3} - \frac{\left(2bnx^{1-m}(fx)^{-1+m}\right)\int \frac{x^{-1+m}(a+b\log}{(d+ex^m}}{3dm}$$

$$= \frac{bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3dem^2(d+ex^m)^2} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{3em(d+ex^m)^3}$$

$$= \frac{bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3dem^2(d+ex^m)^2} - \frac{2bnx(fx)^{-1+m}(a+b\log(cx^n))}{3d^3m^2(d+ex^m)} -$$

$$= \frac{bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3dem^2(d+ex^m)^2} - \frac{2bnx(fx)^{-1+m}(a+b\log(cx^n))}{3d^3m^2(d+ex^m)} -$$

$$= -\frac{b^2n^2x^{1-m}(fx)^{-1+m}}{3d^2em^3(d+ex^m)} - \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(x)}{3d^3em^2} + \frac{bnx^{1-m}(fx)^{-1+m}}{3dem^2(d}$$

Mathematica [A]
time = 0.33, size = 240, normalized size = 0.69

$$\frac{x^{-m}(fx)^m\left(\frac{bmn(a+b\log(cx^n))}{d(d+ex^m)^2} - \frac{m^2(a+b\log(cx^n))^2}{(d+ex^m)^3} + \frac{bn(2am-bn+2bm\log(cx^n))}{d^2(d+ex^m)} - \frac{2abmn\log(d-dx^m)}{d^3} + \frac{3b^2n^2\log(d-dx^m)}{d^3} + \frac{2b^2mn(n\log(x)-\log(cx^n))\log(d-dx^m)}{d^3} + \frac{2b^2n^2\left(\frac{1}{2}m^2\log^2(x)+\left(-m\log(x)+\log\left(-\frac{ex^m}{d}\right)\right)\log(d+ex^m)+\text{Li}_2\left(1+\frac{ex^m}{d}\right)\right)}{d^3}\right)}{3efm^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^4,x]
```

```
[Out] ((f*x)^m*((b*m*n*(a + b*Log[c*x^n]))/(d*(d + e*x^m)^2) - (m^2*(a + b*Log[c*
x^n])^2)/(d + e*x^m)^3 + (b*n*(2*a*m - b*n + 2*b*m*Log[c*x^n]))/(d^2*(d + e
*x^m)) - (2*a*b*m*n*Log[d - d*x^m])/d^3 + (3*b^2*n^2*Log[d - d*x^m])/d^3 +
(2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d^3 + (2*b^2*n^2*((m^2*L
og[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^m] + PolyLog[2,
1 + (e*x^m)/d]))/d^3))/(3*e*f*m^3*x^m)
```

Maple [F]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{(fx)^{-1+m} (a+b\ln (c\,x^n))^2}{(d+e\,x^m)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m)^4,x)
```

```
[Out] int((f*x)^(-1+m)*(a+b*ln(c*x^n))^2/(d+e*x^m)^4,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="maxima"
)
```

```
[Out] 1/3*a*b*f^m*n*((3*d*e + 2*e^(m*log(x) + 2))/((d^4*f*m*e^2 + 2*d^3*f*m*e^(m*
log(x) + 3) + d^2*f*m*e^(2*m*log(x) + 4))*m) + 2*(m*log(x) + 2)*e^(-1)/(d^3
*f*m^2) - 2*e^(-1)*log(d*e + e^(m*log(x) + 2))/(d^3*f*m^2)) - 1/3*(f^m*log(
x^n)^2/(d^3*f*m*e + 3*d^2*f*m*e^(m*log(x) + 2) + 3*d*f*m*e^(2*m*log(x) + 3)
 + f*m*e^(3*m*log(x) + 4)) - 3*integrate(1/3*(3*f^m*m*e^(m*log(x) + 1)*log(
c)^2 + 2*(d*f^m*n + (3*f^m*m*log(c) + f^m*n)*e^(m*log(x) + 1))*log(x^n))/(d
^4*f*m*x*e + 4*d^3*f*m*x*e^(m*log(x) + 2) + 6*d^2*f*m*x*e^(2*m*log(x) + 3)
+ 4*d*f*m*x*e^(3*m*log(x) + 4) + f*m*x*e^(4*m*log(x) + 5)), x))*b^2 - 2/3*a
*b*f^m*log(c*x^n)/(d^3*f*m*e + 3*d^2*f*m*e^(m*log(x) + 2) + 3*d*f*m*e^(2*m*
log(x) + 3) + f*m*e^(3*m*log(x) + 4)) - 1/3*a^2*f^m/(d^3*f*m*e + 3*d^2*f*m*
e^(m*log(x) + 2) + 3*d*f*m*e^(2*m*log(x) + 3) + f*m*e^(3*m*log(x) + 4))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 802 vs. $2(327) = 654$.
time = 0.38, size = 802, normalized size = 2.32

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="fricas"
)
```

```
[Out] 1/3*((b^2*m^2*n^2*e^3*log(x)^2 + (2*b^2*m^2*n*e^3*log(c) + (2*a*b*m^2*n - 3
*b^2*m*n^2)*e^3)*log(x))*f^(m - 1)*x^(3*m) + (3*b^2*d*m^2*n^2*e^2*log(x)^2
+ 2*b^2*d*m*n*e^2*log(c) + (2*a*b*d*m*n - b^2*d*n^2)*e^2 + (6*b^2*d*m^2*n*e
```

```
^2*log(c) + (6*a*b*d*m^2*n - 7*b^2*d*m*n^2)*e^2)*log(x))*f^(m - 1)*x^(2*m)
+ (3*b^2*d^2*m^2*n^2*e*log(x)^2 + 5*b^2*d^2*m*n*e*log(c) + (5*a*b*d^2*m*n -
 2*b^2*d^2*n^2)*e + 2*(3*b^2*d^2*m^2*n*e*log(c) + (3*a*b*d^2*m^2*n - 2*b^2*
d^2*m*n^2)*e)*log(x))*f^(m - 1)*x^m - (b^2*d^3*m^2*log(c)^2 + a^2*d^3*m^2 -
 3*a*b*d^3*m*n + b^2*d^3*n^2 + (2*a*b*d^3*m^2 - 3*b^2*d^3*m*n)*log(c))*f^(m
 - 1) - 2*(3*b^2*d^2*f^(m - 1)*n^2*x^m*e + b^2*d^3*f^(m - 1)*n^2 + 3*b^2*d*
f^(m - 1)*n^2*x^(2*m)*e^2 + b^2*f^(m - 1)*n^2*x^(3*m)*e^3)*dilog(-(x^m*e +
d)/d + 1) - ((2*b^2*m*n*e^3*log(c) + (2*a*b*m*n - 3*b^2*n^2)*e^3)*f^(m - 1)
*x^(3*m) + 3*(2*b^2*d*m*n*e^2*log(c) + (2*a*b*d*m*n - 3*b^2*d*n^2)*e^2)*f^(
m - 1)*x^(2*m) + 3*(2*b^2*d^2*m*n*e*log(c) + (2*a*b*d^2*m*n - 3*b^2*d^2*n^2
)*e)*f^(m - 1)*x^m + (2*b^2*d^3*m*n*log(c) + 2*a*b*d^3*m*n - 3*b^2*d^3*n^2)
*f^(m - 1))*log(x^m*e + d) - 2*(3*b^2*d^2*f^(m - 1)*m*n^2*x^m*e*log(x) + b^
2*d^3*f^(m - 1)*m*n^2*log(x) + 3*b^2*d*f^(m - 1)*m*n^2*x^(2*m)*e^2*log(x) +
 b^2*f^(m - 1)*m*n^2*x^(3*m)*e^3*log(x))*log((x^m*e + d)/d))/(3*d^5*m^3*x^m
*e^2 + d^6*m^3*e + 3*d^4*m^3*x^(2*m)*e^3 + d^3*m^3*x^(3*m)*e^4)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**4,x)
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(x^m*e + d)^4, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{{\left(f\,x\right)}^{m-1}\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}{{\left(d+e\,x^m\right)}^4} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^4,x)
[Out] int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^4, x)
```

3.367 $\int x^5(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=59

$$-\frac{1}{36}bdnx^6-\frac{benx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

[Out] -1/36*b*d*n*x^6-b*e*n*x^(6+r)/(6+r)^2+1/6*(d*x^6+6*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))

Rubi [A]
time = 0.06, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {14, 2371, 12}

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{36}bdnx^6-\frac{benx^{r+6}}{(r+6)^2}$$

Antiderivative was successfully verified.

[In] Int[x^5*(d + e*x^r)*(a + b*Log[c*x^n]),x]

[Out] -1/36*(b*d*n*x^6) - (b*e*n*x^(6 + r))/(6 + r)^2 + ((d*x^6 + (6*e*x^(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^5(d+ex^r)(a+b\log(cx^n))\,dx = \frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)(a+b\log(cx^n)) - (bn)\int \frac{1}{6}x^5\left(d+\frac{6ex^r}{6+r}\right)dx$$
$$= \frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)(a+b\log(cx^n)) - \frac{1}{6}(bn)\int x^5\left(d+\frac{6ex^r}{6+r}\right)dx$$
$$= \frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)(a+b\log(cx^n)) - \frac{1}{6}(bn)\int \left(dx^5+\frac{6ex^{5+r}}{6+r}\right)dx$$
$$= -\frac{1}{36}bdnx^6 - \frac{benx^{6+r}}{(6+r)^2} + \frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.08, size = 73, normalized size = 1.24

$$\frac{x^6(6a(6+r)(d(6+r)+6ex^r) - bn(d(6+r)^2+36ex^r) + 6b(6+r)(d(6+r)+6ex^r)\log(cx^n))}{36(6+r)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^6*(6*a*(6 + r)*(d*(6 + r) + 6*e*x^r) - b*n*(d*(6 + r)^2 + 36*e*x^r) + 6*
b*(6 + r)*(d*(6 + r) + 6*e*x^r)*Log[c*x^n]))/(36*(6 + r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 613, normalized size = 10.39

method	result
risch	$\frac{b\,x^6(dr+6e\,x^r+6d)\ln(x^n)}{36+6r} - \frac{x^6\left(-216x^r ae+36bdn+36x^r ben-36x^r aer-216ad+12bdnr-72\ln(c)bdr-6\ln(c)bd\,r^2-6ad\,r^2-216db\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*b*x^6*(d*r+6*e*x^r+6*d)/(6+r)*ln(x^n)-1/36*x^6*(-216*x^r*a*e+36*b*d*n+3
6*x^r*b*e*n-36*x^r*a*e*r-216*a*d-3*I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2
-108*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-108*I*Pi*b*e*csgn(I*x^n)*csgn(I
*c*x^n)^2*x^r+12*b*d*n*r-72*ln(c)*b*d*r-6*ln(c)*b*d*r^2-6*a*d*r^2-216*d*b*l
n(c)-36*ln(c)*b*e*x^r*r+108*I*Pi*b*d*csgn(I*c*x^n)^3-72*a*d*r+b*d*n*r^2-216
*ln(c)*b*e*x^r-18*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-18*I*Pi*b*e*csgn
(I*x^n)*csgn(I*c*x^n)^2*x^r*r+36*I*Pi*b*d*csgn(I*c*x^n)^3*r+3*I*Pi*b*d*r^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+36*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)*r+108*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+108*I*Pi*b*
d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n
```

```
)^2-36*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r-36*I*Pi*b*d*csgn(I*x^n)*csgn(I*
c*x^n)^2*r+18*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r-108*I*Pi*b
*d*csgn(I*c)*csgn(I*c*x^n)^2-108*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+3*I*P
i*b*d*r^2*csgn(I*c*x^n)^3+108*I*Pi*b*e*csgn(I*c*x^n)^3*x^r+18*I*Pi*b*e*csgn
(I*c*x^n)^3*x^r*r)/(6+r)^2
```

Maxima [A]
time = 0.29, size = 76, normalized size = 1.29

$$-\frac{1}{36}\,bdnx^6+\frac{1}{6}\,bdx^6\log\left(cx^n\right)+\frac{1}{6}\,adx^6+\frac{bex^{r+6}\log\left(cx^n\right)}{r+6}-\frac{benx^{r+6}}{\left(r+6\right)^2}+\frac{aex^{r+6}}{r+6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*d*n*x^6 + 1/6*b*d*x^6*log(c*x^n) + 1/6*a*d*x^6 + b*e*x^(r + 6)*log(
c*x^n)/(r + 6) - b*e*n*x^(r + 6)/(r + 6)^2 + a*e*x^(r + 6)/(r + 6)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 158 vs. $2(57) = 114$.
time = 0.35, size = 158, normalized size = 2.68

$$\frac{6\,(bdr^2+12\,bdr+36\,bd)x^6\log\left(c\right)+6\,(bdnr^2+12\,bdnr+36\,bdn)x^6\log\left(x\right)-(36\,bdn+(bdn-6\,ad)r^2-216\,ad+12\,(bdn-6\,ad)r)x^6+36\,((br+6\,b)x^6e\log\left(c\right)+(bnr+6\,bn)x^6e\log\left(x\right)-(bn-ar-6\,a)x^6e)x^r}{36\,(r^2+12\,r+36)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/36*(6*(b*d*r^2 + 12*b*d*r + 36*b*d)*x^6*log(c) + 6*(b*d*n*r^2 + 12*b*d*n*
r + 36*b*d*n)*x^6*log(x) - (36*b*d*n + (b*d*n - 6*a*d)*r^2 - 216*a*d + 12*(
b*d*n - 6*a*d)*r)*x^6 + 36*((b*r + 6*b)*x^6*e*log(c) + (b*n*r + 6*b*n)*x^6*
e*log(x) - (b*n - a*r - 6*a)*x^6*e)*x^r)/(r^2 + 12*r + 36)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.
time = 12.55, size = 398, normalized size = 6.75

$$\begin{cases}\frac{6adr^2x^6}{36r^2+432r+1296}+\frac{72adrx^6}{36r^2+432r+1296}+\frac{216adx^6}{36r^2+432r+1296}+\frac{36aerx^6x^r}{36r^2+432r+1296}+\frac{216aex^6x^r}{36r^2+432r+1296}-\frac{bdnr^2x^6}{36r^2+432r+1296}-\frac{12bdnrx^6}{36r^2+432r+1296}-\frac{36bdnx^6}{36r^2+432r+1296}+\frac{6bdr^2x^6\log\left(cx^n\right)}{36r^2+432r+1296}+\frac{72bdrx^6\log\left(cx^n\right)}{36r^2+432r+1296}+\frac{216bdx^6\log\left(cx^n\right)}{36r^2+432r+1296}-\frac{36benx^6x^r}{36r^2+432r+1296}+\frac{36berx^6x^r\log\left(cx^n\right)}{36r^2+432r+1296}+\frac{216bex^6x^r\log\left(cx^n\right)}{36r^2+432r+1296} & \text{for}\: r \neq -6 \\ \frac{adx^6}{6}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^6}{36}+\frac{bdx^6\log\left(cx^n\right)}{6}+\frac{be\log\left(cx^n\right)^2}{2n} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((6*a*d*r**2*x**6/(36*r**2 + 432*r + 1296) + 72*a*d*r*x**6/(36*r**
2 + 432*r + 1296) + 216*a*d*x**6/(36*r**2 + 432*r + 1296) + 36*a*e*r*x**6*x
**r/(36*r**2 + 432*r + 1296) + 216*a*e*x**6*x**r/(36*r**2 + 432*r + 1296) -
 b*d*n*r**2*x**6/(36*r**2 + 432*r + 1296) - 12*b*d*n*r*x**6/(36*r**2 + 432*
r + 1296) - 36*b*d*n*x**6/(36*r**2 + 432*r + 1296) + 6*b*d*r**2*x**6*log(c*
```

```
x**n)/(36*r**2 + 432*r + 1296) + 72*b*d*r*x**6*log(c*x**n)/(36*r**2 + 432*r
 + 1296) + 216*b*d*x**6*log(c*x**n)/(36*r**2 + 432*r + 1296) - 36*b*e*n*x**
6*x**r/(36*r**2 + 432*r + 1296) + 36*b*e*r*x**6*x**r*log(c*x**n)/(36*r**2 +
 432*r + 1296) + 216*b*e*x**6*x**r*log(c*x**n)/(36*r**2 + 432*r + 1296), Ne
(r, -6)), (a*d*x**6/6 + a*e*log(c*x**n)/n - b*d*n*x**6/36 + b*d*x**6*log(c*
x**n)/6 + b*e*log(c*x**n)**2/(2*n), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 137 vs. $2(57) = 114$.
time = 4.28, size = 137, normalized size = 2.32

$$\frac{bnrx^6x^re\log(x)}{r^2+12r+36}+\frac{1}{6}bdnx^6\log(x)+\frac{6bnx^6x^re\log(x)}{r^2+12r+36}-\frac{1}{36}bdnx^6-\frac{bnx^6x^re}{r^2+12r+36}+\frac{1}{6}bdx^6\log(c)+\frac{bx^6x^re\log(c)}{r+6}+\frac{1}{6}adx^6+\frac{ax^6x^re}{r+6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*n*r*x^6*x^r*e*log(x)/(r^2 + 12*r + 36) + 1/6*b*d*n*x^6*log(x) + 6*b*n*x^6
*x^r*e*log(x)/(r^2 + 12*r + 36) - 1/36*b*d*n*x^6 - b*n*x^6*x^r*e/(r^2 + 12*
r + 36) + 1/6*b*d*x^6*log(c) + b*x^6*x^r*e*log(c)/(r + 6) + 1/6*a*d*x^6 + a
*x^6*x^r*e/(r + 6)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^5\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^5*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.368 $\int x^3(d+ex^r)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=59

$$-\frac{1}{16}bdnx^4-\frac{benx^{4+r}}{(4+r)^2}+\frac{1}{4}\left(dx^4+\frac{4ex^{4+r}}{4+r}\right)(a+b\log(cx^n))$$

```
[Out] -1/16*b*d*n*x^4-b*e*n*x^(4+r)/(4+r)^2+1/4*(d*x^4+4*e*x^(4+r)/(4+r))*(a+b*ln
(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.143$, Rules used = {14, 2371, 12}

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{16}bdnx^4-\frac{benx^{r+4}}{(r+4)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d*n*x^4) - (b*e*n*x^(4 + r))/(4 + r)^2 + ((d*x^4 + (4*e*x^(4 + r))
/(4 + r))*(a + b*Log[c*x^n]))/4
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$
\begin{aligned}
\int x^3 (d+e x^r) (a+b \log (c x^n)) \, dx &= \frac{1}{4} \left(d x^4+\frac{4 e x^{4+r}}{4+r}\right) (a+b \log (c x^n))-(b n) \int \frac{1}{4} x^3 \left(d+\frac{4 e x^r}{4+r}\right) \, dx \\
&= \frac{1}{4} \left(d x^4+\frac{4 e x^{4+r}}{4+r}\right) (a+b \log (c x^n))-\frac{1}{4} (b n) \int x^3 \left(d+\frac{4 e x^r}{4+r}\right) \, dx \\
&= \frac{1}{4} \left(d x^4+\frac{4 e x^{4+r}}{4+r}\right) (a+b \log (c x^n))-\frac{1}{4} (b n) \int \left(d x^3+\frac{4 e x^{3+r}}{4+r}\right) \, dx \\
&= -\frac{1}{16} b d n x^4-\frac{b e n x^{4+r}}{(4+r)^2}+\frac{1}{4} \left(d x^4+\frac{4 e x^{4+r}}{4+r}\right) (a+b \log (c x^n))
\end{aligned}
$$

Mathematica [A]
time = 0.07, size = 73, normalized size = 1.24

$$\frac{x^4 (4 a (4+r) (d (4+r)+4 e x^r)-b n (d (4+r)^2+16 e x^r)+4 b (4+r) (d (4+r)+4 e x^r) \log (c x^n))}{16 (4+r)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^4*(4*a*(4 + r)*(d*(4 + r) + 4*e*x^r) - b*n*(d*(4 + r)^2 + 16*e*x^r) + 4*
b*(4 + r)*(d*(4 + r) + 4*e*x^r)*Log[c*x^n]))/(16*(4 + r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 613, normalized size = 10.39

method	result
risch	$\frac{b x^4 (d r+4 e x^r+4 d) \ln(x^n)}{16+4 r}-\frac{x^4 \left(-64 x^r a e+16 b d n+16 x^r b e n-16 x^r a e r-64 a d+8 b d n r-32 \ln(c) b d r-4 \ln(c) b d r^2-4 a d r^2-64 d b \ln(c)\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*b*x^4*(d*r+4*e*x^r+4*d)/(4+r)*ln(x^n)-1/16*x^4*(-64*x^r*a*e+16*b*d*n+16
*x^r*b*e*n-16*x^r*a*e*r-64*a*d-32*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+8*
b*d*n*r-32*ln(c)*b*d*r-4*ln(c)*b*d*r^2-4*a*d*r^2-64*d*b*ln(c)-16*ln(c)*b*e*
x^r*r-32*a*d*r+b*d*n*r^2+2*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-64*ln(c)*b*e*x^r+32*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-8*I*P
i*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-8*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^
2*x^r*r+16*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*r+16*I*Pi*b*d*csgn(
I*c*x^n)^3*r-32*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+32*I*Pi*b*d*csgn(I*c*x^n
)^3-2*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d*r^2*csgn(I*x^n)*csg
n(I*c*x^n)^2-32*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+8*I*Pi*b*e*csgn(I*
```

```
c*x^n)^3*x^r*r-16*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r-16*I*Pi*b*d*csgn(I*x
^n)*csgn(I*c*x^n)^2*r+32*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-32*I*
Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*Pi*b*d*r^2*csgn(I*c*x^n)^3+32*I*Pi*b
*e*csgn(I*c*x^n)^3*x^r+8*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r
)/(4+r)^2
```

Maxima [A]
time = 0.28, size = 76, normalized size = 1.29

$$-\frac{1}{16}\,bdnx^4+\frac{1}{4}\,bdx^4\log\left(cx^n\right)+\frac{1}{4}\,adx^4+\frac{bex^{r+4}\log\left(cx^n\right)}{r+4}-\frac{benx^{r+4}}{\left(r+4\right)^2}+\frac{aex^{r+4}}{r+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*d*n*x^4 + 1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4 + b*e*x^(r + 4)*log(
c*x^n)/(r + 4) - b*e*n*x^(r + 4)/(r + 4)^2 + a*e*x^(r + 4)/(r + 4)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 158 vs. $2(57) = 114$.
time = 0.35, size = 158, normalized size = 2.68

$$\frac{4\left(bdr^2+8\,bdr+16\,bd\right)x^4\log\left(c\right)+4\left(bdnr^2+8\,bdnr+16\,bdn\right)x^4\log\left(x\right)-\left(16\,bdn+\left(bdn-4\,ad\right)r^2-64\,ad+8\left(bdn-4\,ad\right)r\right)x^4+16\left(\left(br+4\,b\right)x^4e\log\left(c\right)+\left(bnr+4\,bn\right)x^4e\log\left(x\right)-\left(bn-ar-4\,a\right)x^4e\right)x^r}{16\left(r^2+8\,r+16\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/16*(4*(b*d*r^2 + 8*b*d*r + 16*b*d)*x^4*log(c) + 4*(b*d*n*r^2 + 8*b*d*n*r
+ 16*b*d*n)*x^4*log(x) - (16*b*d*n + (b*d*n - 4*a*d)*r^2 - 64*a*d + 8*(b*d*
n - 4*a*d)*r)*x^4 + 16*((b*r + 4*b)*x^4*e*log(c) + (b*n*r + 4*b*n)*x^4*e*lo
g(x) - (b*n - a*r - 4*a)*x^4*e)*x^r)/(r^2 + 8*r + 16)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.
time = 3.84, size = 398, normalized size = 6.75

$$\begin{cases}\frac{4adr^2x^4}{16r^2+128r+256}+\frac{32adrx^4}{16r^2+128r+256}+\frac{64adx^4}{16r^2+128r+256}+\frac{16aerx^4x^r}{16r^2+128r+256}+\frac{64aex^4x^r}{16r^2+128r+256}-\frac{bdnr^2x^4}{16r^2+128r+256}-\frac{8bdnrx^4}{16r^2+128r+256}-\frac{16bdnx^4}{16r^2+128r+256}+\frac{4bdr^2x^4\log\left(cx^n\right)}{16r^2+128r+256}+\frac{32bdrx^4\log\left(cx^n\right)}{16r^2+128r+256}+\frac{64bdx^4\log\left(cx^n\right)}{16r^2+128r+256}-\frac{16benx^4x^r}{16r^2+128r+256}+\frac{16berx^4x^r\log\left(cx^n\right)}{16r^2+128r+256}+\frac{64bex^4x^r\log\left(cx^n\right)}{16r^2+128r+256} & \text{for}\ r\neq -4\\ \frac{adx^4}{4}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^4}{16}+\frac{bdx^4\log\left(cx^n\right)}{4}+\frac{be\log\left(cx^n\right)^2}{2n} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((4*a*d*r**2*x**4/(16*r**2 + 128*r + 256) + 32*a*d*r*x**4/(16*r**2
 + 128*r + 256) + 64*a*d*x**4/(16*r**2 + 128*r + 256) + 16*a*e*r*x**4*x**r/
(16*r**2 + 128*r + 256) + 64*a*e*x**4*x**r/(16*r**2 + 128*r + 256) - b*d*n*
r**2*x**4/(16*r**2 + 128*r + 256) - 8*b*d*n*r*x**4/(16*r**2 + 128*r + 256)
- 16*b*d*n*x**4/(16*r**2 + 128*r + 256) + 4*b*d*r**2*x**4*log(c*x**n)/(16*r
```

```
**2 + 128*r + 256) + 32*b*d*r*x**4*log(c*x**n)/(16*r**2 + 128*r + 256) + 64
*b*d*x**4*log(c*x**n)/(16*r**2 + 128*r + 256) - 16*b*e*n*x**4*x**r/(16*r**2
 + 128*r + 256) + 16*b*e*r*x**4*x**r*log(c*x**n)/(16*r**2 + 128*r + 256) +
64*b*e*x**4*x**r*log(c*x**n)/(16*r**2 + 128*r + 256), Ne(r, -4)), (a*d*x**4
/4 + a*e*log(c*x**n)/n - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 + b*e*log(c
*x**n)**2/(2*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 137 vs. 2(57) = 114.
time = 3.32, size = 137, normalized size = 2.32

$$\frac{bnrx^4x^re\log(x)}{r^2+8r+16}+\frac{1}{4}bdnx^4\log(x)+\frac{4\,bnx^4x^re\log(x)}{r^2+8r+16}-\frac{1}{16}bdnx^4-\frac{bnx^4x^re}{r^2+8r+16}+\frac{1}{4}bdx^4\log(c)+\frac{bx^4x^re\log(c)}{r+4}+\frac{1}{4}adx^4+\frac{ax^4x^re}{r+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*n*r*x^4*x^r*e*log(x)/(r^2 + 8*r + 16) + 1/4*b*d*n*x^4*log(x) + 4*b*n*x^4*
x^r*e*log(x)/(r^2 + 8*r + 16) - 1/16*b*d*n*x^4 - b*n*x^4*x^r*e/(r^2 + 8*r +
 16) + 1/4*b*d*x^4*log(c) + b*x^4*x^r*e*log(c)/(r + 4) + 1/4*a*d*x^4 + a*x^
4*x^r*e/(r + 4)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^3\,\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^3*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.369 $\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=59

$$-\frac{1}{4}bdnx^2-\frac{benx^{2+r}}{(2+r)^2}+\frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/4*b*d*n*x^2-b*e*n*x^(2+r)/(2+r)^2+1/2*(d*x^2+2*e*x^(2+r)/(2+r))*(a+b*ln(
c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}=0.158$, Rules used = {14, 2371, 12}

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bdnx^2-\frac{benx^{r+2}}{(r+2)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d*n*x^2) - (b*e*n*x^(2 + r))/(2 + r)^2 + ((d*x^2 + (2*e*x^(2 + r))/
(2 + r))*(a + b*Log[c*x^n]))/2
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{2}x\left(d+\frac{2ex^r}{2+r}\right)\,dx$$
$$= \frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{2}(bn)\int x\left(d+\frac{2ex^r}{2+r}\right)\,dx$$
$$= \frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{2}(bn)\int\left(dx+\frac{2ex^{1+r}}{2+r}\right)\,dx$$
$$= -\frac{1}{4}bdnx^2-\frac{benx^{2+r}}{(2+r)^2}+\frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

Mathematica [A]
time = 0.07, size = 73, normalized size = 1.24

$$\frac{x^2\left(2a(2+r)\left(d(2+r)+2ex^r\right)-bn\left(d(2+r)^2+4ex^r\right)+2b(2+r)\left(d(2+r)+2ex^r\right)\log\left(cx^n\right)\right)}{4(2+r)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(2*a*(2 + r)*(d*(2 + r) + 2*e*x^r) - b*n*(d*(2 + r)^2 + 4*e*x^r) + 2*b
*(2 + r)*(d*(2 + r) + 2*e*x^r)*Log[c*x^n]))/(4*(2 + r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 613, normalized size = 10.39

method	result
risch	$\frac{b\,x^2(dr+2e\,x^r+2d)\ln(x^n)}{4+2r}-\frac{x^2\left(-8x^r ae+4bdn+4x^r ben-4x^r aer-8ad+4bdnr-8\ln(c)bdr-2\ln(c)bd\,r^2-2ad\,r^2-8db\ln(c)-4\ln(c)\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*x^2*(d*r+2*e*x^r+2*d)/(2+r)*ln(x^n)-1/4*x^2*(-8*x^r*a*e+4*b*d*n+4*x^r
*b*e*n-4*x^r*a*e*r-8*a*d+2*I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-4*I*Pi*b*d*csgn(I
*c)*csgn(I*c*x^n)^2*r+4*b*d*n*r-8*ln(c)*b*d*r-2*ln(c)*b*d*r^2-2*a*d*r^2-8*d
*b*ln(c)-4*ln(c)*b*e*x^r*r+4*I*Pi*b*d*csgn(I*c*x^n)^3-8*a*d*r+b*d*n*r^2-8*l
n(c)*b*e*x^r-2*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-2*I*Pi*b*e*csgn(I*x
^n)*csgn(I*c*x^n)^2*x^r*r+I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+
4*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*r+4*I*Pi*b*e*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^r-4*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-4*I*Pi*b*
e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-4*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*r-
I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^
```

```
n)^2-4*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)*x^r*r+4*I*csgn(I*c*x^n)*csgn(I*x^n)*csgn(I*c)*d*b*Pi-4*I*Pi*b
*d*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*e*csgn(I*c*x^n)^3*x^r+I*Pi*b*d*r^2*
csgn(I*c*x^n)^3+4*I*Pi*b*d*csgn(I*c*x^n)^3*r)/(2+r)^2
```

Maxima [**A**]
time = 0.28, size = 76, normalized size = 1.29

$$-\frac{1}{4}\,bdnx^2+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2+\frac{bex^{r+2}\log\left(cx^n\right)}{r+2}-\frac{benx^{r+2}}{\left(r+2\right)^2}+\frac{aex^{r+2}}{r+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/4*b*d*n*x^2 + 1/2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2 + b*e*x^(r + 2)*log(c
*x^n)/(r + 2) - b*e*n*x^(r + 2)/(r + 2)^2 + a*e*x^(r + 2)/(r + 2)
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 158 vs. 2(57) = 114.
time = 0.37, size = 158, normalized size = 2.68

$$\frac{2\,(bdr^2+4\,bdr+4\,bd)x^2\log\left(c\right)+2\,(bdnr^2+4\,bdnr+4\,bdn)x^2\log\left(x\right)-(4\,bdn+(bdn-2\,ad)r^2-8\,ad+4\,(bdn-2\,ad)r)x^2+4\,((br+2\,b)x^2e\log\left(c\right)+(bnr+2\,bn)x^2e\log\left(x\right)-(bn-ar-2\,a)x^2e)x^r}{4\,(r^2+4\,r+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/4*(2*(b*d*r^2 + 4*b*d*r + 4*b*d)*x^2*log(c) + 2*(b*d*n*r^2 + 4*b*d*n*r +
4*b*d*n)*x^2*log(x) - (4*b*d*n + (b*d*n - 2*a*d)*r^2 - 8*a*d + 4*(b*d*n - 2
*a*d)*r)*x^2 + 4*((b*r + 2*b)*x^2*e*log(c) + (b*n*r + 2*b*n)*x^2*e*log(x) -
 (b*n - a*r - 2*a)*x^2*e)*x^r)/(r^2 + 4*r + 4)
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 398 vs. 2(51) = 102.
time = 0.98, size = 398, normalized size = 6.75

$$\begin{cases}\frac{2adr^2x^2}{4r^2+16r+16}+\frac{8adrx^2}{4r^2+16r+16}+\frac{8adx^2}{4r^2+16r+16}+\frac{4aerx^2x^r}{4r^2+16r+16}+\frac{8aex^2x^r}{4r^2+16r+16}-\frac{bdnr^2x^2}{4r^2+16r+16}-\frac{4bdnrx^2}{4r^2+16r+16}-\frac{4bdnx^2}{4r^2+16r+16}+\frac{2bdr^2x^2\log\left(cx^n\right)}{4r^2+16r+16}+\frac{8bdrx^2\log\left(cx^n\right)}{4r^2+16r+16}+\frac{8bdx^2\log\left(cx^n\right)}{4r^2+16r+16}-\frac{4benx^2x^r}{4r^2+16r+16}+\frac{4berx^2x^r\log\left(cx^n\right)}{4r^2+16r+16}+\frac{8bex^2x^r\log\left(cx^n\right)}{4r^2+16r+16} & \text{for}\: r\neq -2\\ \frac{adx^2}{2}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^2}{4}+\frac{bdx^2\log\left(cx^n\right)}{2}+\frac{be\log\left(cx^n\right)^2}{2n} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((2*a*d*r**2*x**2/(4*r**2 + 16*r + 16) + 8*a*d*r*x**2/(4*r**2 + 16
*r + 16) + 8*a*d*x**2/(4*r**2 + 16*r + 16) + 4*a*e*r*x**2*x**r/(4*r**2 + 16
*r + 16) + 8*a*e*x**2*x**r/(4*r**2 + 16*r + 16) - b*d*n*r**2*x**2/(4*r**2 +
 16*r + 16) - 4*b*d*n*r*x**2/(4*r**2 + 16*r + 16) - 4*b*d*n*x**2/(4*r**2 +
16*r + 16) + 2*b*d*r**2*x**2*log(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*d*r*x**
2*log(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*d*x**2*log(c*x**n)/(4*r**2 + 16*r
```

```
+ 16) - 4*b*e*n*x**2*x**r/(4*r**2 + 16*r + 16) + 4*b*e*r*x**2*x**r*log(c*x*
*n)/(4*r**2 + 16*r + 16) + 8*b*e*x**2*x**r*log(c*x**n)/(4*r**2 + 16*r + 16)
, Ne(r, -2)), (a*d*x**2/2 + a*e*log(c*x**n)/n - b*d*n*x**2/4 + b*d*x**2*log
(c*x**n)/2 + b*e*log(c*x**n)**2/(2*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 137 vs. 2(57) = 114.
time = 1.78, size = 137, normalized size = 2.32

$$\frac{bnrx^2x^re\log(x)}{r^2+4r+4}+\frac{1}{2}bdnx^2\log(x)+\frac{2bnx^2x^re\log(x)}{r^2+4r+4}-\frac{1}{4}bdnx^2-\frac{bnx^2x^re}{r^2+4r+4}+\frac{1}{2}bdx^2\log(c)+\frac{bx^2x^re\log(c)}{r+2}+\frac{1}{2}adx^2+\frac{ax^2x^re}{r+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*n*r*x^2*x^r*e*log(x)/(r^2 + 4*r + 4) + 1/2*b*d*n*x^2*log(x) + 2*b*n*x^2*x
^r*e*log(x)/(r^2 + 4*r + 4) - 1/4*b*d*n*x^2 - b*n*x^2*x^r*e/(r^2 + 4*r + 4)
 + 1/2*b*d*x^2*log(c) + b*x^2*x^r*e*log(c)/(r + 2) + 1/2*a*d*x^2 + a*x^2*x^
r*e/(r + 2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.370 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x} dx$

Optimal. Leaf size=53

$$-\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}$$

```
[Out] -b*e*n*x^r/r^2+e*x^r*(a+b*ln(c*x^n))/r+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Rubi [A]
time = 0.06, antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {14, 2393, 2338, 2341}

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{ex^r(a+b\log(cx^n))}{r}-\frac{benx^r}{r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -((b*e*n*x^r)/r^2) + (e*x^r*(a + b*Log[c*x^n]))/r + (d*(a + b*Log[c*x^n])^2
)/(2*b*n)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
```

```
Q[r]))
```

Rubi steps

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \int \left(\frac{d(a+b\log(cx^n))}{x}+ex^{-1+r}(a+b\log(cx^n))\right)dx$$
$$= d\int \frac{a+b\log(cx^n)}{x}\,dx + e\int x^{-1+r}(a+b\log(cx^n))\,dx$$
$$= -\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}$$

Mathematica [A]
time = 0.05, size = 51, normalized size = 0.96

$$-\frac{1}{2}bdn\log^2(x)+d\log(x)(a+b\log(cx^n))+\frac{ex^r(-bn+ar+br\log(cx^n))}{r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
[Out] -1/2*(b*d*n*Log[x]^2) + d*Log[x]*(a + b*Log[c*x^n]) + (e*x^r*(-(b*n) + a*r
+ b*r*Log[c*x^n]))/r^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 278, normalized size = 5.25

method	result
risch	$\frac{b(dr\ln(x)+e\,x^r)\ln(x^n)}{r}-\frac{i\mathrm{csgn}(ic\,x^n)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic)db\pi\ln(x)}{2}+\frac{i\ln(x)\pi bd\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{2}+\frac{i\ln(x)\pi bd\,\mathrm{csgn}(ix^n)\mathrm{csgn}}{2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
[Out] b*(d*r*ln(x)+e*x^r)/r*ln(x^n)-1/2*I*csgn(I*c*x^n)*csgn(I*x^n)*csgn(I*c)*d*b
*Pi*ln(x)+1/2*I*ln(x)*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(x)*Pi*b*d*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*csgn(I*c*x^n)^3*d*b*Pi*ln(x)-1/2*I/r*Pi*b*
e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+1/2*I/r*Pi*b*e*csgn(I*c)*csgn(I*c
*x^n)^2*x^r+1/2*I/r*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-1/2*I/r*Pi*b*e*c
sgn(I*c*x^n)^3*x^r-1/2*b*d*n*ln(x)^2+ln(x)*ln(c)*b*d+ln(x)*a*d+1/r*ln(c)*b*
e*x^r+a/r*x^r*e-b*e*n*x^r/r^2
```

Maxima [A]
time = 0.29, size = 56, normalized size = 1.06

$$\frac{bex^r\log(cx^n)}{r}+\frac{bd\log(cx^n)^2}{2n}+ad\log(x)-\frac{benx^r}{r^2}+\frac{aex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] b*e*x^r*log(c*x^n)/r + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x) - b*e*n*x^r/r^2
+ a*e*x^r/r
```

Fricas [A]
time = 0.42, size = 69, normalized size = 1.30

$$\frac{bdnr^2\log(x)^2 + 2\left(bnre\log(x) + bre\log(c) - (bn - ar)e\right)x^r + 2\left(bdr^2\log(c) + adr^2\right)\log(x)}{2\,r^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*(b*d*n*r^2*log(x)^2 + 2*(b*n*r*e*log(x) + b*r*e*log(c) - (b*n - a*r)*e)
*x^r + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x))/r^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 131 vs. 2(46) = 92.
time = 5.23, size = 131, normalized size = 2.47

$$\begin{cases} (a + b\log(c))\,(d + e)\log(x) & \text{for } n = 0 \wedge r = 0 \\ (d + e)\left(\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a - b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r = 0 \\ (a + b\log(c))\left(d\log(x) + \frac{ex^r}{r}\right) & \text{for } n = 0 \\ \frac{ad\log(cx^n)}{n} + \frac{aex^r}{r} + \frac{bd\log(cx^n)^2}{2n} - \frac{benx^r}{r^2} + \frac{bex^r\log(cx^n)}{r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise(((a + b*log(c))*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)*Pi
ecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b
*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), ((a + b*log(c))*(d*log(x) + e*
x**r/r), Eq(n, 0)), (a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**2/(2
*n) - b*e*n*x**r/r**2 + b*e*x**r*log(c*x**n)/r, True))
```

Giac [A]
time = 2.72, size = 69, normalized size = 1.30

$$\frac{1}{2}\,bdn\log(x)^2 + \frac{bnx^re\log(x)}{r} + bd\log(c)\log(x) + \frac{bx^re\log(c)}{r} + ad\log(x) - \frac{bnx^re}{r^2} + \frac{ax^re}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*d*n*log(x)^2 + b*n*x^r*e*log(x)/r + b*d*log(c)*log(x) + b*x^r*e*log(c
)/r + a*d*log(x) - b*n*x^r*e/r^2 + a*x^r*e/r
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(d + e\,x^r)\,\left(a + b\,\ln\left(c\,x^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x, x)
```

3.371 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=71

$$-\frac{bdn}{4x^2}-\frac{benx^{-2+r}}{(2-r)^2}-\frac{d(a+b\log(cx^n))}{2x^2}-\frac{ex^{-2+r}(a+b\log(cx^n))}{2-r}$$

```
[Out] -1/4*b*d*n/x^2-b*e*n*x^(-2+r)/(2-r)^2-1/2*d*(a+b*ln(c*x^n))/x^2-e*x^(-2+r)*
(a+b*ln(c*x^n))/(2-r)
```

Rubi [A]
time = 0.05, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {14, 2372}

$$-\frac{d(a+b\log(cx^n))}{2x^2}-\frac{ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{bdn}{4x^2}-\frac{benx^{r-2}}{(2-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d*n)/x^2 - (b*e*n*x^(-2 + r))/(2 - r)^2 - (d*(a + b*Log[c*x^n]))/(2
*x^2) - (e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx &= -\frac{1}{2}\left(\frac{d}{x^2}+\frac{2ex^{-2+r}}{2-r}\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d}{2x^3}+\frac{ex^{-3+r}}{-2+r}\right)dx\\ &= -\frac{bdn}{4x^2}-\frac{benx^{-2+r}}{(2-r)^2}-\frac{1}{2}\left(\frac{d}{x^2}+\frac{2ex^{-2+r}}{2-r}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.08, size = 72, normalized size = 1.01

$$-\frac{2a(-2+r)\left(d(-2+r)-2ex^r\right)+bn\left(d(-2+r)^2+4ex^r\right)+2b(-2+r)\left(d(-2+r)-2ex^r\right)\log\left(cx^n\right)}{4(-2+r)^2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(2*a*(-2 + r)*(d*(-2 + r) - 2*e*x^r) + b*n*(d*(-2 + r)^2 + 4*e*x^r) +
2*b*(-2 + r)*(d*(-2 + r) - 2*e*x^r)*Log[c*x^n])/((-2 + r)^2*x^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 613, normalized size = 8.63

method	result
risch	$-\frac{b(dr-2e\,x^r-2d)\ln(x^n)}{2(-2+r)x^2}-\frac{8x^r ae+4bdn+4x^r ben-4x^r aer+8ad-4bdnr-8\ln(c)bdr+2\ln(c)bd\,r^2+2ad\,r^2+8db\ln(c)-4\ln(c)be\,x^r r}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(d*r-2*e*x^r-2*d)/(-2+r)/x^2*ln(x^n)-1/4*(8*x^r*a*e+4*b*d*n+4*x^r*b*
e*n-4*x^r*a*e*r+8*a*d+2*I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-4*I*Pi*b*d*csgn(I*c)
*csgn(I*c*x^n)^2*r-4*b*d*n*r-8*ln(c)*b*d*r+2*ln(c)*b*d*r^2+2*a*d*r^2-I*Pi*b
*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*d*b*ln(c)+4*I*Pi*b*e*csgn(I*x^
n)*csgn(I*c*x^n)^2*x^r-4*ln(c)*b*e*x^r*r-8*a*d*r-4*I*Pi*b*e*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^r+b*d*n*r^2+4*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+4
*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d*r^2*csgn(I*c*x^n)^3+8*ln(c)*b*
e*x^r-2*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-2*I*Pi*b*e*csgn(I*x^n)*csg
n(I*c*x^n)^2*x^r*r+4*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*r-4*I*Pi*
b*d*csgn(I*c*x^n)^3+I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*b*e*csgn(
I*c)*csgn(I*c*x^n)^2*x^r-4*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*P
i*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^
2*r+2*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r-4*I*Pi*b*e*csgn(I*
c*x^n)^3*x^r+4*I*Pi*b*d*csgn(I*c*x^n)^3*r)/(-2+r)^2/x^2
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-3>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(64) = 128$.
time = 0.37, size = 140, normalized size = 1.97

$$-\frac{4\,bdn+(bdn+2\,ad)r^2+8\,ad-4\,(bdn+2\,ad)r-4\,((br-2\,b)e\log(c)+(bnr-2\,bn)e\log(x)-(bn-ar+2\,a)e)x^r+2\,(bdr^2-4\,bdr+4\,bd)\log(c)+2\,(bdnr^2-4\,bdnr+4\,bdn)\log(x)}{4\,(r^2-4\,r+4)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(4*b*d*n + (b*d*n + 2*a*d)*r^2 + 8*a*d - 4*(b*d*n + 2*a*d)*r - 4*((b*r
 - 2*b)*e*log(c) + (b*n*r - 2*b*n)*e*log(x) - (b*n - a*r + 2*a)*e)*x^r + 2*
(b*d*r^2 - 4*b*d*r + 4*b*d)*log(c) + 2*(b*d*n*r^2 - 4*b*d*n*r + 4*b*d*n)*lo
g(x))/((r^2 - 4*r + 4)*x^2)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.
time = 3.45, size = 495, normalized size = 6.97

$$\begin{cases} -\frac{2adr^2}{4r^2x^2-16rx^2+16x^2}+\frac{8adr}{4r^2x^2-16rx^2+16x^2}-\frac{8ad}{4r^2x^2-16rx^2+16x^2}+\frac{4aerx^r}{4r^2x^2-16rx^2+16x^2}-\frac{8aex^r}{4r^2x^2-16rx^2+16x^2}-\frac{bdnr^2}{4r^2x^2-16rx^2+16x^2}+\frac{4bdnr}{4r^2x^2-16rx^2+16x^2}-\frac{4bdn}{4r^2x^2-16rx^2+16x^2}-\frac{2bdr^2\log(cx^n)}{4r^2x^2-16rx^2+16x^2}+\frac{8bdr\log(cx^n)}{4r^2x^2-16rx^2+16x^2}-\frac{8bd\log(cx^n)}{4r^2x^2-16rx^2+16x^2}-\frac{4benx^r}{4r^2x^2-16rx^2+16x^2}+\frac{4berx^r\log(cx^n)}{4r^2x^2-16rx^2+16x^2}-\frac{8bex^r\log(cx^n)}{4r^2x^2-16rx^2+16x^2} & \text{for}\ r\neq 2 \\ -\frac{ad}{2x^2}+ae\log(x)+bd\left(-\frac{n}{4x^2}-\frac{\log(cx^n)}{2x^2}\right)-be\left(\begin{cases}-\log(c)\log(x) & \text{for}\ n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right) & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Piecewise((-2*a*d*r**2/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) + 8*a*d*r/(4*r**
2*x**2 - 16*r*x**2 + 16*x**2) - 8*a*d/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) +
 4*a*e*r*x**r/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 8*a*e*x**r/(4*r**2*x**2
 - 16*r*x**2 + 16*x**2) - b*d*n*r**2/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) +
4*b*d*n*r/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 4*b*d*n/(4*r**2*x**2 - 16*r
*x**2 + 16*x**2) - 2*b*d*r**2*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**
2) + 8*b*d*r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 8*b*d*log(c*
x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 4*b*e*n*x**r/(4*r**2*x**2 - 16*
r*x**2 + 16*x**2) + 4*b*e*r*x**r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*
x**2) - 8*b*e*x**r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2), Ne(r, 2
)), (-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2*x**2))
- b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)),
 True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 396 vs. $2(64) = 128$.
time = 4.32, size = 396, normalized size = 5.58

$$-\frac{bdnr^2\log(x)}{2\,(r^2-4\,r+4)x^2}+\frac{bnrx^re\log(x)}{(r^2-4\,r+4)x^2}-\frac{bdnr^2}{4\,(r^2-4\,r+4)x^2}-\frac{bdr^2\log(c)}{2\,(r^2-4\,r+4)x^2}+\frac{brx^re\log(c)}{(r^2-4\,r+4)x^2}+\frac{2\,bdnr\log(x)}{(r^2-4\,r+4)x^2}-\frac{2\,bnx^re\log(x)}{(r^2-4\,r+4)x^2}+\frac{bdnr}{(r^2-4\,r+4)x^2}-\frac{adr^2}{2\,(r^2-4\,r+4)x^2}-\frac{bnx^re}{(r^2-4\,r+4)x^2}+\frac{arx^re}{(r^2-4\,r+4)x^2}+\frac{2\,bdr\log(c)}{(r^2-4\,r+4)x^2}-\frac{2\,bx^re\log(c)}{(r^2-4\,r+4)x^2}-\frac{2\,bdn\log(x)}{(r^2-4\,r+4)x^2}-\frac{bdn}{(r^2-4\,r+4)x^2}+\frac{2\,adr}{(r^2-4\,r+4)x^2}-\frac{2\,ax^re}{(r^2-4\,r+4)x^2}-\frac{2\,bd\log(c)}{(r^2-4\,r+4)x^2}-\frac{2\,ad}{(r^2-4\,r+4)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] -1/2*b*d*n*r^2*log(x)/((r^2 - 4*r + 4)*x^2) + b*n*r*x^r*e*log(x)/((r^2 - 4*
r + 4)*x^2) - 1/4*b*d*n*r^2/((r^2 - 4*r + 4)*x^2) - 1/2*b*d*r^2*log(c)/((r^
2 - 4*r + 4)*x^2) + b*r*x^r*e*log(c)/((r^2 - 4*r + 4)*x^2) + 2*b*d*n*r*log(
x)/((r^2 - 4*r + 4)*x^2) - 2*b*n*x^r*e*log(x)/((r^2 - 4*r + 4)*x^2) + b*d*n
*r/((r^2 - 4*r + 4)*x^2) - 1/2*a*d*r^2/((r^2 - 4*r + 4)*x^2) - b*n*x^r*e/((
r^2 - 4*r + 4)*x^2) + a*r*x^r*e/((r^2 - 4*r + 4)*x^2) + 2*b*d*r*log(c)/((r^
2 - 4*r + 4)*x^2) - 2*b*x^r*e*log(c)/((r^2 - 4*r + 4)*x^2) - 2*b*d*n*log(x)
/((r^2 - 4*r + 4)*x^2) - b*d*n/((r^2 - 4*r + 4)*x^2) + 2*a*d*r/((r^2 - 4*r
+ 4)*x^2) - 2*a*x^r*e/((r^2 - 4*r + 4)*x^2) - 2*b*d*log(c)/((r^2 - 4*r + 4)
*x^2) - 2*a*d/((r^2 - 4*r + 4)*x^2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^3, x)
```

3.372 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=71

$$-\frac{bdn}{16x^4}-\frac{benx^{-4+r}}{(4-r)^2}-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{ex^{-4+r}(a+b\log(cx^n))}{4-r}$$

```
[Out] -1/16*b*d*n/x^4-b*e*n*x^(-4+r)/(4-r)^2-1/4*d*(a+b*ln(c*x^n))/x^4-e*x^(-4+r)
*(a+b*ln(c*x^n))/(4-r)
```

Rubi [A]
time = 0.05, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {14, 2372}

$$-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{bdn}{16x^4}-\frac{benx^{r-4}}{(4-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d*n)/x^4 - (b*e*n*x^(-4 + r))/(4 - r)^2 - (d*(a + b*Log[c*x^n]))/(
4*x^4) - (e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx &= -\frac{1}{4}\left(\frac{d}{x^4}+\frac{4ex^{-4+r}}{4-r}\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d}{4x^5}+\frac{ex^{-5+r}}{-4+r}\right)dx\\ &= -\frac{bdn}{16x^4}-\frac{benx^{-4+r}}{(4-r)^2}-\frac{1}{4}\left(\frac{d}{x^4}+\frac{4ex^{-4+r}}{4-r}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.09, size = 72, normalized size = 1.01

$$-\frac{4a(-4+r)\left(d(-4+r)-4ex^r\right)+bn\left(d(-4+r)^2+16ex^r\right)+4b(-4+r)\left(d(-4+r)-4ex^r\right)\log\left(cx^n\right)}{16(-4+r)^2x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(4*a*(-4 + r)*(d*(-4 + r) - 4*e*x^r) + b*n*(d*(-4 + r)^2 + 16*e*x^r)
+ 4*b*(-4 + r)*(d*(-4 + r) - 4*e*x^r)*Log[c*x^n])/((-4 + r)^2*x^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 613, normalized size = 8.63

method	result
risch	$-\frac{b(dr-4e\,x^r-4d)\ln(x^n)}{4(-4+r)x^4}-\frac{64x^r ae+16bdn+16x^r ben-16x^r aer+64ad-8bdnr-32\ln(c)bdr+4\ln(c)bd\,r^2+4ad\,r^2+64db\ln(c)-16\,\mathrm{l}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(d*r-4*e*x^r-4*d)/(-4+r)/x^4*ln(x^n)-1/16*(64*x^r*a*e+16*b*d*n+16*x^
r*b*e*n-16*x^r*a*e*r-16*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*r+2*I*Pi*b*d*r
^2*csgn(I*x^n)*csgn(I*c*x^n)^2+64*a*d+32*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2
*x^r+2*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2-32*I*Pi*b*d*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)-8*b*d*n*r-32*ln(c)*b*d*r+4*ln(c)*b*d*r^2+16*I*Pi*b*d*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*r+4*a*d*r^2+64*d*b*ln(c)-16*ln(c)*b*e*x^r*
r+8*I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-16*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r-
32*a*d*r-32*I*Pi*b*d*csgn(I*c*x^n)^3-8*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2
*x^r*r-8*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r+b*d*n*r^2-32*I*Pi*b*e*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-2*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+64*ln(c)*b*e*x^r+8*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*x^r*r+16*I*Pi*b*d*csgn(I*c*x^n)^3*r+32*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)
^2*x^r-2*I*Pi*b*d*r^2*csgn(I*c*x^n)^3+32*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2
+32*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-32*I*Pi*b*e*csgn(I*c*x^n)^3*x^r)/(
-4+r)^2/x^4
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-5>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(64) = 128$.
time = 0.36, size = 140, normalized size = 1.97

$$-\frac{16\,bdn + (bdn + 4\,ad)r^2 + 64\,ad - 8\,(bdn + 4\,ad)r - 16\,((br - 4\,b)e\log(c) + (bnr - 4\,bn)e\log(x) - (bn - ar + 4\,a)e)x^r + 4\,(bdr^2 - 8\,bdr + 16\,bd)\log(c) + 4\,(bdnr^2 - 8\,bdnr + 16\,bdn)\log(x)}{16\,(r^2 - 8\,r + 16)x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] -1/16*(16*b*d*n + (b*d*n + 4*a*d)*r^2 + 64*a*d - 8*(b*d*n + 4*a*d)*r - 16*(
(b*r - 4*b)*e*log(c) + (b*n*r - 4*b*n)*e*log(x) - (b*n - a*r + 4*a)*e)*x^r
+ 4*(b*d*r^2 - 8*b*d*r + 16*b*d)*log(c) + 4*(b*d*n*r^2 - 8*b*d*n*r + 16*b*d
*n)*log(x))/((r^2 - 8*r + 16)*x^4)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.
time = 5.56, size = 495, normalized size = 6.97

$$\begin{cases} -\frac{4adr^2}{16r^2x^4-128rx^4+256x^4} + \frac{32adr}{16r^2x^4-128rx^4+256x^4} - \frac{64ad}{16r^2x^4-128rx^4+256x^4} + \frac{16aerx^r}{16r^2x^4-128rx^4+256x^4} - \frac{64aex^r}{16r^2x^4-128rx^4+256x^4} - \frac{bdnr^2}{16r^2x^4-128rx^4+256x^4} + \frac{8bdnr}{16r^2x^4-128rx^4+256x^4} - \frac{16bdn}{16r^2x^4-128rx^4+256x^4} - \frac{4bdr^2\log(cx^n)}{16r^2x^4-128rx^4+256x^4} + \frac{32bdr\log(cx^n)}{16r^2x^4-128rx^4+256x^4} - \frac{64bd\log(cx^n)}{16r^2x^4-128rx^4+256x^4} - \frac{16benx^r}{16r^2x^4-128rx^4+256x^4} + \frac{16berx^r\log(cx^n)}{16r^2x^4-128rx^4+256x^4} - \frac{64bex^r\log(cx^n)}{16r^2x^4-128rx^4+256x^4} & \text{for}\: r \neq 4 \\ -\frac{ad}{4x^4} + ae\log(x) + bd\left(-\frac{n}{16x^4} - \frac{\log(cx^n)}{4x^4}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for}\: n = 0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] Piecewise((-4*a*d*r**2/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 32*a*d*r/(1
6*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*a*d/(16*r**2*x**4 - 128*r*x**4 +
256*x**4) + 16*a*e*r*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*a*e*x
**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - b*d*n*r**2/(16*r**2*x**4 - 128
*r*x**4 + 256*x**4) + 8*b*d*n*r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 16
*b*d*n/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 4*b*d*r**2*log(c*x**n)/(16*
r**2*x**4 - 128*r*x**4 + 256*x**4) + 32*b*d*r*log(c*x**n)/(16*r**2*x**4 - 1
28*r*x**4 + 256*x**4) - 64*b*d*log(c*x**n)/(16*r**2*x**4 - 128*r*x**4 + 256
*x**4) - 16*b*e*n*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 16*b*e*r*x*
*r*log(c*x**n)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*b*e*x**r*log(c*x
**n)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4), Ne(r, 4)), (-a*d/(4*x**4) + a*
e*log(x) + b*d*(-n/(16*x**4) - log(c*x**n)/(4*x**4)) - b*e*Piecewise((-log(
c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 397 vs. $2(64) = 128$.
time = 3.44, size = 397, normalized size = 5.59

$$-\frac{bdnr^2\log(x)}{4\,(r^2-8\,r+16)x^4} + \frac{bnrx^re\log(x)}{(r^2-8\,r+16)x^4} - \frac{bdnr^2}{16\,(r^2-8\,r+16)x^4} - \frac{bdr^2\log(c)}{4\,(r^2-8\,r+16)x^4} + \frac{brx^re\log(c)}{(r^2-8\,r+16)x^4} + \frac{2\,bdnr\log(x)}{(r^2-8\,r+16)x^4} - \frac{4\,bnx^re\log(x)}{(r^2-8\,r+16)x^4} + \frac{bdnr}{2\,(r^2-8\,r+16)x^4} - \frac{adr^2}{4\,(r^2-8\,r+16)x^4} - \frac{bnx^re}{(r^2-8\,r+16)x^4} + \frac{arx^re}{(r^2-8\,r+16)x^4} + \frac{2\,bdr\log(c)}{(r^2-8\,r+16)x^4} - \frac{4\,bx^re\log(c)}{(r^2-8\,r+16)x^4} - \frac{4\,bdn\log(x)}{(r^2-8\,r+16)x^4} - \frac{bdn}{(r^2-8\,r+16)x^4} + \frac{2\,adr}{(r^2-8\,r+16)x^4} - \frac{4\,ax^re}{(r^2-8\,r+16)x^4} - \frac{4\,bd\log(c)}{(r^2-8\,r+16)x^4} - \frac{4\,ad}{(r^2-8\,r+16)x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

```
[Out] -1/4*b*d*n*r^2*log(x)/((r^2 - 8*r + 16)*x^4) + b*n*r*x^r*e*log(x)/((r^2 - 8
*r + 16)*x^4) - 1/16*b*d*n*r^2/((r^2 - 8*r + 16)*x^4) - 1/4*b*d*r^2*log(c)/
((r^2 - 8*r + 16)*x^4) + b*r*x^r*e*log(c)/((r^2 - 8*r + 16)*x^4) + 2*b*d*n*
r*log(x)/((r^2 - 8*r + 16)*x^4) - 4*b*n*x^r*e*log(x)/((r^2 - 8*r + 16)*x^4)
 + 1/2*b*d*n*r/((r^2 - 8*r + 16)*x^4) - 1/4*a*d*r^2/((r^2 - 8*r + 16)*x^4)
- b*n*x^r*e/((r^2 - 8*r + 16)*x^4) + a*r*x^r*e/((r^2 - 8*r + 16)*x^4) + 2*b
*d*r*log(c)/((r^2 - 8*r + 16)*x^4) - 4*b*x^r*e*log(c)/((r^2 - 8*r + 16)*x^4
) - 4*b*d*n*log(x)/((r^2 - 8*r + 16)*x^4) - b*d*n/((r^2 - 8*r + 16)*x^4) +
2*a*d*r/((r^2 - 8*r + 16)*x^4) - 4*a*x^r*e/((r^2 - 8*r + 16)*x^4) - 4*b*d*l
og(c)/((r^2 - 8*r + 16)*x^4) - 4*a*d/((r^2 - 8*r + 16)*x^4)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^5,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^5, x)
```

3.373 $\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=59

$$-\frac{1}{25}bdnx^5-\frac{benx^{5+r}}{(5+r)^2}+\frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

[Out] -1/25*b*d*n*x^5-b*e*n*x^(5+r)/(5+r)^2+1/5*(d*x^5+5*e*x^(5+r)/(5+r))*(a+b*ln(c*x^n))

Rubi [A]
time = 0.06, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}=0.143$, Rules used = {14, 2371, 12}

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{25}bdnx^5-\frac{benx^{r+5}}{(r+5)^2}$$

Antiderivative was successfully verified.

[In] Int[x^4*(d + e*x^r)*(a + b*Log[c*x^n]),x]

[Out] -1/25*(b*d*n*x^5) - (b*e*n*x^(5 + r))/(5 + r)^2 + ((d*x^5 + (5*e*x^(5 + r))/(5 + r))*(a + b*Log[c*x^n]))/5

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^4(d+ex^r)(a+b\log(cx^n))\,dx = \frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)(a+b\log(cx^n))-(bn)\int\frac{1}{5}x^4\left(d+\frac{5ex^r}{5+r}\right)dx$$
$$=\frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)(a+b\log(cx^n))-\frac{1}{5}(bn)\int x^4\left(d+\frac{5ex^r}{5+r}\right)dx$$
$$=\frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)(a+b\log(cx^n))-\frac{1}{5}(bn)\int\left(dx^4+\frac{5ex^{4+r}}{5+r}\right)dx$$
$$=-\frac{1}{25}bdnx^5-\frac{benx^{5+r}}{(5+r)^2}+\frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.07, size = 73, normalized size = 1.24

$$\frac{x^5(5a(5+r)(d(5+r)+5ex^r)-bn(d(5+r)^2+25ex^r)+5b(5+r)(d(5+r)+5ex^r)\log(cx^n))}{25(5+r)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^5*(5*a*(5 + r)*(d*(5 + r) + 5*e*x^r) - b*n*(d*(5 + r)^2 + 25*e*x^r) + 5*
b*(5 + r)*(d*(5 + r) + 5*e*x^r)*Log[c*x^n]))/(25*(5 + r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 614, normalized size = 10.41

method	result
risch	$\frac{b\,x^5(dr+5e\,x^r+5d)\ln(x^n)}{25+5r}-\frac{x^5\left(-250x^r ae+50bdn+50x^r ben-50x^r aer-250ad+20bdnr-100\ln(c)bdr-10\ln(c)bd\,r^2-10ad\,r^2-25\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/5*b*x^5*(d*r+5*e*x^r+5*d)/(5+r)*ln(x^n)-1/50*x^5*(-250*x^r*a*e+50*b*d*n+5
0*x^r*b*e*n-50*x^r*a*e*r+25*I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-250*a*d+20*b*d*n
*r-100*ln(c)*b*d*r-10*ln(c)*b*d*r^2-25*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x
^r*r-10*a*d*r^2-250*d*b*ln(c)-50*ln(c)*b*e*x^r*r-100*a*d*r+2*b*d*n*r^2-25*I
*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r*r+50*I*Pi*b*d*r*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-250*ln(c)*b*e*x^r+125*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+125*I*Pi*b*d*csgn(I*c*x^n)^3+5*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+125*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-125*I*Pi
*b*d*csgn(I*c)*csgn(I*c*x^n)^2+5*I*Pi*b*d*r^2*csgn(I*c*x^n)^3+125*I*Pi*b*e*
csgn(I*c*x^n)^3*x^r-50*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r-125*I*Pi*b*e*cs
```

```
gn(I*x^n)*csgn(I*c*x^n)^2*x^r-125*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-50
*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*r+25*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*x^r*r-5*I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+50*I*Pi*b*d*c
sgn(I*c*x^n)^3*r-125*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-5*I*Pi*b*d*r^2*cs
gn(I*c)*csgn(I*c*x^n)^2)/(5+r)^2
```

Maxima [A]
time = 0.29, size = 76, normalized size = 1.29

$$-\frac{1}{25}\,bdnx^5+\frac{1}{5}\,bdx^5\log\left(cx^n\right)+\frac{1}{5}\,adx^5+\frac{bex^{r+5}\log\left(cx^n\right)}{r+5}-\frac{benx^{r+5}}{\left(r+5\right)^2}+\frac{aex^{r+5}}{r+5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*d*n*x^5 + 1/5*b*d*x^5*log(c*x^n) + 1/5*a*d*x^5 + b*e*x^(r + 5)*log(
c*x^n)/(r + 5) - b*e*n*x^(r + 5)/(r + 5)^2 + a*e*x^(r + 5)/(r + 5)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 158 vs. $2(57) = 114$.
time = 0.36, size = 158, normalized size = 2.68

$$\frac{5\,(bdr^2+10\,bdr+25\,bd)x^5\log\left(c\right)+5\,(bdnr^2+10\,bdnr+25\,bdn)x^5\log\left(x\right)-(25\,bdn+(bdn-5\,ad)r^2-125\,ad+10\,(bdn-5\,ad)r)x^5+25\,((br+5\,b)x^5e\log\left(c\right)+(bnr+5\,bn)x^5e\log\left(x\right)-(bn-ar-5\,a)x^5e)x^r}{25\,(r^2+10\,r+25)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/25*(5*(b*d*r^2 + 10*b*d*r + 25*b*d)*x^5*log(c) + 5*(b*d*n*r^2 + 10*b*d*n*
r + 25*b*d*n)*x^5*log(x) - (25*b*d*n + (b*d*n - 5*a*d)*r^2 - 125*a*d + 10*(
b*d*n - 5*a*d)*r)*x^5 + 25*((b*r + 5*b)*x^5*e*log(c) + (b*n*r + 5*b*n)*x^5*
e*log(x) - (b*n - a*r - 5*a)*x^5*e)*x^r)/(r^2 + 10*r + 25)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.
time = 7.08, size = 398, normalized size = 6.75

$$\begin{cases} \frac{5adr^2x^5}{25r^2+250r+625}+\frac{50adrx^5}{25r^2+250r+625}+\frac{125adx^5}{25r^2+250r+625}+\frac{25aerx^5x^r}{25r^2+250r+625}+\frac{125aex^5x^r}{25r^2+250r+625}-\frac{bdnr^2x^5}{25r^2+250r+625}-\frac{10bdnrx^5}{25r^2+250r+625}-\frac{25bdnx^5}{25r^2+250r+625}+\frac{5bdr^2x^5\log\left(cx^n\right)}{25r^2+250r+625}+\frac{50bdrx^5\log\left(cx^n\right)}{25r^2+250r+625}+\frac{125bdx^5\log\left(cx^n\right)}{25r^2+250r+625}-\frac{25benx^5x^r}{25r^2+250r+625}+\frac{25berx^5x^r\log\left(cx^n\right)}{25r^2+250r+625}+\frac{125bex^5x^r\log\left(cx^n\right)}{25r^2+250r+625} & \text{for}\ r\neq -5 \\ \frac{adx^5}{5}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^5}{25}+\frac{bdx^5\log\left(cx^n\right)}{5}+\frac{be\log\left(cx^n\right)^2}{2n} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((5*a*d*r**2*x**5/(25*r**2 + 250*r + 625) + 50*a*d*r*x**5/(25*r**2
 + 250*r + 625) + 125*a*d*x**5/(25*r**2 + 250*r + 625) + 25*a*e*r*x**5*x**r
/(25*r**2 + 250*r + 625) + 125*a*e*x**5*x**r/(25*r**2 + 250*r + 625) - b*d*
n*r**2*x**5/(25*r**2 + 250*r + 625) - 10*b*d*n*r*x**5/(25*r**2 + 250*r + 62
5) - 25*b*d*n*x**5/(25*r**2 + 250*r + 625) + 5*b*d*r**2*x**5*log(c*x**n)/(2
```

```
5*r**2 + 250*r + 625) + 50*b*d*r*x**5*log(c*x**n)/(25*r**2 + 250*r + 625) +
 125*b*d*x**5*log(c*x**n)/(25*r**2 + 250*r + 625) - 25*b*e*n*x**5*x**r/(25*
r**2 + 250*r + 625) + 25*b*e*r*x**5*x**r*log(c*x**n)/(25*r**2 + 250*r + 625
) + 125*b*e*x**5*x**r*log(c*x**n)/(25*r**2 + 250*r + 625), Ne(r, -5)), (a*d
*x**5/5 + a*e*log(c*x**n)/n - b*d*n*x**5/25 + b*d*x**5*log(c*x**n)/5 + b*e*
log(c*x**n)**2/(2*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 137 vs. 2(57) = 114.
time = 2.69, size = 137, normalized size = 2.32

$$\frac{bnrx^5x^re\log(x)}{r^2+10\,r+25}+\frac{1}{5}\,bdnx^5\log(x)+\frac{5\,bnx^5x^re\log(x)}{r^2+10\,r+25}-\frac{1}{25}\,bdnx^5-\frac{bnx^5x^re}{r^2+10\,r+25}+\frac{1}{5}\,bdx^5\log(c)+\frac{bx^5x^re\log(c)}{r+5}+\frac{1}{5}\,adx^5+\frac{ax^5x^re}{r+5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*n*r*x^5*x^r*e*log(x)/(r^2 + 10*r + 25) + 1/5*b*d*n*x^5*log(x) + 5*b*n*x^5
*x^r*e*log(x)/(r^2 + 10*r + 25) - 1/25*b*d*n*x^5 - b*n*x^5*x^r*e/(r^2 + 10*
r + 25) + 1/5*b*d*x^5*log(c) + b*x^5*x^r*e*log(c)/(r + 5) + 1/5*a*d*x^5 + a
*x^5*x^r*e/(r + 5)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^4\,\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^4*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.374 $\int x^2(d+ex^r)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=59

$$-\frac{1}{9}bdnx^3-\frac{benx^{3+r}}{(3+r)^2}+\frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))$$

```
[Out] -1/9*b*d*n*x^3-b*e*n*x^(3+r)/(3+r)^2+1/3*(d*x^3+3*e*x^(3+r)/(3+r))*(a+b*ln(
c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {14, 2371, 12}

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{9}bdnx^3-\frac{benx^{r+3}}{(r+3)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d*n*x^3) - (b*e*n*x^(3 + r))/(3 + r)^2 + ((d*x^3 + (3*e*x^(3 + r))/
(3 + r))*(a + b*Log[c*x^n]))/3
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$
\begin{aligned}
\int x^2(d+ex^r)\,(a+b\log(cx^n))\,dx &= \frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))-(bn)\int \frac{1}{3}x^2\left(d+\frac{3ex^r}{3+r}\right)dx \\
&= \frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int x^2\left(d+\frac{3ex^r}{3+r}\right)dx \\
&= \frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int\left(dx^2+\frac{3ex^{2+r}}{3+r}\right)dx \\
&= -\frac{1}{9}bdnx^3-\frac{benx^{3+r}}{(3+r)^2}+\frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))
\end{aligned}
$$

Mathematica [A]
time = 0.07, size = 73, normalized size = 1.24

$$
\frac{x^3(3a(3+r)\,(d(3+r)+3ex^r)-bn(d(3+r)^2+9ex^r)+3b(3+r)\,(d(3+r)+3ex^r)\log(cx^n))}{9(3+r)^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^3*(3*a*(3 + r)*(d*(3 + r) + 3*e*x^r) - b*n*(d*(3 + r)^2 + 9*e*x^r) + 3*b
*(3 + r)*(d*(3 + r) + 3*e*x^r)*Log[c*x^n]))/(9*(3 + r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 614, normalized size = 10.41

method	result
risch	$\frac{b\,x^3(dr+3e\,x^r+3d)\ln(x^n)}{9+3r}-\frac{x^3\left(-54x^r ae+18bdn+18x^r ben-18x^r aer-54ad+12bdnr-36\ln(c)bdr-6\ln(c)bd\,r^2-6ad\,r^2-54db\ln(c\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*b*x^3*(d*r+3*e*x^r+3*d)/(3+r)*ln(x^n)-1/18*x^3*(-54*x^r*a*e+18*b*d*n+18
*x^r*b*e*n-18*x^r*a*e*r-3*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2-54*a*d+12*
b*d*n*r-36*ln(c)*b*d*r-6*ln(c)*b*d*r^2+18*I*Pi*b*d*r*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-6*a*d*r^2-54*d*b*ln(c)-18*ln(c)*b*e*x^r*r-9*I*Pi*b*e*csgn(I*c
)*csgn(I*c*x^n)^2*x^r*r-36*a*d*r+2*b*d*n*r^2-9*I*Pi*b*e*csgn(I*x^n)*csgn(I*
c*x^n)^2*x^r*r+3*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+27*I*Pi*b
*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-54*ln(c)*b*e*x^r+27*I*Pi*b*d*csg
n(I*c*x^n)^3+9*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r+27*I*Pi*b
*e*csgn(I*c*x^n)^3*x^r+18*I*Pi*b*d*csgn(I*c*x^n)^3*r-27*I*Pi*b*d*csgn(I*x^n
)*csgn(I*c*x^n)^2-3*I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-18*I*Pi*b*d*cs
```

```
gn(I*x^n)*csgn(I*c*x^n)^2*r+9*I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-18*I*Pi*b*d*cs
gn(I*c)*csgn(I*c*x^n)^2*r+27*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2
7*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+3*I*Pi*b*d*r^2*csgn(I*c*x^n)^3-2
7*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-27*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n
)^2)/(3+r)^2
```

Maxima [A]
time = 0.29, size = 76, normalized size = 1.29

$$-\frac{1}{9}\,bdnx^3+\frac{1}{3}\,bdx^3\log\left(cx^n\right)+\frac{1}{3}\,adx^3+\frac{bex^{r+3}\log\left(cx^n\right)}{r+3}-\frac{benx^{r+3}}{(r+3)^2}+\frac{aex^{r+3}}{r+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/9*b*d*n*x^3 + 1/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3 + b*e*x^(r + 3)*log(c
*x^n)/(r + 3) - b*e*n*x^(r + 3)/(r + 3)^2 + a*e*x^(r + 3)/(r + 3)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 158 vs. 2(57) = 114.
time = 0.36, size = 158, normalized size = 2.68

$$\frac{3\,(bdr^2+6\,bdr+9\,bd)x^3\log\left(c\right)+3\,(bdnr^2+6\,bdnr+9\,bdn)x^3\log\left(x\right)-(9\,bdn+(bdn-3\,ad)r^2-27\,ad+6\,(bdn-3\,ad)r)x^3+9\,((br+3\,b)x^3e\log\left(c\right)+(bnr+3\,bn)x^3e\log\left(x\right)-(bn-ar-3\,a)x^3e)x^r}{9\,(r^2+6\,r+9)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/9*(3*(b*d*r^2 + 6*b*d*r + 9*b*d)*x^3*log(c) + 3*(b*d*n*r^2 + 6*b*d*n*r +
9*b*d*n)*x^3*log(x) - (9*b*d*n + (b*d*n - 3*a*d)*r^2 - 27*a*d + 6*(b*d*n -
3*a*d)*r)*x^3 + 9*((b*r + 3*b)*x^3*e*log(c) + (b*n*r + 3*b*n)*x^3*e*log(x)
- (b*n - a*r - 3*a)*x^3*e)*x^r)/(r^2 + 6*r + 9)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 398 vs. 2(51) = 102.
time = 2.02, size = 398, normalized size = 6.75

$$\begin{cases} \frac{3adr^2x^3}{9r^2+54r+81}+\frac{18adrx^3}{9r^2+54r+81}+\frac{27adx^3}{9r^2+54r+81}+\frac{9aerx^3x^r}{9r^2+54r+81}+\frac{27aex^3x^r}{9r^2+54r+81}-\frac{bdnr^2x^3}{9r^2+54r+81}-\frac{6bdnrx^3}{9r^2+54r+81}-\frac{9bdnx^3}{9r^2+54r+81}+\frac{3bdr^2x^3\log\left(cx^n\right)}{9r^2+54r+81}+\frac{18bdrx^3\log\left(cx^n\right)}{9r^2+54r+81}+\frac{27bdx^3\log\left(cx^n\right)}{9r^2+54r+81}-\frac{9benx^3x^r}{9r^2+54r+81}+\frac{9berx^3x^r\log\left(cx^n\right)}{9r^2+54r+81}+\frac{27bex^3x^r\log\left(cx^n\right)}{9r^2+54r+81} & \text{for}\: r \neq -3 \\ \frac{adx^3}{3}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^3}{9}+\frac{bdx^3\log\left(cx^n\right)}{3}+\frac{be\log\left(cx^n\right)^2}{2n} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((3*a*d*r**2*x**3/(9*r**2 + 54*r + 81) + 18*a*d*r*x**3/(9*r**2 + 5
4*r + 81) + 27*a*d*x**3/(9*r**2 + 54*r + 81) + 9*a*e*r*x**3*x**r/(9*r**2 +
54*r + 81) + 27*a*e*x**3*x**r/(9*r**2 + 54*r + 81) - b*d*n*r**2*x**3/(9*r**
2 + 54*r + 81) - 6*b*d*n*r*x**3/(9*r**2 + 54*r + 81) - 9*b*d*n*x**3/(9*r**2
 + 54*r + 81) + 3*b*d*r**2*x**3*log(c*x**n)/(9*r**2 + 54*r + 81) + 18*b*d*r
```

```
*x**3*log(c*x**n)/(9*r**2 + 54*r + 81) + 27*b*d*x**3*log(c*x**n)/(9*r**2 +
54*r + 81) - 9*b*e*n*x**3*x**r/(9*r**2 + 54*r + 81) + 9*b*e*r*x**3*x**r*log
(c*x**n)/(9*r**2 + 54*r + 81) + 27*b*e*x**3*x**r*log(c*x**n)/(9*r**2 + 54*r
 + 81), Ne(r, -3)), (a*d*x**3/3 + a*e*log(c*x**n)/n - b*d*n*x**3/9 + b*d*x*
*3*log(c*x**n)/3 + b*e*log(c*x**n)**2/(2*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 137 vs. 2(57) = 114.
time = 2.35, size = 137, normalized size = 2.32

$$\frac{bnrx^3x^re\log(x)}{r^2+6r+9}+\frac{1}{3}bdnx^3\log(x)+\frac{3bnx^3x^re\log(x)}{r^2+6r+9}-\frac{1}{9}bdnx^3-\frac{bnx^3x^re}{r^2+6r+9}+\frac{1}{3}bdx^3\log(c)+\frac{bx^3x^re\log(c)}{r+3}+\frac{1}{3}adx^3+\frac{ax^3x^re}{r+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*n*r*x^3*x^r*e*log(x)/(r^2 + 6*r + 9) + 1/3*b*d*n*x^3*log(x) + 3*b*n*x^3*x
^r*e*log(x)/(r^2 + 6*r + 9) - 1/9*b*d*n*x^3 - b*n*x^3*x^r*e/(r^2 + 6*r + 9)
 + 1/3*b*d*x^3*log(c) + b*x^3*x^r*e*log(c)/(r + 3) + 1/3*a*d*x^3 + a*x^3*x^
r*e/(r + 3)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^2\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^2*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.375 $\int (d+ex^r)(a+b\log(cx^n))\,dx$

Optimal. Leaf size=57

$$-bdnx-\frac{benx^{1+r}}{(1+r)^2}+dx(a+b\log(cx^n))+\frac{ex^{1+r}(a+b\log(cx^n))}{1+r}$$

```
[Out] -b*d*n*x-b*e*n*x^(1+r)/(1+r)^2+d*x*(a+b*ln(c*x^n))+e*x^(1+r)*(a+b*ln(c*x^n)
)/(1+r)
```

Rubi [A]
time = 0.02, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2350, 12}

$$dx(a+b\log(cx^n))+\frac{ex^{r+1}(a+b\log(cx^n))}{r+1}-bdnx-\frac{benx^{r+1}}{(r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d*n*x) - (b*e*n*x^(1 + r))/(1 + r)^2 + d*x*(a + b*Log[c*x^n]) + (e*x^(1
 + r)*(a + b*Log[c*x^n]))/(1 + r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex^r)(a+b\log(cx^n))\,dx &= \left(dx+\frac{ex^{1+r}}{1+r}\right)(a+b\log(cx^n))-(bn)\int\frac{d+dr+ex^r}{1+r}\,dx\\ &= \left(dx+\frac{ex^{1+r}}{1+r}\right)(a+b\log(cx^n))-\frac{(bn)\int(d+dr+ex^r)\,dx}{1+r}\\ &= -bdnx-\frac{benx^{1+r}}{(1+r)^2}+\left(dx+\frac{ex^{1+r}}{1+r}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.06, size = 61, normalized size = 1.07

$$\frac{x(a(1+r)\left(d+dr+ex^r\right)-bn(d(1+r)^2+ex^r)+b(1+r)\left(d+dr+ex^r\right)\log\left(cx^n\right))}{(1+r)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(a*(1 + r)*(d + d*r + e*x^r) - b*n*(d*(1 + r)^2 + e*x^r) + b*(1 + r)*(d
+ d*r + e*x^r)*Log[c*x^n]))/(1 + r)^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.08, size = 606, normalized size = 10.63

method	result
risch	$\frac{bx(dr+e\,x^r+d)\ln(x^n)}{1+r}-\frac{x\left(-2x^r ae+2bdn+2x^r ben-2x^r aer-2ad+4bdnr-4\ln(c)bdr-2\ln(c)bd\,r^2-2ad\,r^2-2db\ln(c)-2\ln(c)be\,x^r\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(d*r+e*x^r+d)/(1+r)*ln(x^n)-1/2*x*(-2*x^r*a*e+2*b*d*n+I*x^r*csgn(I*c*x^
n)^3*e*b*Pi+2*x^r*b*e*n-2*x^r*a*e*r-2*a*d+4*b*d*n*r+I*Pi*b*e*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*x^r+2*I*Pi*b*d*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-
4*ln(c)*b*d*r-2*ln(c)*b*d*r^2-2*a*d*r^2-2*d*b*ln(c)-2*ln(c)*b*e*x^r*r+I*Pi*
b*d*csgn(I*c*x^n)^3-4*a*d*r+2*b*d*n*r^2-2*ln(c)*b*e*x^r+2*I*Pi*b*d*csgn(I*c
*x^n)^3*r-I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-I*Pi*b*e*csgn(I*x^n)*csg
n(I*c*x^n)^2*x^r*r+I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*
e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r+I*Pi*b*d*r^2*csgn(I*c*x^n)^3-I*
x^r*csgn(I*c*x^n)^2*csgn(I*x^n)*e*b*Pi+I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-I*x^r
*csgn(I*c*x^n)^2*csgn(I*c)*e*b*Pi-I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi
*b*d*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*P
i*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*
r-2*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r+I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n))/(1+r)^2
```

Maxima [A]
time = 0.29, size = 68, normalized size = 1.19

$$-bdnx+bdx\log\left(cx^n\right)+adx+\frac{bex^{r+1}\log\left(cx^n\right)}{r+1}-\frac{benx^{r+1}}{(r+1)^2}+\frac{aex^{r+1}}{r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d*n*x + b*d*x*log(c*x^n) + a*d*x + b*e*x^(r + 1)*log(c*x^n)/(r + 1) - b*
e*n*x^(r + 1)/(r + 1)^2 + a*e*x^(r + 1)/(r + 1)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 136 vs. $2(59) = 118$.
time = 0.39, size = 136, normalized size = 2.39

$$\frac{(bdr^2 + 2\,bdr + bd)x\log(c) + (bdnr^2 + 2\,bdnr + bdn)x\log(x) + ((br + b)xe\log(c) + (bnr + bn)xe\log(x) - (bn - ar - a)xe)x^r - (bdn + (bdn - ad)r^2 - ad + 2\,(bdn - ad)r)x}{r^2 + 2\,r + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((b*d*r^2 + 2*b*d*r + b*d)*x*log(c) + (b*d*n*r^2 + 2*b*d*n*r + b*d*n)*x*log
(x) + ((b*r + b)*x*e*log(c) + (b*n*r + b*n)*x*e*log(x) - (b*n - a*r - a)*x*
e)*x^r - (b*d*n + (b*d*n - a*d)*r^2 - a*d + 2*(b*d*n - a*d)*r)*x)/(r^2 + 2*
r + 1)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 323 vs. $2(54) = 108$.
time = 0.48, size = 323, normalized size = 5.67

$$\begin{cases} \frac{adr^2x}{r^2+2r+1} + \frac{2adrx}{r^2+2r+1} + \frac{adx}{r^2+2r+1} + \frac{aerxx^r}{r^2+2r+1} + \frac{aexx^r}{r^2+2r+1} - \frac{bdnr^2x}{r^2+2r+1} - \frac{2bdnrx}{r^2+2r+1} - \frac{bdnx}{r^2+2r+1} + \frac{bdr^2x\log{(cx^n)}}{r^2+2r+1} + \frac{2bdrx\log{(cx^n)}}{r^2+2r+1} + \frac{bdx\log{(cx^n)}}{r^2+2r+1} - \frac{benxx^r}{r^2+2r+1} + \frac{berxx^r\log{(cx^n)}}{r^2+2r+1} + \frac{bexx^r\log{(cx^n)}}{r^2+2r+1} & \text{for}\ r \neq -1 \\ adx + \frac{ae\log{(cx^n)}}{n} - bdnx + bdx\log{(cx^n)} + \frac{be\log{(cx^n)}^2}{2n} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*d*r**2*x/(r**2 + 2*r + 1) + 2*a*d*r*x/(r**2 + 2*r + 1) + a*d*x
/(r**2 + 2*r + 1) + a*e*r*x*x**r/(r**2 + 2*r + 1) + a*e*x*x**r/(r**2 + 2*r
+ 1) - b*d*n*r**2*x/(r**2 + 2*r + 1) - 2*b*d*n*r*x/(r**2 + 2*r + 1) - b*d*n
*x/(r**2 + 2*r + 1) + b*d*r**2*x*log(c*x**n)/(r**2 + 2*r + 1) + 2*b*d*r*x*l
og(c*x**n)/(r**2 + 2*r + 1) + b*d*x*log(c*x**n)/(r**2 + 2*r + 1) - b*e*n*x*
x**r/(r**2 + 2*r + 1) + b*e*r*x*x**r*log(c*x**n)/(r**2 + 2*r + 1) + b*e*x*x
**r*log(c*x**n)/(r**2 + 2*r + 1), Ne(r, -1)), (a*d*x + a*e*log(c*x**n)/n -
b*d*n*x + b*d*x*log(c*x**n) + b*e*log(c*x**n)**2/(2*n), True))
```

Giac [A]
time = 2.45, size = 115, normalized size = 2.02

$$\frac{bnrxx^re\log(x)}{r^2 + 2\,r + 1} + bdnx\log(x) + \frac{bnxx^re\log(x)}{r^2 + 2\,r + 1} - bdnx - \frac{bnxx^re}{r^2 + 2\,r + 1} + bdx\log(c) + \frac{bxx^re\log(c)}{r + 1} + adx + \frac{axx^re}{r + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*n*r*x*x^r*e*log(x)/(r^2 + 2*r + 1) + b*d*n*x*log(x) + b*n*x*x^r*e*log(x)/
(r^2 + 2*r + 1) - b*d*n*x - b*n*x*x^r*e/(r^2 + 2*r + 1) + b*d*x*log(c) + b*
x*x^r*e*log(c)/(r + 1) + a*d*x + a*x*x^r*e/(r + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^r)*(a + b*log(c*x^n)),x)
[Out] int((d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.376 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=67

$$-\frac{bdn}{x}-\frac{benx^{-1+r}}{(1-r)^2}-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{-1+r}(a+b\log(cx^n))}{1-r}$$

```
[Out] -b*d*n/x-b*e*n*x^(-1+r)/(1-r)^2-d*(a+b*ln(c*x^n))/x-e*x^(-1+r)*(a+b*ln(c*x^
n))/(1-r)
```

Rubi [A]
time = 0.05, antiderivative size = 67, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {14, 2372, 12}

$$-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{bdn}{x}-\frac{benx^{r-1}}{(1-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d*n)/x) - (b*e*n*x^(-1 + r))/(1 - r)^2 - (d*(a + b*Log[c*x^n]))/x - (e
*x^(-1 + r)*(a + b*Log[c*x^n]))/(1 - r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = -\left(\frac{d}{x}+\frac{ex^{-1+r}}{1-r}\right)(a+b\log(cx^n)) - (bn)\int \frac{-d+dr-ex^r}{(1-r)x^2}\,dx$$
$$= -\left(\frac{d}{x}+\frac{ex^{-1+r}}{1-r}\right)(a+b\log(cx^n)) - \frac{(bn)\int \frac{-d+dr-ex^r}{x^2}\,dx}{1-r}$$
$$= -\left(\frac{d}{x}+\frac{ex^{-1+r}}{1-r}\right)(a+b\log(cx^n)) - \frac{(bn)\int \left(\frac{d(-1+r)}{x^2}-ex^{-2+r}\right)dx}{1-r}$$
$$= -\frac{bdn}{x} - \frac{benx^{-1+r}}{(1-r)^2} - \left(\frac{d}{x}+\frac{ex^{-1+r}}{1-r}\right)(a+b\log(cx^n))$$

Mathematica [A]
time = 0.08, size = 67, normalized size = 1.00

$$-\frac{a(-1+r)(d(-1+r)-ex^r)+bn(d(-1+r)^2+ex^r)+b(-1+r)(d(-1+r)-ex^r)\log(cx^n)}{(-1+r)^2x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((a*(-1 + r)*(d*(-1 + r) - e*x^r) + b*n*(d*(-1 + r)^2 + e*x^r) + b*(-1 + r
)*(d*(-1 + r) - e*x^r)*Log[c*x^n])/((-1 + r)^2*x))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 614, normalized size = 9.16

method	result
risch	$-\frac{b(dr-e\,x^r-d)\ln(x^n)}{(-1+r)x} - \frac{2x^r ae+2bdn+2x^r ben-2x^r aer+2ad-4bdnr-4\ln(c)bdr+2\ln(c)bd\,r^2+2ad\,r^2+2db\ln(c)-2\ln(c)be\,x^r r-$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b*(d*r-e*x^r-d)/(-1+r)/x*ln(x^n)-1/2*(2*x^r*a*e+2*b*d*n-I*Pi*b*e*csgn(I*c*
x^n)^3*x^r+2*x^r*b*e*n-2*x^r*a*e*r+I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+I
*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+2*a*d-I*Pi*b*d*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)-4*b*d*n*r+2*I*Pi*b*d*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-
4*ln(c)*b*d*r+2*ln(c)*b*d*r^2+2*a*d*r^2-I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)*x^r+2*d*b*ln(c)-2*ln(c)*b*e*x^r*r-4*a*d*r+I*Pi*b*d*r^2*csgn(I*c)*
csgn(I*c*x^n)^2-I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*b*d*n*r^
2+2*ln(c)*b*e*x^r+2*I*Pi*b*d*csgn(I*c*x^n)^3*r-I*Pi*b*d*csgn(I*c*x^n)^3-I*P
i*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*
x^r*r+I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r+I*Pi*b*e*csgn(I*c*
```

```
x^n)^3*x^r*r+I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b*d*csgn(I*x^n)*csgn(I
*c*x^n)^2-I*Pi*b*d*r^2*csgn(I*c*x^n)^3+I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^
n)^2-2*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*r-2*I*Pi*b*d*csgn(I*c)*csgn(I*c
*x^n)^2*r)/(-1+r)^2/x
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-2>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 130 vs. $2(64) = 128$.
time = 0.39, size = 130, normalized size = 1.94

$$-\frac{bdn + (bdn + ad)r^2 + ad - 2\,(bdn + ad)r - ((br - b)e\log(c) + (bnr - bn)e\log(x) - (bn - ar + a)e)x^r + (bdr^2 - 2\,bdr + bd)\log(c) + (bdnr^2 - 2\,bdnr + bdn)\log(x)}{(r^2 - 2\,r + 1)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] -(b*d*n + (b*d*n + a*d)*r^2 + a*d - 2*(b*d*n + a*d)*r - ((b*r - b)*e*log(c)
 + (b*n*r - b*n)*e*log(x) - (b*n - a*r + a)*e)*x^r + (b*d*r^2 - 2*b*d*r + b
*d)*log(c) + (b*d*n*r^2 - 2*b*d*n*r + b*d*n)*log(x))/((r^2 - 2*r + 1)*x)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 348 vs. $2(56) = 112$.
time = 3.20, size = 348, normalized size = 5.19

$$\begin{cases} -\frac{adr^2}{r^2x-2rx+x} + \frac{2adr}{r^2x-2rx+x} - \frac{ad}{r^2x-2rx+x} + \frac{aerx^r}{r^2x-2rx+x} - \frac{aex^r}{r^2x-2rx+x} - \frac{bdnr^2}{r^2x-2rx+x} + \frac{2bdnr}{r^2x-2rx+x} - \frac{bdn}{r^2x-2rx+x} - \frac{bdr^2\log(cx^n)}{r^2x-2rx+x} + \frac{2bdr\log(cx^n)}{r^2x-2rx+x} - \frac{bd\log(cx^n)}{r^2x-2rx+x} - \frac{benx^r}{r^2x-2rx+x} + \frac{berx^r\log(cx^n)}{r^2x-2rx+x} - \frac{bex^r\log(cx^n)}{r^2x-2rx+x} & \text{for}\ r \neq 1 \\ -\frac{ad}{x} + ae\log(x) + bd\left(-\frac{n}{x} - \frac{\log(cx^n)}{x}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for}\ n = 0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Piecewise((-a*d*r**2/(r**2*x - 2*r*x + x) + 2*a*d*r/(r**2*x - 2*r*x + x) -
a*d/(r**2*x - 2*r*x + x) + a*e*r*x**r/(r**2*x - 2*r*x + x) - a*e*x**r/(r**2
*x - 2*r*x + x) - b*d*n*r**2/(r**2*x - 2*r*x + x) + 2*b*d*n*r/(r**2*x - 2*r
*x + x) - b*d*n/(r**2*x - 2*r*x + x) - b*d*r**2*log(c*x**n)/(r**2*x - 2*r*x
 + x) + 2*b*d*r*log(c*x**n)/(r**2*x - 2*r*x + x) - b*d*log(c*x**n)/(r**2*x
```

```
- 2*r*x + x) - b*e*n*x**r/(r**2*x - 2*r*x + x) + b*e*r*x**r*log(c*x**n)/(r*
*2*x - 2*r*x + x) - b*e*x**r*log(c*x**n)/(r**2*x - 2*r*x + x), Ne(r, 1)), (
-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewise((-log(c)*l
og(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 193 vs. $2(64) = 128$.
time = 2.40, size = 193, normalized size = 2.88

$$\frac{bnrx^r e \log(x)}{(r^2-2r+1)x} + \frac{brx^r e \log(c)}{(r^2-2r+1)x} - \frac{bdn \log(x)}{x} - \frac{bnx^r e \log(x)}{(r^2-2r+1)x} - \frac{bdn}{x} - \frac{bnx^r e}{(r^2-2r+1)x} + \frac{arx^r e}{(r^2-2r+1)x} - \frac{bd \log(c)}{x} - \frac{bx^r e \log(c)}{(r^2-2r+1)x} - \frac{ad}{x} - \frac{ax^r e}{(r^2-2r+1)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] b*n*r*x^r*e*log(x)/((r^2 - 2*r + 1)*x) + b*r*x^r*e*log(c)/((r^2 - 2*r + 1)*
x) - b*d*n*log(x)/x - b*n*x^r*e*log(x)/((r^2 - 2*r + 1)*x) - b*d*n/x - b*n*
x^r*e/((r^2 - 2*r + 1)*x) + a*r*x^r*e/((r^2 - 2*r + 1)*x) - b*d*log(c)/x -
b*x^r*e*log(c)/((r^2 - 2*r + 1)*x) - a*d/x - a*x^r*e/((r^2 - 2*r + 1)*x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)\,(a+b\,\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^2,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^2, x)
```

3.377 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=71

$$-\frac{bdn}{9x^3}-\frac{benx^{-3+r}}{(3-r)^2}-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{-3+r}(a+b\log(cx^n))}{3-r}$$

```
[Out] -1/9*b*d*n/x^3-b*e*n*x^(-3+r)/(3-r)^2-1/3*d*(a+b*ln(c*x^n))/x^3-e*x^(-3+r)*
(a+b*ln(c*x^n))/(3-r)
```

Rubi [A]
time = 0.05, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {14, 2372}

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{bdn}{9x^3}-\frac{benx^{r-3}}{(3-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d*n)/x^3 - (b*e*n*x^(-3 + r))/(3 - r)^2 - (d*(a + b*Log[c*x^n]))/(3
*x^3) - (e*x^(-3 + r)*(a + b*Log[c*x^n]))/(3 - r)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx &= -\frac{1}{3}\left(\frac{d}{x^3}+\frac{3ex^{-3+r}}{3-r}\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d}{3x^4}+\frac{ex^{-4+r}}{-3+r}\right)dx\\ &= -\frac{bdn}{9x^3}-\frac{benx^{-3+r}}{(3-r)^2}-\frac{1}{3}\left(\frac{d}{x^3}+\frac{3ex^{-3+r}}{3-r}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.09, size = 72, normalized size = 1.01

$$-\frac{3a(-3+r)\left(d(-3+r)-3ex^r\right)+bn\left(d(-3+r)^2+9ex^r\right)+3b(-3+r)\left(d(-3+r)-3ex^r\right)\log\left(cx^n\right)}{9(-3+r)^2x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(3*a*(-3 + r)*(d*(-3 + r) - 3*e*x^r) + b*n*(d*(-3 + r)^2 + 9*e*x^r) + 
3*b*(-3 + r)*(d*(-3 + r) - 3*e*x^r)*Log[c*x^n])/((-3 + r)^2*x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 614, normalized size = 8.65

method	result
risch	$-\frac{b(dr-3e\,x^r-3d)\ln(x^n)}{3(-3+r)x^3}-\frac{54x^r ae+18bdn+18x^r ben-18x^r aer+54ad-12bdnr-36\ln(c)bdr+6\ln(c)bd\,r^2+6ad\,r^2+54db\ln(c)-18}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(d*r-3*e*x^r-3*d)/(-3+r)/x^3*ln(x^n)-1/18*(54*x^r*a*e+18*b*d*n+18*x^
r*b*e*n-18*x^r*a*e*r+54*a*d+27*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+9*I*P
i*b*e*csgn(I*c*x^n)^3*x^r*r-18*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r-12*b*d*
n*r-36*ln(c)*b*d*r+6*ln(c)*b*d*r^2+6*a*d*r^2+18*I*Pi*b*d*r*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)-9*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r*r+54*d*b*ln(
c)-18*ln(c)*b*e*x^r*r-3*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-36
*a*d*r+27*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+3*I*Pi*b*d*r^2*csgn(I*c)
*csgn(I*c*x^n)^2+2*b*d*n*r^2+54*ln(c)*b*e*x^r-27*I*Pi*b*d*csgn(I*c*x^n)^3-9
*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r-27*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)*x^r+9*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r+18*
I*Pi*b*d*csgn(I*c*x^n)^3*r-27*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+
27*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2-3*I*Pi*b*d*r^2*csgn(I*c*x^n)^3-27*I*P
i*b*e*csgn(I*c*x^n)^3*x^r-18*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*r+27*I*Pi
*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+3*I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2
)/(-3+r)^2/x^3
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-4>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(64) = 128$.

time = 0.37, size = 140, normalized size = 1.97

$$-\frac{9\,bdn + (bdn + 3\,ad)r^2 + 27\,ad - 6\,(bdn + 3\,ad)r - 9\,((br - 3\,b)e\log(c) + (bnr - 3\,bn)e\log(x) - (bn - ar + 3\,a)e)x^r + 3\,(bdr^2 - 6\,bdr + 9\,bd)\log(c) + 3\,(bdnr^2 - 6\,bdnr + 9\,bdn)\log(x)}{9\,(r^2 - 6\,r + 9)x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/9*(9*b*d*n + (b*d*n + 3*a*d)*r^2 + 27*a*d - 6*(b*d*n + 3*a*d)*r - 9*((b*
r - 3*b)*e*log(c) + (b*n*r - 3*b*n)*e*log(x) - (b*n - a*r + 3*a)*e)*x^r + 3
*(b*d*r^2 - 6*b*d*r + 9*b*d)*log(c) + 3*(b*d*n*r^2 - 6*b*d*n*r + 9*b*d*n)*l
og(x))/((r^2 - 6*r + 9)*x^3)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

time = 4.14, size = 495, normalized size = 6.97

$$\begin{cases} -\frac{3adr^2}{9r^2x^3-54rx^3+81x^3} + \frac{18adr}{9r^2x^3-54rx^3+81x^3} - \frac{27ad}{9r^2x^3-54rx^3+81x^3} + \frac{9aerx^r}{9r^2x^3-54rx^3+81x^3} - \frac{27aex^r}{9r^2x^3-54rx^3+81x^3} - \frac{bdnr^2}{9r^2x^3-54rx^3+81x^3} + \frac{6bdnr}{9r^2x^3-54rx^3+81x^3} - \frac{9bdn}{9r^2x^3-54rx^3+81x^3} - \frac{3bdr^2\log(cx^n)}{9r^2x^3-54rx^3+81x^3} + \frac{18bdr\log(cx^n)}{9r^2x^3-54rx^3+81x^3} - \frac{27bd\log(cx^n)}{9r^2x^3-54rx^3+81x^3} - \frac{9benx^r}{9r^2x^3-54rx^3+81x^3} + \frac{9berx^r\log(cx^n)}{9r^2x^3-54rx^3+81x^3} - \frac{27bex^r\log(cx^n)}{9r^2x^3-54rx^3+81x^3} & \text{for}\: r \neq 3 \\ -\frac{ad}{3x^3} + ae\log(x) + bd\left(-\frac{n}{9x^3} - \frac{\log(cx^n)}{3x^3}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for}\: n = 0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] Piecewise((-3*a*d*r**2/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) + 18*a*d*r/(9*r*
*2*x**3 - 54*r*x**3 + 81*x**3) - 27*a*d/(9*r**2*x**3 - 54*r*x**3 + 81*x**3)
 + 9*a*e*r*x**r/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 27*a*e*x**r/(9*r**2*x
**3 - 54*r*x**3 + 81*x**3) - b*d*n*r**2/(9*r**2*x**3 - 54*r*x**3 + 81*x**3)
 + 6*b*d*n*r/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 9*b*d*n/(9*r**2*x**3 - 5
4*r*x**3 + 81*x**3) - 3*b*d*r**2*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*
x**3) + 18*b*d*r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 27*b*d*l
og(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 9*b*e*n*x**r/(9*r**2*x**3
- 54*r*x**3 + 81*x**3) + 9*b*e*r*x**r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3
+ 81*x**3) - 27*b*e*x**r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3), N
e(r, 3)), (-a*d/(3*x**3) + a*e*log(x) + b*d*(-n/(9*x**3) - log(c*x**n)/(3*x
**3)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), T
rue)), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 397 vs. $2(64) = 128$.

time = 2.39, size = 397, normalized size = 5.59

$$-\frac{bdnr^2\log(x)}{3\,(r^2 - 6\,r + 9)x^3} + \frac{bnrx^re\log(x)}{(r^2 - 6\,r + 9)x^3} - \frac{bdnr^2}{9\,(r^2 - 6\,r + 9)x^3} - \frac{bdr^2\log(c)}{3\,(r^2 - 6\,r + 9)x^3} + \frac{brx^re\log(c)}{(r^2 - 6\,r + 9)x^3} + \frac{2\,bdnr\log(x)}{(r^2 - 6\,r + 9)x^3} - \frac{3\,bnx^re\log(x)}{(r^2 - 6\,r + 9)x^3} + \frac{2\,bdnr}{3\,(r^2 - 6\,r + 9)x^3} - \frac{adr^2}{3\,(r^2 - 6\,r + 9)x^3} - \frac{bnx^re}{(r^2 - 6\,r + 9)x^3} + \frac{arx^re}{(r^2 - 6\,r + 9)x^3} + \frac{2\,bdr\log(c)}{(r^2 - 6\,r + 9)x^3} - \frac{3\,bx^re\log(c)}{(r^2 - 6\,r + 9)x^3} - \frac{3\,bdn\log(x)}{(r^2 - 6\,r + 9)x^3} - \frac{bdn}{(r^2 - 6\,r + 9)x^3} + \frac{2\,adr}{(r^2 - 6\,r + 9)x^3} - \frac{3\,ax^re}{(r^2 - 6\,r + 9)x^3} - \frac{3\,bd\log(c)}{(r^2 - 6\,r + 9)x^3} - \frac{3\,ad}{(r^2 - 6\,r + 9)x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] -1/3*b*d*n*r^2*log(x)/((r^2 - 6*r + 9)*x^3) + b*n*r*x^r*e*log(x)/((r^2 - 6*
r + 9)*x^3) - 1/9*b*d*n*r^2/((r^2 - 6*r + 9)*x^3) - 1/3*b*d*r^2*log(c)/((r^
2 - 6*r + 9)*x^3) + b*r*x^r*e*log(c)/((r^2 - 6*r + 9)*x^3) + 2*b*d*n*r*log(
x)/((r^2 - 6*r + 9)*x^3) - 3*b*n*x^r*e*log(x)/((r^2 - 6*r + 9)*x^3) + 2/3*b
*d*n*r/((r^2 - 6*r + 9)*x^3) - 1/3*a*d*r^2/((r^2 - 6*r + 9)*x^3) - b*n*x^r*
e/((r^2 - 6*r + 9)*x^3) + a*r*x^r*e/((r^2 - 6*r + 9)*x^3) + 2*b*d*r*log(c)/
((r^2 - 6*r + 9)*x^3) - 3*b*x^r*e*log(c)/((r^2 - 6*r + 9)*x^3) - 3*b*d*n*lo
g(x)/((r^2 - 6*r + 9)*x^3) - b*d*n/((r^2 - 6*r + 9)*x^3) + 2*a*d*r/((r^2 -
6*r + 9)*x^3) - 3*a*x^r*e/((r^2 - 6*r + 9)*x^3) - 3*b*d*log(c)/((r^2 - 6*r
+ 9)*x^3) - 3*a*d/((r^2 - 6*r + 9)*x^3)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^4, x)
```

3.378 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=71

$$-\frac{bdn}{25x^5}-\frac{benx^{-5+r}}{(5-r)^2}-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{-5+r}(a+b\log(cx^n))}{5-r}$$

```
[Out] -1/25*b*d*n/x^5-b*e*n*x^(-5+r)/(5-r)^2-1/5*d*(a+b*ln(c*x^n))/x^5-e*x^(-5+r)
*(a+b*ln(c*x^n))/(5-r)
```

Rubi [A]
time = 0.05, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {14, 2372}

$$-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{bdn}{25x^5}-\frac{benx^{r-5}}{(5-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d*n)/x^5 - (b*e*n*x^(-5 + r))/(5 - r)^2 - (d*(a + b*Log[c*x^n]))/(
5*x^5) - (e*x^(-5 + r)*(a + b*Log[c*x^n]))/(5 - r)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx &= -\frac{1}{5}\left(\frac{d}{x^5}+\frac{5ex^{-5+r}}{5-r}\right)(a+b\log(cx^n))-(bn)\int\left(-\frac{d}{5x^6}+\frac{ex^{-6+r}}{-5+r}\right)dx\\ &= -\frac{bdn}{25x^5}-\frac{benx^{-5+r}}{(5-r)^2}-\frac{1}{5}\left(\frac{d}{x^5}+\frac{5ex^{-5+r}}{5-r}\right)(a+b\log(cx^n))\end{aligned}$$

Mathematica [A]
time = 0.07, size = 72, normalized size = 1.01

$$-\frac{5a(-5+r)\left(d(-5+r)-5ex^r\right)+bn(d(-5+r)^2+25ex^r)+5b(-5+r)\left(d(-5+r)-5ex^r\right)\log\left(cx^n\right)}{25(-5+r)^2x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(5*a*(-5 + r)*(d*(-5 + r) - 5*e*x^r) + b*n*(d*(-5 + r)^2 + 25*e*x^r)
+ 5*b*(-5 + r)*(d*(-5 + r) - 5*e*x^r)*Log[c*x^n])/((-5 + r)^2*x^5)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 614, normalized size = 8.65

method	result
risch	$-\frac{b(dr-5e\,x^r-5d)\ln(x^n)}{5(-5+r)x^5}-\frac{250x^r ae+50bdn+50x^r ben-50x^r aer+250ad-20bdnr-100\ln(c)bdr+10\ln(c)bd\,r^2+10ad\,r^2+250db\ln(}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/5*b*(d*r-5*e*x^r-5*d)/(-5+r)/x^5*ln(x^n)-1/50*(250*x^r*a*e+50*b*d*n+50*x
^r*b*e*n-50*x^r*a*e*r+250*a*d+125*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+
5*I*Pi*b*d*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-50*I*Pi*b*d*csgn(I*x^n)*csgn(I*c
*x^n)^2*r-20*b*d*n*r-125*I*Pi*b*d*csgn(I*c*x^n)^3-100*ln(c)*b*d*r+10*ln(c)*
b*d*r^2-25*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r*r+10*a*d*r^2+250*d*b*ln(c
)-50*ln(c)*b*e*x^r*r-25*I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r*r-100*a*d*
r-125*I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*b*d*n*r^2+250*ln(c)*b*
e*x^r-125*I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+50*I*Pi*b*d*r*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-5*I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)-125*I*Pi*b*e*csgn(I*c*x^n)^3*x^r+50*I*Pi*b*d*csgn(I*c*x^n)^3*r+5*
I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2+125*I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)
^2*x^r+125*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+25*I*Pi*b*e*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^r*r+25*I*Pi*b*e*csgn(I*c*x^n)^3*x^r*r-50*I*Pi*b*d*cs
gn(I*c)*csgn(I*c*x^n)^2*r+125*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2-5*I*Pi*b*d
*r^2*csgn(I*c*x^n)^3)/(-5+r)^2/x^5
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-6>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(64) = 128$.
time = 0.35, size = 140, normalized size = 1.97

$$-\frac{25\,bdn + (bdn + 5\,ad)r^2 + 125\,ad - 10\,(bdn + 5\,ad)r - 25\,((br - 5\,b)e\log(c) + (bnr - 5\,bn)e\log(x) - (bn - ar + 5\,a)e)x^r + 5\,(bdr^2 - 10\,bdr + 25\,bd)\log(c) + 5\,(bdnr^2 - 10\,bdnr + 25\,bdn)\log(x)}{25\,(r^2 - 10\,r + 25)x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/25*(25*b*d*n + (b*d*n + 5*a*d)*r^2 + 125*a*d - 10*(b*d*n + 5*a*d)*r - 25
*((b*r - 5*b)*e*log(c) + (b*n*r - 5*b*n)*e*log(x) - (b*n - a*r + 5*a)*e)*x^
r + 5*(b*d*r^2 - 10*b*d*r + 25*b*d)*log(c) + 5*(b*d*n*r^2 - 10*b*d*n*r + 25
*b*d*n)*log(x))/((r^2 - 10*r + 25)*x^5)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.
time = 8.00, size = 495, normalized size = 6.97

$$\begin{cases} -\frac{5adr^2}{25r^2x^5-250rx^5+625x^5} + \frac{50adr}{25r^2x^5-250rx^5+625x^5} - \frac{125ad}{25r^2x^5-250rx^5+625x^5} + \frac{25aerx^r}{25r^2x^5-250rx^5+625x^5} - \frac{125aex^r}{25r^2x^5-250rx^5+625x^5} - \frac{bdnr^2}{25r^2x^5-250rx^5+625x^5} + \frac{10bdnr}{25r^2x^5-250rx^5+625x^5} - \frac{25bdn}{25r^2x^5-250rx^5+625x^5} - \frac{5bdr^2\log(cx^n)}{25r^2x^5-250rx^5+625x^5} + \frac{50bdr\log(cx^n)}{25r^2x^5-250rx^5+625x^5} - \frac{125bd\log(cx^n)}{25r^2x^5-250rx^5+625x^5} - \frac{25benx^r}{25r^2x^5-250rx^5+625x^5} + \frac{25berx^r\log(cx^n)}{25r^2x^5-250rx^5+625x^5} - \frac{125bex^r\log(cx^n)}{25r^2x^5-250rx^5+625x^5} & \text{for}\: r \neq 5 \\ -\frac{ad}{5x^5} + ae\log(x) + bd\left(-\frac{n}{25x^5} - \frac{\log(cx^n)}{5x^5}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for}\: n = 0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] Piecewise((-5*a*d*r**2/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 50*a*d*r/(2
5*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*a*d/(25*r**2*x**5 - 250*r*x**5 +
 625*x**5) + 25*a*e*r*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*a*e
*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - b*d*n*r**2/(25*r**2*x**5 - 2
50*r*x**5 + 625*x**5) + 10*b*d*n*r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) -
 25*b*d*n/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 5*b*d*r**2*log(c*x**n)/(
25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 50*b*d*r*log(c*x**n)/(25*r**2*x**5
- 250*r*x**5 + 625*x**5) - 125*b*d*log(c*x**n)/(25*r**2*x**5 - 250*r*x**5 +
 625*x**5) - 25*b*e*n*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 25*b*e*
r*x**r*log(c*x**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*b*e*x**r*lo
g(c*x**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5), Ne(r, 5)), (-a*d/(5*x**5)
 + a*e*log(x) + b*d*(-n/(25*x**5) - log(c*x**n)/(5*x**5)) - b*e*Piecewise((
-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 397 vs. $2(64) = 128$.
time = 3.35, size = 397, normalized size = 5.59

$$-\frac{bdnr^2\log(x)}{5\,(r^2 - 10\,r + 25)x^5} + \frac{bnrx^re\log(x)}{(r^2 - 10\,r + 25)x^5} - \frac{bdnr^2}{25\,(r^2 - 10\,r + 25)x^5} - \frac{bdr^2\log(c)}{5\,(r^2 - 10\,r + 25)x^5} + \frac{brx^re\log(c)}{(r^2 - 10\,r + 25)x^5} + \frac{2\,bdnr\log(x)}{(r^2 - 10\,r + 25)x^5} - \frac{5\,bnx^re\log(x)}{(r^2 - 10\,r + 25)x^5} + \frac{2\,bdnr}{5\,(r^2 - 10\,r + 25)x^5} - \frac{adr^2}{5\,(r^2 - 10\,r + 25)x^5} - \frac{bnx^re}{(r^2 - 10\,r + 25)x^5} + \frac{arx^re}{(r^2 - 10\,r + 25)x^5} + \frac{2\,bdr\log(c)}{(r^2 - 10\,r + 25)x^5} - \frac{5\,bx^re\log(c)}{(r^2 - 10\,r + 25)x^5} - \frac{5\,bdn\log(x)}{(r^2 - 10\,r + 25)x^5} - \frac{bdn}{(r^2 - 10\,r + 25)x^5} + \frac{2\,adr}{(r^2 - 10\,r + 25)x^5} - \frac{5\,ax^re}{(r^2 - 10\,r + 25)x^5} - \frac{5\,bd\log(c)}{(r^2 - 10\,r + 25)x^5} - \frac{5\,ad}{(r^2 - 10\,r + 25)x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] -1/5*b*d*n*r^2*log(x)/((r^2 - 10*r + 25)*x^5) + b*n*r*x^r*e*log(x)/((r^2 -
10*r + 25)*x^5) - 1/25*b*d*n*r^2/((r^2 - 10*r + 25)*x^5) - 1/5*b*d*r^2*log(
c)/((r^2 - 10*r + 25)*x^5) + b*r*x^r*e*log(c)/((r^2 - 10*r + 25)*x^5) + 2*b
*d*n*r*log(x)/((r^2 - 10*r + 25)*x^5) - 5*b*n*x^r*e*log(x)/((r^2 - 10*r + 2
5)*x^5) + 2/5*b*d*n*r/((r^2 - 10*r + 25)*x^5) - 1/5*a*d*r^2/((r^2 - 10*r +
25)*x^5) - b*n*x^r*e/((r^2 - 10*r + 25)*x^5) + a*r*x^r*e/((r^2 - 10*r + 25)
*x^5) + 2*b*d*r*log(c)/((r^2 - 10*r + 25)*x^5) - 5*b*x^r*e*log(c)/((r^2 - 1
0*r + 25)*x^5) - 5*b*d*n*log(x)/((r^2 - 10*r + 25)*x^5) - b*d*n/((r^2 - 10*
r + 25)*x^5) + 2*a*d*r/((r^2 - 10*r + 25)*x^5) - 5*a*x^r*e/((r^2 - 10*r + 2
5)*x^5) - 5*b*d*log(c)/((r^2 - 10*r + 25)*x^5) - 5*a*d/((r^2 - 10*r + 25)*x
^5)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)\;(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^6,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x^6, x)
```

3.379 $\int x^5(d+ex^r)^2\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=103

$$-\frac{1}{36}bd^2nx^6-\frac{be^2nx^{2(3+r)}}{4(3+r)^2}-\frac{2bdenx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(d^2x^6+\frac{3e^2x^{2(3+r)}}{3+r}+\frac{12dex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

```
[Out] -1/36*b*d^2*n*x^6-1/4*b*e^2*n*x^(6+2*r)/(3+r)^2-2*b*d*e*n*x^(6+r)/(6+r)^2+1
/6*(d^2*x^6+3*e^2*x^(6+2*r)/(3+r)+12*d*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.11, antiderivative size = 103, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{36}bd^2nx^6-\frac{2bdenx^{r+6}}{(r+6)^2}-\frac{be^2nx^{2(r+3)}}{4(r+3)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/36*(b*d^2*n*x^6) - (b*e^2*n*x^(2*(3 + r)))/(4*(3 + r)^2) - (2*b*d*e*n*x^
(6 + r))/(6 + r)^2 + ((d^2*x^6 + (3*e^2*x^(2*(3 + r)))/(3 + r) + (12*d*e*x^
(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^5(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)dx = \frac{1}{6}\left(d^2x^6+\frac{3e^2x^{2(3+r)}}{3+r}+\frac{12dex^{6+r}}{6+r}\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{6}x^5\Big(c$$
$$=\frac{1}{6}\left(d^2x^6+\frac{3e^2x^{2(3+r)}}{3+r}+\frac{12dex^{6+r}}{6+r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}(bn)\int x^5\Big(c$$
$$=\frac{1}{6}\left(d^2x^6+\frac{3e^2x^{2(3+r)}}{3+r}+\frac{12dex^{6+r}}{6+r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}(bn)\int\Big(d^2x$$
$$=-\frac{1}{36}bd^2nx^6-\frac{be^2nx^{2(3+r)}}{4(3+r)^2}-\frac{2bdenx^{6+r}}{(6+r)^2}+\frac{1}{6}\Big(d^2x^6+\frac{3e^2x^{2(3+r)}}{3+r}+\frac{12}{}$$

Mathematica [A]
time = 0.18, size = 115, normalized size = 1.12

$$\frac{1}{36}x^6\left(6bd^2n\log(x)+d^2(6a-bn-6bn\log(x)+6b\log(cx^n))+\frac{9e^2x^{2r}(-bn+2a(3+r)+2b(3+r)\log(cx^n))}{(3+r)^2}+\frac{72dex^r(-bn+a(6+r)+b(6+r)\log(cx^n))}{(6+r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^6*(6*b*d^2*n*Log[x] + d^2*(6*a - b*n - 6*b*n*Log[x] + 6*b*Log[c*x^n]) +
(9*e^2*x^(2*r)*(-(b*n) + 2*a*(3 + r) + 2*b*(3 + r)*Log[c*x^n]))/(3 + r)^2 +
 (72*d*e*x^r*(-(b*n) + a*(6 + r) + b*(6 + r)*Log[c*x^n]))/(6 + r)^2))/36
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.20, size = 1924, normalized size = 18.68

method	result	size
risch	Expression too large to display	1924

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*b*x^6*(3*e^2*(x^r)^2*r+d^2*r^2+12*d*e*x^r*r+18*e^2*(x^r)^2+9*d^2*r+36*d
*e*x^r+18*d^2)/(3+r)/(6+r)*ln(x^n)-1/36*x^6*(-1944*e^2*(x^r)^2*a-3888*d*e*x
^r*a-3*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2-54*I*Pi*b*d^2*r^3*csgn(I*
c)*csgn(I*c*x^n)^2-54*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2+117*b*d^2*
n*r^2+324*b*d^2*n*r-702*ln(c)*b*d^2*r^2-1944*ln(c)*b*d^2*r-6*ln(c)*b*d^2*r^
4-108*ln(c)*b*d^2*r^3-9*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-
1944*d^2*b*ln(c)+324*b*d^2*n-1944*a*d^2+b*d^2*n*r^4+18*b*d^2*n*r^3-6*a*d^2*
```

```
r^4-108*a*d^2*r^3-972*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-702*a*d^
2*r^2-1944*a*d^2*r-1944*ln(c)*b*e^2*(x^r)^2-18*a*e^2*r^3*(x^r)^2-270*a*e^2*
r^2*(x^r)^2-1296*a*e^2*r*(x^r)^2+324*b*e^2*n*(x^r)^2-864*a*d*e*r^2*x^r-3240
*a*d*e*r*x^r+108*b*e^2*n*r*(x^r)^2+648*b*d*e*n*x^r+9*b*e^2*n*r^2*(x^r)^2-72
*a*d*e*r^3*x^r-270*ln(c)*b*e^2*r^2*(x^r)^2-1296*ln(c)*b*e^2*r*(x^r)^2-18*ln
(c)*b*e^2*r^3*(x^r)^2-3888*ln(c)*b*d*e*x^r+972*I*Pi*b*d^2*csgn(I*c*x^n)^3-9
72*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+3*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3+
972*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-351*I*Pi*b*d^2*r^2*csgn(
I*c)*csgn(I*c*x^n)^2+9*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+54*I*Pi*b*d^2
*r^3*csgn(I*c*x^n)^3+432*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*x^r-1620*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+1944*I*Pi*b*d*e*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+351*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+3*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+54*I*P
i*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-9*I*Pi*b*e^2*r^3*csgn(I*c)*
csgn(I*c*x^n)^2*(x^r)^2+1620*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r-135*I*Pi*b*e^
2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+432*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^
3*x^r+432*b*d*e*n*r*x^r-864*ln(c)*b*d*e*r^2*x^r-432*I*Pi*b*d*e*r^2*csgn(I*c
)*csgn(I*c*x^n)^2*x^r-432*I*Pi*b*d*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+13
5*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+36*I*Pi*b*d*e*
r^3*csgn(I*c*x^n)^3*x^r-648*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-
648*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-3*I*Pi*b*d^2*r^4*csgn(
I*c)*csgn(I*c*x^n)^2-36*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r+9*I*Pi
*b*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-36*I*Pi*b*d*e*r^3*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x^r-972*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x
^r)^2+1944*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r+972*I*Pi*b*d^2*r*csgn(I*c*x^n)^3-
972*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+648*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*(x^r)^2-1620*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-
3240*ln(c)*b*d*e*r*x^r+36*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*x^r+135*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+648*I*Pi*b*e^2*r*csgn(I*c*
x^n)^3*(x^r)^2+1620*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+97
2*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+972*I*Pi*b*d^2*r*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1944*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^
2*x^r-1944*I*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-135*I*Pi*b*e^2*r^2*cs
gn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-351*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n
)^2-972*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*c*x^n)^2-972*I*Pi*b*d^2*r*csgn(I*x^n)
*csgn(I*c*x^n)^2-72*ln(c)*b*d*e*r^3*x^r+72*b*d*e*n*r^2*x^r+351*I*Pi*b*d^2*r
^2*csgn(I*c*x^n)^3+972*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2)/(3+r)^2/(6+r)^2
```

Maxima [A]
time = 0.29, size = 148, normalized size = 1.44

$$-\frac{1}{36}\,bd^2nx^6+\frac{1}{6}\,bd^2x^6\log\left(cx^n\right)+\frac{1}{6}\,ad^2x^6+\frac{be^2x^{2\,r+6}\log\left(cx^n\right)}{2\,(r+3)}+\frac{2\,bdex^{r+6}\log\left(cx^n\right)}{r+6}-\frac{be^2nx^{2\,r+6}}{4\,(r+3)^2}+\frac{ae^2x^{2\,r+6}}{2\,(r+3)}-\frac{2\,bdenx^{r+6}}{(r+6)^2}+\frac{2\,adex^{r+6}}{r+6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*d^2*n*x^6 + 1/6*b*d^2*x^6*log(c*x^n) + 1/6*a*d^2*x^6 + 1/2*b*e^2*x^
(2*r + 6)*log(c*x^n)/(r + 3) + 2*b*d*e*x^(r + 6)*log(c*x^n)/(r + 6) - 1/4*b
*e^2*n*x^(2*r + 6)/(r + 3)^2 + 1/2*a*e^2*x^(2*r + 6)/(r + 3) - 2*b*d*e*n*x^
(r + 6)/(r + 6)^2 + 2*a*d*e*x^(r + 6)/(r + 6)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 441 vs. $2(97) = 194$.
time = 0.39, size = 441, normalized size = 4.28

$$\frac{6\,(bd^2r^4 + 18\,bd^2r^3 + 117\,bd^2r^2 + 324\,bd^2r + 324\,bd^2)x^6\log(c) + 6\,(bd^2nr^4 + 18\,bd^2nr^3 + 117\,bd^2nr^2 + 324\,bd^2nr + 324\,bd^2n)x^6\log(x) - ((bd^2n - 6\,ad^2)r^4 + 18\,(bd^2n - 6\,ad^2)r^3 - 1944\,ad^2 + 117\,(bd^2n - 6\,ad^2)r^2 + 324\,(bd^2n - 6\,ad^2)r)x^6 + 9\,(2\,(br^3 + 15\,br^2 + 72\,br + 108\,b)x^6e^2\log(c) + 2\,(bnr^3 + 15\,bnr^2 + 72\,bnr + 108\,bn)x^6e^2\log(x) + (2\,ar^3 - (bn - 30\,a)r^2 - 36\,bn - 12\,(bn - 12\,a)r + 216\,a)x^6e^2)x^{2r} + 72\,((bdr^3 + 12\,bdr^2 + 45\,bdr + 54\,bd)x^6e\log(c) + (bdnr^3 + 12\,bdnr^2 + 45\,bdnr + 54\,bdn)x^6e\log(x) + (adr^3 - 9\,bdn - (bdn - 12\,ad)r^2 + 54\,ad - 3\,(2\,bdn - 15\,ad)r)x^6e)x^r}{36\,(r^4 + 18\,r^3 + 117\,r^2 + 324\,r + 324)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/36*(6*(b*d^2*r^4 + 18*b*d^2*r^3 + 117*b*d^2*r^2 + 324*b*d^2*r + 324*b*d^2
)*x^6*log(c) + 6*(b*d^2*n*r^4 + 18*b*d^2*n*r^3 + 117*b*d^2*n*r^2 + 324*b*d^
2*n*r + 324*b*d^2*n)*x^6*log(x) - ((b*d^2*n - 6*a*d^2)*r^4 + 324*b*d^2*n +
18*(b*d^2*n - 6*a*d^2)*r^3 - 1944*a*d^2 + 117*(b*d^2*n - 6*a*d^2)*r^2 + 324
*(b*d^2*n - 6*a*d^2)*r)*x^6 + 9*(2*(b*r^3 + 15*b*r^2 + 72*b*r + 108*b)*x^6*
e^2*log(c) + 2*(b*n*r^3 + 15*b*n*r^2 + 72*b*n*r + 108*b*n)*x^6*e^2*log(x) +
 (2*a*r^3 - (b*n - 30*a)*r^2 - 36*b*n - 12*(b*n - 12*a)*r + 216*a)*x^6*e^2)
*x^(2*r) + 72*((b*d*r^3 + 12*b*d*r^2 + 45*b*d*r + 54*b*d)*x^6*e*log(c) + (b
*d*n*r^3 + 12*b*d*n*r^2 + 45*b*d*n*r + 54*b*d*n)*x^6*e*log(x) + (a*d*r^3 -
9*b*d*n - (b*d*n - 12*a*d)*r^2 + 54*a*d - 3*(2*b*d*n - 15*a*d)*r)*x^6*e)*x^
r)/(r^4 + 18*r^3 + 117*r^2 + 324*r + 324)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1634 vs. $2(97) = 194$.
time = 38.43, size = 1634, normalized size = 15.86

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*d**2*x**6/6 + 2*a*d*e*log(c*x**n)/n - a*e**2/(6*x**6) - b*d**2
*n*x**6/36 + b*d**2*x**6*log(c*x**n)/6 + b*d*e*log(c*x**n)**2/n - b*e**2*n/
(36*x**6) - b*e**2*log(c*x**n)/(6*x**6), Eq(r, -6)), (a*d**2*x**6/6 + 2*a*d
*e*x**3/3 + a*e**2*log(c*x**n)/n - b*d**2*n*x**6/36 + b*d**2*x**6*log(c*x**
n)/6 - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 + b*e**2*log(c*x**n)**
2/(2*n), Eq(r, -3)), (6*a*d**2*r**4*x**6/(36*r**4 + 648*r**3 + 4212*r**2 +
11664*r + 11664) + 108*a*d**2*r**3*x**6/(36*r**4 + 648*r**3 + 4212*r**2 + 1
1664*r + 11664) + 702*a*d**2*r**2*x**6/(36*r**4 + 648*r**3 + 4212*r**2 + 11
664*r + 11664) + 1944*a*d**2*r*x**6/(36*r**4 + 648*r**3 + 4212*r**2 + 11664
*r + 11664) + 1944*a*d**2*x**6/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r +
11664) + 72*a*d*e*r**3*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r
```

```
+ 11664) + 864*a*d*e*r**2*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 11664
*r + 11664) + 3240*a*d*e*r*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 1166
4*r + 11664) + 3888*a*d*e*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 11664
*r + 11664) + 18*a*e**2*r**3*x**6*x**(2*r)/(36*r**4 + 648*r**3 + 4212*r**2
+ 11664*r + 11664) + 270*a*e**2*r**2*x**6*x**(2*r)/(36*r**4 + 648*r**3 + 42
12*r**2 + 11664*r + 11664) + 1296*a*e**2*r*x**6*x**(2*r)/(36*r**4 + 648*r**
3 + 4212*r**2 + 11664*r + 11664) + 1944*a*e**2*x**6*x**(2*r)/(36*r**4 + 648
*r**3 + 4212*r**2 + 11664*r + 11664) - b*d**2*n*r**4*x**6/(36*r**4 + 648*r*
*3 + 4212*r**2 + 11664*r + 11664) - 18*b*d**2*n*r**3*x**6/(36*r**4 + 648*r*
*3 + 4212*r**2 + 11664*r + 11664) - 117*b*d**2*n*r**2*x**6/(36*r**4 + 648*r
**3 + 4212*r**2 + 11664*r + 11664) - 324*b*d**2*n*r*x**6/(36*r**4 + 648*r**
3 + 4212*r**2 + 11664*r + 11664) - 324*b*d**2*n*x**6/(36*r**4 + 648*r**3 +
4212*r**2 + 11664*r + 11664) + 6*b*d**2*r**4*x**6*log(c*x**n)/(36*r**4 + 64
8*r**3 + 4212*r**2 + 11664*r + 11664) + 108*b*d**2*r**3*x**6*log(c*x**n)/(3
6*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 702*b*d**2*r**2*x**6*log
(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1944*b*d**2*r
*x**6*log(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1944
*b*d**2*x**6*log(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664)
 - 72*b*d*e*n*r**2*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11
664) - 432*b*d*e*n*r*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r +
11664) - 648*b*d*e*n*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r +
11664) + 72*b*d*e*r**3*x**6*x**r*log(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**
2 + 11664*r + 11664) + 864*b*d*e*r**2*x**6*x**r*log(c*x**n)/(36*r**4 + 648*
r**3 + 4212*r**2 + 11664*r + 11664) + 3240*b*d*e*r*x**6*x**r*log(c*x**n)/(3
6*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 3888*b*d*e*x**6*x**r*log
(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) - 9*b*e**2*n*r*
*2*x**6*x**(2*r)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) - 108*b
*e**2*n*r*x**6*x**(2*r)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664)
- 324*b*e**2*n*x**6*x**(2*r)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11
664) + 18*b*e**2*r**3*x**6*x**(2*r)*log(c*x**n)/(36*r**4 + 648*r**3 + 4212*
r**2 + 11664*r + 11664) + 270*b*e**2*r**2*x**6*x**(2*r)*log(c*x**n)/(36*r**
4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1296*b*e**2*r*x**6*x**(2*r)*l
og(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1944*b*e**2
*x**6*x**(2*r)*log(c*x**n)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 1166
4), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 744 vs. 2(97) = 194.
time = 2.60, size = 744, normalized size = 7.22

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/36*(6*b*d^2*n*r^4*x^6*log(x) + 72*b*d*n*r^3*x^6*x^r*e*log(x) - b*d^2*n*r^
4*x^6 + 6*b*d^2*r^4*x^6*log(c) + 72*b*d*r^3*x^6*x^r*e*log(c) + 108*b*d^2*n*
r^3*x^6*log(x) + 18*b*n*r^3*x^6*x^(2*r)*e^2*log(x) + 864*b*d*n*r^2*x^6*x^r*
e*log(x) - 18*b*d^2*n*r^3*x^6 + 6*a*d^2*r^4*x^6 - 72*b*d*n*r^2*x^6*x^r*e +
72*a*d*r^3*x^6*x^r*e + 108*b*d^2*r^3*x^6*log(c) + 18*b*r^3*x^6*x^(2*r)*e^2*
log(c) + 864*b*d*r^2*x^6*x^r*e*log(c) + 702*b*d^2*n*r^2*x^6*log(x) + 270*b*
n*r^2*x^6*x^(2*r)*e^2*log(x) + 3240*b*d*n*r*x^6*x^r*e*log(x) - 117*b*d^2*n*
r^2*x^6 + 108*a*d^2*r^3*x^6 - 9*b*n*r^2*x^6*x^(2*r)*e^2 + 18*a*r^3*x^6*x^(2
*r)*e^2 - 432*b*d*n*r*x^6*x^r*e + 864*a*d*r^2*x^6*x^r*e + 702*b*d^2*r^2*x^6
*log(c) + 270*b*r^2*x^6*x^(2*r)*e^2*log(c) + 3240*b*d*r*x^6*x^r*e*log(c) +
1944*b*d^2*n*r*x^6*log(x) + 1296*b*n*r*x^6*x^(2*r)*e^2*log(x) + 3888*b*d*n*
x^6*x^r*e*log(x) - 324*b*d^2*n*r*x^6 + 702*a*d^2*r^2*x^6 - 108*b*n*r*x^6*x^
(2*r)*e^2 + 270*a*r^2*x^6*x^(2*r)*e^2 - 648*b*d*n*x^6*x^r*e + 3240*a*d*r*x^
6*x^r*e + 1944*b*d^2*r*x^6*log(c) + 1296*b*r*x^6*x^(2*r)*e^2*log(c) + 3888*
b*d*x^6*x^r*e*log(c) + 1944*b*d^2*n*x^6*log(x) + 1944*b*n*x^6*x^(2*r)*e^2*l
og(x) - 324*b*d^2*n*x^6 + 1944*a*d^2*r*x^6 - 324*b*n*x^6*x^(2*r)*e^2 + 1296
*a*r*x^6*x^(2*r)*e^2 + 3888*a*d*x^6*x^r*e + 1944*b*d^2*x^6*log(c) + 1944*b*
x^6*x^(2*r)*e^2*log(c) + 1944*a*d^2*x^6 + 1944*a*x^6*x^(2*r)*e^2)/(r^4 + 18
*r^3 + 117*r^2 + 324*r + 324)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int x^5 \left(d+e\,x^r\right)^2 \left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^5*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.380 $\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx$

Optimal. Leaf size=103

$$-\frac{1}{16}bd^2nx^4-\frac{be^2nx^{2(2+r)}}{4(2+r)^2}-\frac{2bdenx^{4+r}}{(4+r)^2}+\frac{1}{4}\left(d^2x^4+\frac{2e^2x^{2(2+r)}}{2+r}+\frac{8dex^{4+r}}{4+r}\right)(a+b\log(cx^n))$$

```
[Out] -1/16*b*d^2*n*x^4-1/4*b*e^2*n*x^(4+2*r)/(2+r)^2-2*b*d*e*n*x^(4+r)/(4+r)^2+1
/4*(d^2*x^4+2*e^2*x^(4+2*r)/(2+r)+8*d*e*x^(4+r)/(4+r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.11, antiderivative size = 103, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {276, 2371, 12, 14}

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{16}bd^2nx^4-\frac{2bdenx^{r+4}}{(r+4)^2}-\frac{be^2nx^{2(r+2)}}{4(r+2)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d^2*n*x^4) - (b*e^2*n*x^(2*(2 + r)))/(4*(2 + r)^2) - (2*b*d*e*n*x^
(4 + r))/(4 + r)^2 + ((d^2*x^4 + (2*e^2*x^(2*(2 + r)))/(2 + r) + (8*d*e*x^(
4 + r))/(4 + r))*(a + b*Log[c*x^n]))/4
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^3(d+ex^r)^2\,(a+b\log(cx^n))\,dx = \frac{1}{4}\left(d^2x^4+\frac{2e^2x^{2(2+r)}}{2+r}+\frac{8dex^{4+r}}{4+r}\right)(a+b\log(cx^n)) - (bn)\int\frac{1}{4}x^3\Big(d^2$$
$$= \frac{1}{4}\left(d^2x^4+\frac{2e^2x^{2(2+r)}}{2+r}+\frac{8dex^{4+r}}{4+r}\right)(a+b\log(cx^n)) - \frac{1}{4}(bn)\int x^3\Big(d^2$$
$$= \frac{1}{4}\left(d^2x^4+\frac{2e^2x^{2(2+r)}}{2+r}+\frac{8dex^{4+r}}{4+r}\right)(a+b\log(cx^n)) - \frac{1}{4}(bn)\int\Big(d^2x^3$$
$$= -\frac{1}{16}bd^2nx^4 - \frac{be^2nx^{2(2+r)}}{4(2+r)^2} - \frac{2bdenx^{4+r}}{(4+r)^2} + \frac{1}{4}\Big(d^2x^4+\frac{2e^2x^{2(2+r)}}{2+r}+ 8d$$

Mathematica [A]
time = 0.17, size = 115, normalized size = 1.12

$$\frac{1}{16}x^4\left(4bd^2n\log(x)+d^2(4a-bn-4bn\log(x)+4b\log(cx^n))+\frac{4e^2x^{2r}(-bn+2a(2+r)+2b(2+r)\log(cx^n))}{(2+r)^2}+\frac{32dex^r(-bn+a(4+r)+b(4+r)\log(cx^n))}{(4+r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^4*(4*b*d^2*n*Log[x] + d^2*(4*a - b*n - 4*b*n*Log[x] + 4*b*Log[c*x^n]) +
(4*e^2*x^(2*r)*(-(b*n) + 2*a*(2 + r) + 2*b*(2 + r)*Log[c*x^n]))/(2 + r)^2 +
 (32*d*e*x^r*(-(b*n) + a*(4 + r) + b*(4 + r)*Log[c*x^n]))/(4 + r)^2))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.20, size = 1924, normalized size = 18.68

method	result	size
risch	Expression too large to display	1924

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*b*(2*e^2*(x^r)^2*r+d^2*r^2+8*d*e*x^r*r+8*e^2*(x^r)^2+6*d^2*r+16*d*e
*x^r+8*d^2)/(2+r)/(4+r)*ln(x^n)-1/16*x^4*(-256*e^2*(x^r)^2*a+128*I*Pi*b*d^2
*csgn(I*c*x^n)^3+128*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2
-512*d*e*x^r*a+256*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r+40*I*Pi*b*e^2*r^2*csgn(I*
c*x^n)^3*(x^r)^2+128*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2+320*I*Pi*b*d*e*r*
csgn(I*c*x^n)^3*x^r+52*b*d^2*n*r^2+96*b*d^2*n*r-208*ln(c)*b*d^2*r^2-384*ln(
c)*b*d^2*r-4*ln(c)*b*d^2*r^4-48*ln(c)*b*d^2*r^3-128*I*Pi*b*d^2*csgn(I*c)*cs
```

```
gn(I*c*x^n)^2-128*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*Pi*b*d^2*r^4*c
sgn(I*c*x^n)^3-256*d^2*b*ln(c)+64*b*d^2*n-256*a*d^2+b*d^2*n*r^4+12*b*d^2*n*
r^3-4*a*d^2*r^4-48*a*d^2*r^3-192*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2-2
08*a*d^2*r^2-384*a*d^2*r-256*ln(c)*b*e^2*(x^r)^2-16*I*Pi*b*d*e*r^3*csgn(I*c
)*csgn(I*c*x^n)^2*x^r-8*a*e^2*r^3*(x^r)^2-80*a*e^2*r^2*(x^r)^2-256*a*e^2*r*
(x^r)^2+64*b*e^2*n*(x^r)^2-256*a*d*e*r^2*x^r-640*a*d*e*r*x^r+32*b*e^2*n*r*(
x^r)^2+128*b*d*e*n*x^r+4*b*e^2*n*r^2*(x^r)^2-32*a*d*e*r^3*x^r-80*ln(c)*b*e^
2*r^2*(x^r)^2-256*ln(c)*b*e^2*r*(x^r)^2-8*ln(c)*b*e^2*r^3*(x^r)^2-512*ln(c)
*b*d*e*x^r+4*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+104*I*Pi*b*d^2*r^2*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+16*I*Pi*b*d*e*r^3*csgn(I*c*x^n)^3*x^r-24*I*
Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2-104*I*Pi*b*d^2*r^2*csgn(I*x^n)*csg
n(I*c*x^n)^2-192*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*c*x^n)^2+128*I*Pi*b*d*e*r^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-16*I*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(
I*c*x^n)^2*x^r-128*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-128*I*P
i*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-128*I*Pi*b*d*e*r^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2*x^r+40*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^
r)^2+4*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+128*b*d*e
*n*r*x^r-256*ln(c)*b*d*e*r^2*x^r-4*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2
*(x^r)^2+16*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+128*I*Pi
*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-104*I*Pi*b*d^2*r^2*csgn(I*c)*csg
n(I*c*x^n)^2-128*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-4*I*Pi*b*e^
2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+24*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+320*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x
^r+2*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-40*I*Pi*b*e^2*r^2*c
sgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-128*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2
*(x^r)^2-128*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-640*ln(c)*b*d*e
*r*x^r-2*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d^2*r^4*csgn(I*x
^n)*csgn(I*c*x^n)^2-24*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2+192*I*Pi*b*
d^2*r*csgn(I*c*x^n)^3-32*ln(c)*b*d*e*r^3*x^r+32*b*d*e*n*r^2*x^r+104*I*Pi*b*
d^2*r^2*csgn(I*c*x^n)^3+24*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3+128*I*Pi*b*e^2*cs
gn(I*c*x^n)^3*(x^r)^2+128*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*
(x^r)^2-256*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+192*I*Pi*b*d^2*r*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+128*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r-320*I
*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-320*I*Pi*b*d*e*r*csgn(I*x^n)*csgn
(I*c*x^n)^2*x^r+256*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-40*I
*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-256*I*Pi*b*d*e*csgn(I*x^n)*
csgn(I*c*x^n)^2*x^r)/(2+r)^2/(4+r)^2
```

Maxima [A]

time = 0.28, size = 148, normalized size = 1.44

$$-\frac{1}{16}\,bd^2nx^4+\frac{1}{4}\,bd^2x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^2x^4+\frac{be^2x^{2\,r+4}\log\left(cx^n\right)}{2\,(r+2)}+\frac{2\,bdex^{r+4}\log\left(cx^n\right)}{r+4}-\frac{be^2nx^{2\,r+4}}{4\,(r+2)^2}+\frac{ae^2x^{2\,r+4}}{2\,(r+2)}-\frac{2\,bdenx^{r+4}}{(r+4)^2}+\frac{2\,adex^{r+4}}{r+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*d^2*n*x^4 + 1/4*b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4 + 1/2*b*e^2*x^
(2*r + 4)*log(c*x^n)/(r + 2) + 2*b*d*e*x^(r + 4)*log(c*x^n)/(r + 4) - 1/4*b
*e^2*n*x^(2*r + 4)/(r + 2)^2 + 1/2*a*e^2*x^(2*r + 4)/(r + 2) - 2*b*d*e*n*x^
(r + 4)/(r + 4)^2 + 2*a*d*e*x^(r + 4)/(r + 4)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 440 vs. $2(97) = 194$.
time = 0.38, size = 440, normalized size = 4.27

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/16*(4*(b*d^2*r^4 + 12*b*d^2*r^3 + 52*b*d^2*r^2 + 96*b*d^2*r + 64*b*d^2)*x
^4*log(c) + 4*(b*d^2*n*r^4 + 12*b*d^2*n*r^3 + 52*b*d^2*n*r^2 + 96*b*d^2*n*r
 + 64*b*d^2*n)*x^4*log(x) - ((b*d^2*n - 4*a*d^2)*r^4 + 64*b*d^2*n + 12*(b*d
^2*n - 4*a*d^2)*r^3 - 256*a*d^2 + 52*(b*d^2*n - 4*a*d^2)*r^2 + 96*(b*d^2*n
- 4*a*d^2)*r)*x^4 + 4*(2*(b*r^3 + 10*b*r^2 + 32*b*r + 32*b)*x^4*e^2*log(c)
+ 2*(b*n*r^3 + 10*b*n*r^2 + 32*b*n*r + 32*b*n)*x^4*e^2*log(x) + (2*a*r^3 -
(b*n - 20*a)*r^2 - 16*b*n - 8*(b*n - 8*a)*r + 64*a)*x^4*e^2)*x^(2*r) + 32*(
(b*d*r^3 + 8*b*d*r^2 + 20*b*d*r + 16*b*d)*x^4*e*log(c) + (b*d*n*r^3 + 8*b*d
*n*r^2 + 20*b*d*n*r + 16*b*d*n)*x^4*e*log(x) + (a*d*r^3 - 4*b*d*n - (b*d*n
- 8*a*d)*r^2 + 16*a*d - 4*(b*d*n - 5*a*d)*r)*x^4*e)*x^r)/(r^4 + 12*r^3 + 52
*r^2 + 96*r + 64)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1625 vs. $2(97) = 194$.
time = 10.10, size = 1625, normalized size = 15.78

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*d**2*x**4/4 + 2*a*d*e*log(c*x**n)/n - a*e**2/(4*x**4) - b*d**2
*n*x**4/16 + b*d**2*x**4*log(c*x**n)/4 + b*d*e*log(c*x**n)**2/n - b*e**2*n/
(16*x**4) - b*e**2*log(c*x**n)/(4*x**4), Eq(r, -4)), (a*d**2*x**4/4 + a*d*e
*x**2 + a*e**2*log(c*x**n)/n - b*d**2*n*x**4/16 + b*d**2*x**4*log(c*x**n)/4
 - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) + b*e**2*log(c*x**n)**2/(2*n), E
q(r, -2)), (4*a*d**2*r**4*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 10
24) + 48*a*d**2*r**3*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) +
 208*a*d**2*r**2*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 384
*a*d**2*r*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a*d**2
*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 32*a*d*e*r**3*x**4*
x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a*d*e*r**2*x**4*
```

```
x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 640*a*d*e*r*x**4*x**
r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 512*a*d*e*x**4*x**r/(16
*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 8*a*e**2*r**3*x**4*x**(2*r)/
(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 80*a*e**2*r**2*x**4*x**(2
*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a*e**2*r*x**4*x**
(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a*e**2*x**4*x**
(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - b*d**2*n*r**4*x**4/
(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 12*b*d**2*n*r**3*x**4/(16
*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 52*b*d**2*n*r**2*x**4/(16*r*
*4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 96*b*d**2*n*r*x**4/(16*r**4 + 1
92*r**3 + 832*r**2 + 1536*r + 1024) - 64*b*d**2*n*x**4/(16*r**4 + 192*r**3
+ 832*r**2 + 1536*r + 1024) + 4*b*d**2*r**4*x**4*log(c*x**n)/(16*r**4 + 192
*r**3 + 832*r**2 + 1536*r + 1024) + 48*b*d**2*r**3*x**4*log(c*x**n)/(16*r**
4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 208*b*d**2*r**2*x**4*log(c*x**n)
/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 384*b*d**2*r*x**4*log(c*
x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*b*d**2*x**4*log
(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 32*b*d*e*n*r**2*
x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 128*b*d*e*n*r*x
**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 128*b*d*e*n*x**4
*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 32*b*d*e*r**3*x**4*
x**r*log(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*b*d*
e*r**2*x**4*x**r*log(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024
) + 640*b*d*e*r*x**4*x**r*log(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536
*r + 1024) + 512*b*d*e*x**4*x**r*log(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2
 + 1536*r + 1024) - 4*b*e**2*n*r**2*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832
*r**2 + 1536*r + 1024) - 32*b*e**2*n*r*x**4*x**(2*r)/(16*r**4 + 192*r**3 +
832*r**2 + 1536*r + 1024) - 64*b*e**2*n*x**4*x**(2*r)/(16*r**4 + 192*r**3 +
 832*r**2 + 1536*r + 1024) + 8*b*e**2*r**3*x**4*x**(2*r)*log(c*x**n)/(16*r*
*4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 80*b*e**2*r**2*x**4*x**(2*r)*lo
g(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*b*e**2*r*x*
*4*x**(2*r)*log(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 2
56*b*e**2*x**4*x**(2*r)*log(c*x**n)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r
 + 1024), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 744 vs. $2(97) = 194$.

time = 2.50, size = 744, normalized size = 7.22

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/16*(4*b*d^2*n*r^4*x^4*log(x) + 32*b*d*n*r^3*x^4*x^r*e*log(x) - b*d^2*n*r^
4*x^4 + 4*b*d^2*r^4*x^4*log(c) + 32*b*d*r^3*x^4*x^r*e*log(c) + 48*b*d^2*n*r
```

```
^3*x^4*log(x) + 8*b*n*r^3*x^4*x^(2*r)*e^2*log(x) + 256*b*d*n*r^2*x^4*x^r*e*
log(x) - 12*b*d^2*n*r^3*x^4 + 4*a*d^2*r^4*x^4 - 32*b*d*n*r^2*x^4*x^r*e + 32
*a*d*r^3*x^4*x^r*e + 48*b*d^2*r^3*x^4*log(c) + 8*b*r^3*x^4*x^(2*r)*e^2*log(
c) + 256*b*d*r^2*x^4*x^r*e*log(c) + 208*b*d^2*n*r^2*x^4*log(x) + 80*b*n*r^2
*x^4*x^(2*r)*e^2*log(x) + 640*b*d*n*r*x^4*x^r*e*log(x) - 52*b*d^2*n*r^2*x^4
 + 48*a*d^2*r^3*x^4 - 4*b*n*r^2*x^4*x^(2*r)*e^2 + 8*a*r^3*x^4*x^(2*r)*e^2 -
 128*b*d*n*r*x^4*x^r*e + 256*a*d*r^2*x^4*x^r*e + 208*b*d^2*r^2*x^4*log(c) +
 80*b*r^2*x^4*x^(2*r)*e^2*log(c) + 640*b*d*r*x^4*x^r*e*log(c) + 384*b*d^2*n
*r*x^4*log(x) + 256*b*n*r*x^4*x^(2*r)*e^2*log(x) + 512*b*d*n*x^4*x^r*e*log(
x) - 96*b*d^2*n*r*x^4 + 208*a*d^2*r^2*x^4 - 32*b*n*r*x^4*x^(2*r)*e^2 + 80*a
*r^2*x^4*x^(2*r)*e^2 - 128*b*d*n*x^4*x^r*e + 640*a*d*r*x^4*x^r*e + 384*b*d^
2*r*x^4*log(c) + 256*b*r*x^4*x^(2*r)*e^2*log(c) + 512*b*d*x^4*x^r*e*log(c)
+ 256*b*d^2*n*x^4*log(x) + 256*b*n*x^4*x^(2*r)*e^2*log(x) - 64*b*d^2*n*x^4
+ 384*a*d^2*r*x^4 - 64*b*n*x^4*x^(2*r)*e^2 + 256*a*r*x^4*x^(2*r)*e^2 + 512*
a*d*x^4*x^r*e + 256*b*d^2*x^4*log(c) + 256*b*x^4*x^(2*r)*e^2*log(c) + 256*a
*d^2*x^4 + 256*a*x^4*x^(2*r)*e^2)/(r^4 + 12*r^3 + 52*r^2 + 96*r + 64)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^3*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.381 $\int x(d+ex^r)^2 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=102

$$-\frac{1}{4}bd^2nx^2-\frac{be^2nx^{2(1+r)}}{4(1+r)^2}-\frac{2bdenx^{2+r}}{(2+r)^2}+\frac{1}{2}\left(d^2x^2+\frac{e^2x^{2(1+r)}}{1+r}+\frac{4dex^{2+r}}{2+r}\right)(a+b\log(cx^n))$$

```
[Out] -1/4*b*d^2*n*x^2-1/4*b*e^2*n*x^(2+2*r)/(1+r)^2-2*b*d*e*n*x^(2+r)/(2+r)^2+1/
2*(d^2*x^2+e^2*x^(2+2*r)/(1+r)+4*d*e*x^(2+r)/(2+r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.09, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{4}bd^2nx^2-\frac{2bdenx^{r+2}}{(r+2)^2}-\frac{be^2nx^{2(r+1)}}{4(r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d^2*n*x^2) - (b*e^2*n*x^(2*(1 + r)))/(4*(1 + r)^2) - (2*b*d*e*n*x^(
2 + r))/(2 + r)^2 + ((d^2*x^2 + (e^2*x^(2*(1 + r)))/(1 + r) + (4*d*e*x^(2 +
 r))/(2 + r))*(a + b*Log[c*x^n]))/2
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{2}\left(d^2x^2+\frac{e^2x^{2(1+r)}}{1+r}+\frac{4dex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{2}x\left(d^2+\right.$$
$$=\frac{1}{2}\left(d^2x^2+\frac{e^2x^{2(1+r)}}{1+r}+\frac{4dex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{2}(bn)\int x\left(d^2+\right.$$
$$=\frac{1}{2}\left(d^2x^2+\frac{e^2x^{2(1+r)}}{1+r}+\frac{4dex^{2+r}}{2+r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{2}(bn)\int\left(d^2x+\right.$$
$$=-\frac{1}{4}bd^2nx^2-\frac{be^2nx^{2(1+r)}}{4(1+r)^2}-\frac{2bdenx^{2+r}}{(2+r)^2}+\frac{1}{2}\left(d^2x^2+\frac{e^2x^{2(1+r)}}{1+r}+\frac{4dex^{2}}{2+}\right.$$

Mathematica [A]
time = 0.16, size = 114, normalized size = 1.12

$$\frac{1}{4}x^2\left(2bd^2n\log(x)+d^2(2a-bn-2bn\log(x)+2b\log\left(cx^n\right))+\frac{e^2x^{2r}(-bn+2a(1+r)+2b(1+r)\log\left(cx^n\right))}{(1+r)^2}+\frac{8dex^r(-bn+a(2+r)+b(2+r)\log\left(cx^n\right))}{(2+r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(2*b*d^2*n*Log[x] + d^2*(2*a - b*n - 2*b*n*Log[x] + 2*b*Log[c*x^n]) +
(e^2*x^(2*r)*(-(b*n) + 2*a*(1 + r) + 2*b*(1 + r)*Log[c*x^n]))/(1 + r)^2 + (
8*d*e*x^r*(-(b*n) + a*(2 + r) + b*(2 + r)*Log[c*x^n]))/(2 + r)^2))/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.19, size = 1922, normalized size = 18.84

method	result	size
risch	Expression too large to display	1922

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*x^2*(e^2*(x^r)^2*r+d^2*r^2+4*d*e*x^r*r+2*e^2*(x^r)^2+3*d^2*r+4*d*e*x^
r+2*d^2)/(1+r)/(2+r)*ln(x^n)-1/4*x^2*(-8*e^2*(x^r)^2*a-8*I*Pi*b*e^2*r*csgn(
I*c)*csgn(I*c*x^n)^2*(x^r)^2-5*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^
r)^2-16*d*e*x^r*a-13*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*b*d
^2*r*csgn(I*c)*csgn(I*c*x^n)^2+13*b*d^2*n*r^2+12*b*d^2*n*r-26*ln(c)*b*d^2*r
^2-24*ln(c)*b*d^2*r-2*ln(c)*b*d^2*r^4-12*ln(c)*b*d^2*r^3+4*I*Pi*b*e^2*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-8*d^2*b*ln(c)+4*b*d^2*n-8*a*d^2+b*d^
```

```
2*n*r^4+6*b*d^2*n*r^3-2*a*d^2*r^4-12*a*d^2*r^3-4*I*Pi*b*e^2*csgn(I*x^n)*csg
n(I*c*x^n)^2*(x^r)^2-26*a*d^2*r^2-24*a*d^2*r-8*ln(c)*b*e^2*(x^r)^2-16*I*Pi*
b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r+8*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r-2*
a*e^2*r^3*(x^r)^2-10*a*e^2*r^2*(x^r)^2-16*a*e^2*r*(x^r)^2+4*b*e^2*n*(x^r)^2
-5*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-32*a*d*e*r^2*x^r-40*a
*d*e*r*x^r+4*b*e^2*n*r*(x^r)^2+8*b*d*e*n*x^r+b*e^2*n*r^2*(x^r)^2-8*a*d*e*r^
3*x^r-10*ln(c)*b*e^2*r^2*(x^r)^2-16*ln(c)*b*e^2*r*(x^r)^2-2*ln(c)*b*e^2*r^3
*(x^r)^2-16*ln(c)*b*d*e*x^r-I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*
Pi*b*d^2*csgn(I*c*x^n)^3+20*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r-8*I*Pi*b*d*e*c
sgn(I*x^n)*csgn(I*c*x^n)^2*x^r-13*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2-
4*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+4*I*Pi*b*d*e*r^3*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*x^r+16*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)*x^r-4*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-16*I*Pi*b*d*e*r^2*csgn
(I*x^n)*csgn(I*c*x^n)^2*x^r+5*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)*(x^r)^2+I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*e^2
*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-4*I*Pi*b*d*e*r^3*csgn(I*x^
n)*csgn(I*c*x^n)^2*x^r+5*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+8*I*Pi*b*e^
2*r*csgn(I*c*x^n)^3*(x^r)^2-20*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2
0*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+8*I*Pi*b*d*e*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^r+4*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+12*I*Pi*b*d^2
*r*csgn(I*c*x^n)^3+16*b*d*e*n*r*x^r-32*ln(c)*b*d*e*r^2*x^r+12*I*Pi*b*d^2*r*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+13*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+4*I*Pi*b*d*e*r^3*csgn(I*c*x^n)^3*x^r-4*I*Pi*b*d*e*r^3*csgn(I
*c)*csgn(I*c*x^n)^2*x^r-8*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+20*I*Pi*
b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-I*Pi*b*d^2*r^4*csgn(I*c)*cs
gn(I*c*x^n)^2-6*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2-6*I*Pi*b*d^2*r^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2+16*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r-40*ln(c)*b
*d*e*r*x^r-12*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*e^2*r^3*csgn(
I*c*x^n)^3*(x^r)^2+4*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*
b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-8*ln(c)*b*d*e*r^3*x^r+8*b*d*e*n*r^2*x^r+13*
I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3+6*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3+I*Pi*b*d^2*
r^4*csgn(I*c*x^n)^3-8*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-I*Pi
*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+8*I*Pi*b*e^2*r*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)*(x^r)^2-I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^
r)^2+6*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/(1+r)^2/(2+r)^2
```

Maxima [A]

time = 0.29, size = 148, normalized size = 1.45

$$-\frac{1}{4}\,bd^2nx^2+\frac{1}{2}\,bd^2x^2\log\left(cx^n\right)+\frac{1}{2}\,ad^2x^2+\frac{be^2x^{2\,r+2}\log\left(cx^n\right)}{2\,(r+1)}+\frac{2\,bdex^{r+2}\log\left(cx^n\right)}{r+2}-\frac{be^2nx^{2\,r+2}}{4\,(r+1)^2}+\frac{ae^2x^{2\,r+2}}{2\,(r+1)}-\frac{2\,bdenx^{r+2}}{(r+2)^2}+\frac{2\,adex^{r+2}}{r+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/4*b*d^2*n*x^2 + 1/2*b*d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2 + 1/2*b*e^2*x^(
2*r + 2)*log(c*x^n)/(r + 1) + 2*b*d*e*x^(r + 2)*log(c*x^n)/(r + 2) - 1/4*b*
```

```
e^2*n*x^(2*r + 2)/(r + 1)^2 + 1/2*a*e^2*x^(2*r + 2)/(r + 1) - 2*b*d*e*n*x^(
r + 2)/(r + 2)^2 + 2*a*d*e*x^(r + 2)/(r + 2)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 440 vs. $2(96) = 192$.
time = 0.39, size = 440, normalized size = 4.31

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/4*(2*(b*d^2*r^4 + 6*b*d^2*r^3 + 13*b*d^2*r^2 + 12*b*d^2*r + 4*b*d^2)*x^2*
log(c) + 2*(b*d^2*n*r^4 + 6*b*d^2*n*r^3 + 13*b*d^2*n*r^2 + 12*b*d^2*n*r + 4
*b*d^2*n)*x^2*log(x) - ((b*d^2*n - 2*a*d^2)*r^4 + 4*b*d^2*n + 6*(b*d^2*n -
2*a*d^2)*r^3 - 8*a*d^2 + 13*(b*d^2*n - 2*a*d^2)*r^2 + 12*(b*d^2*n - 2*a*d^2
)*r)*x^2 + (2*(b*r^3 + 5*b*r^2 + 8*b*r + 4*b)*x^2*e^2*log(c) + 2*(b*n*r^3 +
 5*b*n*r^2 + 8*b*n*r + 4*b*n)*x^2*e^2*log(x) + (2*a*r^3 - (b*n - 10*a)*r^2
- 4*b*n - 4*(b*n - 4*a)*r + 8*a)*x^2*e^2)*x^(2*r) + 8*((b*d*r^3 + 4*b*d*r^2
 + 5*b*d*r + 2*b*d)*x^2*e*log(c) + (b*d*n*r^3 + 4*b*d*n*r^2 + 5*b*d*n*r + 2
*b*d*n)*x^2*e*log(x) + (a*d*r^3 - b*d*n - (b*d*n - 4*a*d)*r^2 + 2*a*d - (2*
b*d*n - 5*a*d)*r)*x^2*e)*x^r)/(r^4 + 6*r^3 + 13*r^2 + 12*r + 4)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 1622 vs. $2(97) = 194$.
time = 2.40, size = 1622, normalized size = 15.90

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*d**2*x**2/2 + 2*a*d*e*log(c*x**n)/n - a*e**2/(2*x**2) - b*d**2
*n*x**2/4 + b*d**2*x**2*log(c*x**n)/2 + b*d*e*log(c*x**n)**2/n - b*e**2*n/(
4*x**2) - b*e**2*log(c*x**n)/(2*x**2), Eq(r, -2)), (a*d**2*x**2/2 + 2*a*d*e
*x + a*e**2*log(c*x**n)/n - b*d**2*n*x**2/4 + b*d**2*x**2*log(c*x**n)/2 - 2
*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) + b*e**2*log(c*x**n)**2/(2*n), Eq(r, -1)
), (2*a*d**2*r**4*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 12*a*d**2
*r**3*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 26*a*d**2*r**2*x**2/(
4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 24*a*d**2*r*x**2/(4*r**4 + 24*r**
3 + 52*r**2 + 48*r + 16) + 8*a*d**2*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r
 + 16) + 8*a*d*e*r**3*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) +
32*a*d*e*r**2*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 40*a*d*e
*r*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 16*a*d*e*x**2*x**r/
(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 2*a*e**2*r**3*x**2*x**(2*r)/(4*r
**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 10*a*e**2*r**2*x**2*x**(2*r)/(4*r**4
```

```
 + 24*r**3 + 52*r**2 + 48*r + 16) + 16*a*e**2*r*x**2*x**(2*r)/(4*r**4 + 24*
r**3 + 52*r**2 + 48*r + 16) + 8*a*e**2*x**2*x**(2*r)/(4*r**4 + 24*r**3 + 52
*r**2 + 48*r + 16) - b*d**2*n*r**4*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r
+ 16) - 6*b*d**2*n*r**3*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 13*
b*d**2*n*r**2*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 12*b*d**2*n*r
*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 4*b*d**2*n*x**2/(4*r**4 +
24*r**3 + 52*r**2 + 48*r + 16) + 2*b*d**2*r**4*x**2*log(c*x**n)/(4*r**4 + 2
4*r**3 + 52*r**2 + 48*r + 16) + 12*b*d**2*r**3*x**2*log(c*x**n)/(4*r**4 + 2
4*r**3 + 52*r**2 + 48*r + 16) + 26*b*d**2*r**2*x**2*log(c*x**n)/(4*r**4 + 2
4*r**3 + 52*r**2 + 48*r + 16) + 24*b*d**2*r*x**2*log(c*x**n)/(4*r**4 + 24*r
**3 + 52*r**2 + 48*r + 16) + 8*b*d**2*x**2*log(c*x**n)/(4*r**4 + 24*r**3 +
52*r**2 + 48*r + 16) - 8*b*d*e*n*r**2*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2
 + 48*r + 16) - 16*b*d*e*n*r*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r +
 16) - 8*b*d*e*n*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 8*b*d
*e*r**3*x**2*x**r*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 32
*b*d*e*r**2*x**2*x**r*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16)
+ 40*b*d*e*r*x**2*x**r*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16)
 + 16*b*d*e*x**2*x**r*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16)
- b*e**2*n*r**2*x**2*x**(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 4*
b*e**2*n*r*x**2*x**(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 4*b*e**
2*n*x**2*x**(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 2*b*e**2*r**3*
x**2*x**(2*r)*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 10*b*e
**2*r**2*x**2*x**(2*r)*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16)
 + 16*b*e**2*r*x**2*x**(2*r)*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r
 + 16) + 8*b*e**2*x**2*x**(2*r)*log(c*x**n)/(4*r**4 + 24*r**3 + 52*r**2 + 4
8*r + 16), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 744 vs. 2(96) = 192.

time = 2.63, size = 744, normalized size = 7.29

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/4*(2*b*d^2*n*r^4*x^2*log(x) + 8*b*d*n*r^3*x^2*x^r*e*log(x) - b*d^2*n*r^4*
x^2 + 2*b*d^2*r^4*x^2*log(c) + 8*b*d*r^3*x^2*x^r*e*log(c) + 12*b*d^2*n*r^3*
x^2*log(x) + 2*b*n*r^3*x^2*x^(2*r)*e^2*log(x) + 32*b*d*n*r^2*x^2*x^r*e*log(
x) - 6*b*d^2*n*r^3*x^2 + 2*a*d^2*r^4*x^2 - 8*b*d*n*r^2*x^2*x^r*e + 8*a*d*r^
3*x^2*x^r*e + 12*b*d^2*r^3*x^2*log(c) + 2*b*r^3*x^2*x^(2*r)*e^2*log(c) + 32
*b*d*r^2*x^2*x^r*e*log(c) + 26*b*d^2*n*r^2*x^2*log(x) + 10*b*n*r^2*x^2*x^(2
*r)*e^2*log(x) + 40*b*d*n*r*x^2*x^r*e*log(x) - 13*b*d^2*n*r^2*x^2 + 12*a*d^
2*r^3*x^2 - b*n*r^2*x^2*x^(2*r)*e^2 + 2*a*r^3*x^2*x^(2*r)*e^2 - 16*b*d*n*r*
x^2*x^r*e + 32*a*d*r^2*x^2*x^r*e + 26*b*d^2*r^2*x^2*log(c) + 10*b*r^2*x^2*x
```

```
^(2*r)*e^2*log(c) + 40*b*d*r*x^2*x^r*e*log(c) + 24*b*d^2*n*r*x^2*log(x) + 1
6*b*n*r*x^2*x^(2*r)*e^2*log(x) + 16*b*d*n*x^2*x^r*e*log(x) - 12*b*d^2*n*r*x
^2 + 26*a*d^2*r^2*x^2 - 4*b*n*r*x^2*x^(2*r)*e^2 + 10*a*r^2*x^2*x^(2*r)*e^2
- 8*b*d*n*x^2*x^r*e + 40*a*d*r*x^2*x^r*e + 24*b*d^2*r*x^2*log(c) + 16*b*r*x
^2*x^(2*r)*e^2*log(c) + 16*b*d*x^2*x^r*e*log(c) + 8*b*d^2*n*x^2*log(x) + 8*
b*n*x^2*x^(2*r)*e^2*log(x) - 4*b*d^2*n*x^2 + 24*a*d^2*r*x^2 - 4*b*n*x^2*x^(
2*r)*e^2 + 16*a*r*x^2*x^(2*r)*e^2 + 16*a*d*x^2*x^r*e + 8*b*d^2*x^2*log(c) +
 8*b*x^2*x^(2*r)*e^2*log(c) + 8*a*d^2*x^2 + 8*a*x^2*x^(2*r)*e^2)/(r^4 + 6*r
^3 + 13*r^2 + 12*r + 4)
```

Mupad [**F**]

time = 0.00, size = -1, normalized size = -0.01

$$\int x\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
[Out] int(x*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.382 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=104

$$-\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}-\frac{1}{2}bd^2n\log^2(x)+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}+d^2\log(x)(a+b\log(cx^n))$$

```
[Out] -2*b*d*e*n*x^r/r^2-1/4*b*e^2*n*x^(2*r)/r^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x^r*(a
+b*ln(c*x^n))/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+d^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.09, antiderivative size = 104, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}-\frac{1}{2}bd^2n\log^2(x)-\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-2*b*d*e*n*x^r)/r^2 - (b*e^2*n*x^(2*r))/(4*r^2) - (b*d^2*n*Log[x]^2)/2 + (
2*d*e*x^r*(a + b*Log[c*x^n]))/r + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) +
d^2*Log[x]*(a + b*Log[c*x^n])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
```

```
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x}\,dx &= \frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx^n))-(bn)\int \frac{ex^r(4d+e\\
&= \frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int \frac{ex^r(4d+ex^r)+2}{x}}{2r}\\
&= \frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int \Big(4dex^{-1+r}}{}\\
&= -\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}+\frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx\\
&= -\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}-\frac{1}{2}bd^2n\log^2(x)+\frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x
\end{aligned}$$

Mathematica [A]
time = 0.14, size = 87, normalized size = 0.84

$$-\frac{1}{2}bd^2n\log^2(x)+d^2\log(x)\,(a+b\log(cx^n))+\frac{ex^r(2ar(4d+ex^r)-bn(8d+ex^r)+2br(4d+ex^r)\log(cx^n))}{4r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/2*(b*d^2*n*Log[x]^2) + d^2*Log[x]*(a + b*Log[c*x^n]) + (e*x^r*(2*a*r*(4*
d + e*x^r) - b*n*(8*d + e*x^r) + 2*b*r*(4*d + e*x^r)*Log[c*x^n]))/(4*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.15, size = 487, normalized size = 4.68

method	result
risch	$\frac{b(2d^2\ln(x)r+e^2x^{2r}+4de\,x^r)\ln(x^n)}{2r} - \frac{i\pi b\,e^2\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)x^{2r}}{4r} - \frac{i\pi bde\operatorname{csgn}(ic\,x^n)^3x^r}{r} + \frac{i\pi bde\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)}{r}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*(2*d^2*ln(x)*r+e^2*(x^r)^2+4*d*e*x^r)/r*ln(x^n)-I/r*Pi*b*d*e*csgn(I*c
*x^n)^3*x^r-1/4*I/r*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+1/4*I/r*Pi*b*e^2*csgn(
I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+I/r*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+1
/4*I/r*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+I/r*Pi*b*d*e*csgn(I*x^n)*
csgn(I*c*x^n)^2*x^r+1/2*I*ln(x)*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-I/r*Pi*b
*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-1/4*I/r*Pi*b*e^2*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)*(x^r)^2-1/2*I*ln(x)*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+1/2*I*ln(x)*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*ln(x)*P
i*b*d^2*csgn(I*c*x^n)^3-1/2*b*d^2*n*ln(x)^2+ln(x)*ln(c)*b*d^2+1/2/r*ln(c)*b
*e^2*(x^r)^2+a*d^2*ln(x)+1/2*a/r*(x^r)^2*e^2-1/4/r^2*b*e^2*n*(x^r)^2+2/r*ln
(c)*b*d*e*x^r+2*a/r*x^r*d*e-2*b*d*e*n*x^r/r^2
```

Maxima [A]
time = 0.32, size = 114, normalized size = 1.10

$$\frac{be^2x^{2r}\log(cx^n)}{2r} + \frac{2bdex^r\log(cx^n)}{r} + \frac{bd^2\log(cx^n)^2}{2n} + ad^2\log(x) - \frac{be^2nx^{2r}}{4r^2} + \frac{ae^2x^{2r}}{2r} - \frac{2bdenx^r}{r^2} + \frac{2adex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/2*b*e^2*x^(2*r)*log(c*x^n)/r + 2*b*d*e*x^r*log(c*x^n)/r + 1/2*b*d^2*log(c
*x^n)^2/n + a*d^2*log(x) - 1/4*b*e^2*n*x^(2*r)/r^2 + 1/2*a*e^2*x^(2*r)/r -
2*b*d*e*n*x^r/r^2 + 2*a*d*e*x^r/r
```

Fricas [A]
time = 0.48, size = 116, normalized size = 1.12

$$\frac{2\,bd^2nr^2\log(x)^2 + (2\,bnre^2\log(x) + 2\,bre^2\log(c) - (bn - 2\,ar)e^2)x^{2\,r} + 8\,(bdnre\log(x) + bdre\log(c) - (bdn - adr)e)x^r + 4\,(bd^2r^2\log(c) + ad^2r^2)\log(x)}{4\,r^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/4*(2*b*d^2*n*r^2*log(x)^2 + (2*b*n*r*e^2*log(x) + 2*b*r*e^2*log(c) - (b*n
 - 2*a*r)*e^2)*x^(2*r) + 8*(b*d*n*r*e*log(x) + b*d*r*e*log(c) - (b*d*n - a*
d*r)*e)*x^r + 4*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x))/r^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 216 vs. $2(104) = 208$.

time = 5.34, size = 216, normalized size = 2.08

$$\begin{cases} (a + b\log(c))(d + e)^2 \log(x) & \text{for } n = 0 \wedge r = 0 \\ (d + e)^2 \left(\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a - b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r = 0 \\ (a + b\log(c))\left(d^2\log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r}\right) & \text{for } n = 0 \\ \frac{ad^2\log(cx^n)}{n} + \frac{2adex^r}{r} + \frac{ae^2x^{2r}}{2r} + \frac{bd^2\log(cx^n)^2}{2n} - \frac{2bdenx^r}{r^2} + \frac{2bdex^r\log(cx^n)}{r} - \frac{be^2nx^{2r}}{4r^2} + \frac{be^2x^{2r}\log(cx^n)}{2r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise(((a + b*log(c))*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)
**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((
-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), ((a + b*log(c))*(d**2*lo
g(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0)), (a*d**2*log(c*x**n)/
n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b*d**2*log(c*x**n)**2/(2*n) -
2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)/r - b*e**2*n*x**(2*r)/(4*r**
2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r), True))
```

Giac [A]

time = 3.44, size = 140, normalized size = 1.35

$$\frac{1}{2}\,bd^2n\log(x)^2 + \frac{2\,bdnx^re\log(x)}{r} + bd^2\log(c)\log(x) + \frac{2\,bdx^re\log(c)}{r} + ad^2\log(x) + \frac{bnx^{2\,r}e^2\log(x)}{2\,r} - \frac{2\,bdnx^re}{r^2} + \frac{2\,adx^re}{r} + \frac{bx^{2\,r}e^2\log(c)}{2\,r} - \frac{bnx^{2\,r}e^2}{4\,r^2} + \frac{ax^{2\,r}e^2}{2\,r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*d^2*n*log(x)^2 + 2*b*d*n*x^r*e*log(x)/r + b*d^2*log(c)*log(x) + 2*b*d
*x^r*e*log(c)/r + a*d^2*log(x) + 1/2*b*n*x^(2*r)*e^2*log(x)/r - 2*b*d*n*x^r
*e/r^2 + 2*a*d*x^r*e/r + 1/2*b*x^(2*r)*e^2*log(c)/r - 1/4*b*n*x^(2*r)*e^2/r
^2 + 1/2*a*x^(2*r)*e^2/r
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d + e\,x^r)^2\,(a + b\,\ln(c\,x^n))}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x,x)
```

```
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x, x)
```

3.383 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3} dx$

Optimal. Leaf size=135

$$-\frac{bd^2n}{4x^2}-\frac{be^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{2bdenx^{-2+r}}{(2-r)^2}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{2dex^{-2+r}(a+b\log(cx^n))}{2-r}$$

```
[Out] -1/4*b*d^2*n/x^2-1/4*b*e^2*n/(1-r)^2/(x^(2-2*r))-2*b*d*e*n*x^(-2+r)/(2-r)^2
-1/2*d^2*(a+b*ln(c*x^n))/x^2-1/2*e^2*(a+b*ln(c*x^n))/(1-r)/(x^(2-2*r))-2*d*
e*x^(-2+r)*(a+b*ln(c*x^n))/(2-r)
```

Rubi [A]
time = 0.11, antiderivative size = 135, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{bd^2n}{4x^2}-\frac{2bdenx^{r-2}}{(2-r)^2}-\frac{be^2nx^{-2(1-r)}}{4(1-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^2*n)/x^2 - (b*e^2*n)/(4*(1 - r)^2*x^(2*(1 - r))) - (2*b*d*e*n*x^(
-2 + r))/(2 - r)^2 - (d^2*(a + b*Log[c*x^n]))/(2*x^2) - (e^2*(a + b*Log[c*x
^n]))/(2*(1 - r)*x^(2*(1 - r))) - (2*d*e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2
- r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] && !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{e^2x^{-2(1-r)}}{1-r}+\frac{4dex^{-2+r}}{2-r}\right)(a+b\log(cx^n)) - (bn)\int \frac{-d^2(2-$$

$$= -\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{e^2x^{-2(1-r)}}{1-r}+\frac{4dex^{-2+r}}{2-r}\right)(a+b\log(cx^n)) - \frac{(bn)\int \frac{-d^2(2-3r+}{}}{2}$$

$$= -\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{e^2x^{-2(1-r)}}{1-r}+\frac{4dex^{-2+r}}{2-r}\right)(a+b\log(cx^n)) - \frac{(bn)\int\left(-\frac{d^2(-2+}{}\right.}{}$$

$$= -\frac{bd^2n}{4x^2}-\frac{be^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{2bdenx^{-2+r}}{(2-r)^2}-\frac{1}{2}\left(\frac{d^2}{x^2}+\frac{e^2x^{-2(1-r)}}{1-r}+\frac{4dex^{-2-}}{2-r}\right.$$

Mathematica [A]
time = 0.17, size = 114, normalized size = 0.84

$$\frac{-2bd^2n\log(x)-d^2(2a+bn-2bn\log(x)+2b\log(cx^n))+\frac{8dex^r(-bn+a(-2+r)+b(-2+r)\log(cx^n))}{(-2+r)^2}+\frac{e^2x^{2r}(-bn+2a(-1+r)+2b(-1+r)\log(cx^n))}{(-1+r)^2}}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] (-2*b*d^2*n*Log[x] - d^2*(2*a + b*n - 2*b*n*Log[x] + 2*b*Log[c*x^n]) + (8*d
*e*x^r*(-(b*n) + a*(-2 + r) + b*(-2 + r)*Log[c*x^n]))/(-2 + r)^2 + (e^2*x^(
2*r)*(-(b*n) + 2*a*(-1 + r) + 2*b*(-1 + r)*Log[c*x^n]))/(-1 + r)^2)/(4*x^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.21, size = 1923, normalized size = 14.24

method	result	size
risch	Expression too large to display	1923

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(-e^2*(x^r)^2*r+d^2*r^2-4*d*e*x^r*r+2*e^2*(x^r)^2-3*d^2*r+4*d*e*x^r+
2*d^2)/x^2/(-1+r)/(-2+r)*ln(x^n)-1/4*(8*e^2*(x^r)^2*a-8*I*Pi*b*e^2*r*csgn(I
```

```
*c)*csgn(I*c*x^n)^2*(x^r)^2+16*d*e*x^r*a-12*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*c
*x^n)^2+13*b*d^2*n*r^2-12*b*d^2*n*r+26*ln(c)*b*d^2*r^2-24*ln(c)*b*d^2*r+2*l
n(c)*b*d^2*r^4-12*ln(c)*b*d^2*r^3+13*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^
n)^2+4*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+4*I*Pi*b*e^2*csgn(I*x^n
)*csgn(I*c*x^n)^2*(x^r)^2-8*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r+8*d^2*b*ln(c)-16
*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+4*b*d^2*n-4*I*Pi*b*
d^2*csgn(I*c*x^n)^3+8*a*d^2+b*d^2*n*r^4-6*b*d^2*n*r^3+2*a*d^2*r^4-12*a*d^2*
r^3+26*a*d^2*r^2-24*a*d^2*r-5*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+8*I*Pi
*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+8*ln(c)*b*e^2*(x^r)^2+8*I*Pi*b*d*e*csg
n(I*x^n)*csgn(I*c*x^n)^2*x^r+5*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^
r)^2-2*a*e^2*r^3*(x^r)^2+10*a*e^2*r^2*(x^r)^2-16*a*e^2*r*(x^r)^2+4*b*e^2*n*
(x^r)^2+32*a*d*e*r^2*x^r-40*a*d*e*r*x^r-4*b*e^2*n*r*(x^r)^2+8*b*d*e*n*x^r+b
*e^2*n*r^2*(x^r)^2-8*a*d*e*r^3*x^r+10*ln(c)*b*e^2*r^2*(x^r)^2-16*ln(c)*b*e^
2*r*(x^r)^2-2*ln(c)*b*e^2*r^3*(x^r)^2+16*ln(c)*b*d*e*x^r-5*I*Pi*b*e^2*r^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+16*I*Pi*b*d*e*r^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2*x^r+20*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r+4*I*Pi*b*d*e*r^3*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)*(x^r)^2-4*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi
*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+8*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(
x^r)^2-20*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-20*I*Pi*b*d*e*r*csgn(I
*x^n)*csgn(I*c*x^n)^2*x^r+12*I*Pi*b*d^2*r*csgn(I*c*x^n)^3-16*b*d*e*n*r*x^r+
32*ln(c)*b*d*e*r^2*x^r+12*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+
I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*
c*x^n)^2-16*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r-13*I*Pi*b*d^2*r^2*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*b*d*e*r^3*csgn(I*c*x^n)^3*x^r-4*I*Pi*b*d*e
*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r+20*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)*x^r-8*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+16*I*P
i*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3-4*
I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2-6*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*c*x^n)
^2-6*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2-40*ln(c)*b*d*e*r*x^r-13*I*P
i*b*d^2*r^2*csgn(I*c*x^n)^3+4*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*b
*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+5*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)
^2*(x^r)^2-I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12*I*Pi*b*d^2
*r*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2-8*ln(
c)*b*d*e*r^3*x^r+8*b*d*e*n*r^2*x^r-4*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)*(x^r)^2+13*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2+6*I*Pi*b*d^2*r
^3*csgn(I*c*x^n)^3-8*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-I*Pi*
b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+8*I*Pi*b*e^2*r*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*(x^r)^2-I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r
)^2+6*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/(-1+r)^2/x^2/(-2+
r)^2
```

Maxima [**F(-2)**]

time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-3>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 413 vs. $2(119) = 238$.
time = 0.35, size = 413, normalized size = 3.06

$$-\frac{(bd^2n+2\,ad^2)r^4+4\,bd^2n-6\,(bd^2n+2\,ad^2)r^3+8\,ad^2+13\,(bd^2n+2\,ad^2)r^2-12\,(bd^2n+2\,ad^2)r-(2\,(br^3-5\,br^2+8\,br-4\,b)e^2\log(c)+2\,(bnr^3-5\,bnr^2+8\,bnr-4\,bn)e^2\log(x)+(2\,ar^3-(bn+10\,a)r^2-4\,bn+4\,(bn+4\,a)r-8\,a)e^2)x^{2r}-8\,((bdr^3-4\,bdr^2+5\,bdr-2\,bd)e\log(c)+(bdnr^3-4\,bdnr^2+5\,bdnr-2\,bdn)e\log(x)+(adr^3-bdn-(bdn+4\,ad)r^2-2\,ad+(2\,bdn+5\,ad)r)e)x^r+2\,(bd^2r^4-6\,bd^2r^3+13\,bd^2r^2-12\,bd^2r+4\,bd^2)\log(c)+2\,(bd^2nr^4-6\,bd^2nr^3+13\,bd^2nr^2-12\,bd^2nr+4\,bd^2n)\log(x)}{4\,(r^4-6\,r^3+13\,r^2-12\,r+4)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*((b*d^2*n + 2*a*d^2)*r^4 + 4*b*d^2*n - 6*(b*d^2*n + 2*a*d^2)*r^3 + 8*a
*d^2 + 13*(b*d^2*n + 2*a*d^2)*r^2 - 12*(b*d^2*n + 2*a*d^2)*r - (2*(b*r^3 -
5*b*r^2 + 8*b*r - 4*b)*e^2*log(c) + 2*(b*n*r^3 - 5*b*n*r^2 + 8*b*n*r - 4*b*
n)*e^2*log(x) + (2*a*r^3 - (b*n + 10*a)*r^2 - 4*b*n + 4*(b*n + 4*a)*r - 8*a
)*e^2)*x^(2*r) - 8*((b*d*r^3 - 4*b*d*r^2 + 5*b*d*r - 2*b*d)*e*log(c) + (b*d
*n*r^3 - 4*b*d*n*r^2 + 5*b*d*n*r - 2*b*d*n)*e*log(x) + (a*d*r^3 - b*d*n - (
b*d*n + 4*a*d)*r^2 - 2*a*d + (2*b*d*n + 5*a*d)*r)*e)*x^r + 2*(b*d^2*r^4 - 6
*b*d^2*r^3 + 13*b*d^2*r^2 - 12*b*d^2*r + 4*b*d^2)*log(c) + 2*(b*d^2*n*r^4 -
 6*b*d^2*n*r^3 + 13*b*d^2*n*r^2 - 12*b*d^2*n*r + 4*b*d^2*n)*log(x))/((r^4 -
 6*r^3 + 13*r^2 - 12*r + 4)*x^2)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 2118 vs. $2(119) = 238$.
time = 4.67, size = 2118, normalized size = 15.69

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Piecewise((-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x**
2) - log(c*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piecew
ise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), Eq(r, 1)),
(-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**2/2 - b*d**2*n/(4*x**
2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**n)**2/n - b*e**2*n*x**2/4
 + b*e**2*x**2*log(c*x**n)/2, Eq(r, 2)), (-2*a*d**2*r**4/(4*r**4*x**2 - 24*
r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 12*a*d**2*r**3/(4*r**4*x*
*2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 26*a*d**2*r**2/(4
```

```
*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 24*a*d**2
*r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 8*a*
d**2/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 8*
a*d*e*r**3*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16
*x**2) - 32*a*d*e*r**2*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48
*r*x**2 + 16*x**2) + 40*a*d*e*r*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*
x**2 - 48*r*x**2 + 16*x**2) - 16*a*d*e*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 5
2*r**2*x**2 - 48*r*x**2 + 16*x**2) + 2*a*e**2*r**3*x**(2*r)/(4*r**4*x**2 -
24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 10*a*e**2*r**2*x**(2*r
)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 16*a*
e**2*r*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16
*x**2) - 8*a*e**2*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*
r*x**2 + 16*x**2) - b*d**2*n*r**4/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**
2 - 48*r*x**2 + 16*x**2) + 6*b*d**2*n*r**3/(4*r**4*x**2 - 24*r**3*x**2 + 52
*r**2*x**2 - 48*r*x**2 + 16*x**2) - 13*b*d**2*n*r**2/(4*r**4*x**2 - 24*r**3
*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 12*b*d**2*n*r/(4*r**4*x**2 -
24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 4*b*d**2*n/(4*r**4*x**
2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 2*b*d**2*r**4*log(
c*x**n)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) +
 12*b*d**2*r**3*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48
*r*x**2 + 16*x**2) - 26*b*d**2*r**2*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2
 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 24*b*d**2*r*log(c*x**n)/(4*r**4*x*
*2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 8*b*d**2*log(c*x*
*n)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 8*b
*d*e*n*r**2*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 1
6*x**2) + 16*b*d*e*n*r*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48
*r*x**2 + 16*x**2) - 8*b*d*e*n*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x
**2 - 48*r*x**2 + 16*x**2) + 8*b*d*e*r**3*x**r*log(c*x**n)/(4*r**4*x**2 - 2
4*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 32*b*d*e*r**2*x**r*log(
c*x**n)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) +
 40*b*d*e*r*x**r*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 4
8*r*x**2 + 16*x**2) - 16*b*d*e*x**r*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2
 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - b*e**2*n*r**2*x**(2*r)/(4*r**4*x**
2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 4*b*e**2*n*r*x**(2
*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 4*b
*e**2*n*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 1
6*x**2) + 2*b*e**2*r**3*x**(2*r)*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2 +
52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 10*b*e**2*r**2*x**(2*r)*log(c*x**n)/(
4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 16*b*e**
2*r*x**(2*r)*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*
x**2 + 16*x**2) - 8*b*e**2*x**(2*r)*log(c*x**n)/(4*r**4*x**2 - 24*r**3*x**2
 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2), True))
```

Giac [F]

time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^2*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^3, x)
```

3.384 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=135

$$-\frac{bd^2n}{16x^4}-\frac{be^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{2bdenx^{-4+r}}{(4-r)^2}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{2dex^{-4+r}(a+b\log(c$$

```
[Out] -1/16*b*d^2*n/x^4-1/4*b*e^2*n/(2-r)^2/(x^(4-2*r))-2*b*d*e*n*x^(-4+r)/(4-r)^
2-1/4*d^2*(a+b*ln(c*x^n))/x^4-1/2*e^2*(a+b*ln(c*x^n))/(2-r)/(x^(4-2*r))-2*d
*e*x^(-4+r)*(a+b*ln(c*x^n))/(4-r)
```

Rubi [A]
time = 0.11, antiderivative size = 135, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{bd^2n}{16x^4}-\frac{2bdenx^{r-4}}{(4-r)^2}-\frac{be^2nx^{-2(2-r)}}{4(2-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d^2*n)/x^4 - (b*e^2*n)/(4*(2 - r)^2*x^(2*(2 - r))) - (2*b*d*e*n*x^
(-4 + r))/(4 - r)^2 - (d^2*(a + b*Log[c*x^n]))/(4*x^4) - (e^2*(a + b*Log[c*
x^n]))/(2*(2 - r)*x^(2*(2 - r))) - (2*d*e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4
 - r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{2e^2x^{-2(2-r)}}{2-r}+\frac{8dex^{-4+r}}{4-r}\right)(a+b\log(cx^n))-(bn)\int\frac{-d^2(8$$

$$= -\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{2e^2x^{-2(2-r)}}{2-r}+\frac{8dex^{-4+r}}{4-r}\right)(a+b\log(cx^n))-\frac{(bn)\int\frac{-d^2(8-6r}{}}{}$$

$$= -\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{2e^2x^{-2(2-r)}}{2-r}+\frac{8dex^{-4+r}}{4-r}\right)(a+b\log(cx^n))-\frac{(bn)\int\left(-\frac{d^2(-4}{}\right.}{}$$

$$= -\frac{bd^2n}{16x^4}-\frac{be^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{2bdenx^{-4+r}}{(4-r)^2}-\frac{1}{4}\left(\frac{d^2}{x^4}+\frac{2e^2x^{-2(2-r)}}{2-r}+\frac{8dex^{-}}{4-}\right.$$

Mathematica [A]
time = 0.17, size = 115, normalized size = 0.85

$$\frac{-4bd^2n\log(x)-d^2(4a+bn-4bn\log(x)+4b\log(cx^n))+\frac{32dex^r(-bn+a(-4+r)+b(-4+r)\log(cx^n))}{(-4+r)^2}+\frac{4e^2x^{2r}(-bn+2a(-2+r)+2b(-2+r)\log(cx^n))}{(-2+r)^2}}{16x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] (-4*b*d^2*n*Log[x] - d^2*(4*a + b*n - 4*b*n*Log[x] + 4*b*Log[c*x^n]) + (32*
d*e*x^r*(-(b*n) + a*(-4 + r) + b*(-4 + r)*Log[c*x^n]))/(-4 + r)^2 + (4*e^2*
x^(2*r)*(-(b*n) + 2*a*(-2 + r) + 2*b*(-2 + r)*Log[c*x^n]))/(-2 + r)^2)/(16*
x^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.22, size = 1924, normalized size = 14.25

method	result	size
risch	Expression too large to display	1924

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

```
[Out] -1/4*b*(-2*e^2*(x^r)^2*r+d^2*r^2-8*d*e*x^r*r+8*e^2*(x^r)^2-6*d^2*r+16*d*e*x
^r+8*d^2)/x^4/(-2+r)/(-4+r)*ln(x^n)-1/16*(256*e^2*(x^r)^2*a+512*d*e*x^r*a+1
28*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-320*I*Pi*b*d*e*
r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+52*b*d^2*n*r^2-96*b*d^2*n*r+208*ln(c)*b*d^2
*r^2-384*ln(c)*b*d^2*r+4*ln(c)*b*d^2*r^4-48*ln(c)*b*d^2*r^3+128*I*Pi*b*e^2*
csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+256*d^2*b*ln(c)+64*b*d^2*n+256*a*d^2+b*
d^2*n*r^4-12*b*d^2*n*r^3+4*a*d^2*r^4-48*a*d^2*r^3-40*I*Pi*b*e^2*r^2*csgn(I*
c*x^n)^3*(x^r)^2+2*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+208*a*d^2*r^2
-384*a*d^2*r-24*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2-192*I*Pi*b*d^2*r
*csgn(I*c)*csgn(I*c*x^n)^2+128*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2
-128*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+256*ln(c)*b*e^2*(x^r)^2
-128*I*Pi*b*d^2*csgn(I*c*x^n)^3-8*a*e^2*r^3*(x^r)^2+80*a*e^2*r^2*(x^r)^2-25
6*a*e^2*r*(x^r)^2+64*b*e^2*n*(x^r)^2+256*a*d*e*r^2*x^r-640*a*d*e*r*x^r-32*b
*e^2*n*r*(x^r)^2+128*b*d*e*n*x^r+4*b*e^2*n*r^2*(x^r)^2-32*a*d*e*r^3*x^r+80*
ln(c)*b*e^2*r^2*(x^r)^2-256*ln(c)*b*e^2*r*(x^r)^2-8*ln(c)*b*e^2*r^3*(x^r)^2
+512*ln(c)*b*d*e*x^r-256*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r
+128*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-128*I*Pi*b*d^2*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r
)^2-192*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2+320*I*Pi*b*d*e*r*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*x^r-40*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)*(x^r)^2+128*I*Pi*b*d*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+4*I*Pi
*b*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-16*I*Pi*b*d*e*r^3*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x^r+24*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3+104*I*Pi*b*
d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*c*x^n)^
2+256*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-128*b*d*e*n*r*x^r+256*ln(c)*
b*d*e*r^2*x^r-128*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r+24*I*Pi*b*d^2*r^3*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-256*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r-128*I*Pi
*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+4*I*Pi*b*e^2*r^3*csgn(I*
c*x^n)^3*(x^r)^2+128*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-24*I*Pi*b*d^2*r^3
*csgn(I*c)*csgn(I*c*x^n)^2+104*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1
28*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-2*I*Pi*b*d^2*r^4*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+16*I*Pi*b*d*e*r^3*csgn(I*c*x^n)^3*x^r+2
56*I*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+40*I*Pi*b*e^2*r^2*csgn(I*c)*c
sgn(I*c*x^n)^2*(x^r)^2-4*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+4
0*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-640*ln(c)*b*d*e*r*x^r-
104*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+320*I*Pi*b*d*e*r*csg
n(I*c*x^n)^3*x^r-128*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-320*I
*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-16*I*Pi*b*d*e*r^3*csgn(I*c)*csg
n(I*c*x^n)^2*x^r-32*ln(c)*b*d*e*r^3*x^r+32*b*d*e*n*r^2*x^r+128*I*Pi*b*d^2*c
sgn(I*c)*csgn(I*c*x^n)^2+128*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+192*I*P
i*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+192*I*Pi*b*d^2*r*csgn(I*c*x^n
)^3-128*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2-104*I*Pi*b*d^2*r^2*csgn(I*c*x^n)
^3-2*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3+16*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)*x^r)/(-2+r)^2/x^4/(-4+r)^2
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-5>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 413 vs. 2(119) = 238.
time = 0.38, size = 413, normalized size = 3.06

$$-\frac{(bd^2n+4\,ad^2)r^4+64\,bd^2n-12\,(bd^2n+4\,ad^2)r^3+256\,ad^2+52\,(bd^2n+4\,ad^2)r^2-96\,(bd^2n+4\,ad^2)r-4\,(2\,(br^3-10\,br^2+32\,br-32\,b)e^2\log(c)+2\,(bnr^3-10\,bnr^2+32\,bnr-32\,bn)e^2\log(x)+(2\,ar^3-(bn+20\,a)r^2-16\,bn+8\,(bn+8\,a)r-64\,a)e^2)x^{2r}-32\,((bdr^3-8\,bdr^2+20\,bdr-16\,bd)e\log(c)+(bdnr^3-8\,bdnr^2+20\,bdnr-16\,bdn)e\log(x)+(adr^3-4\,bdn-(bdn+8\,ad)r^2-16\,ad+4\,(bdn+5\,ad)r)e)x^r+4\,(bd^2r^4-12\,bd^2r^3+52\,bd^2r^2-96\,bd^2r+64\,bd^2)\log(c)+4\,(bd^2nr^4-12\,bd^2nr^3+52\,bd^2nr^2-96\,bd^2nr+64\,bd^2n)\log(x)}{16\,(r^4-12\,r^3+52\,r^2-96\,r+64)x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] -1/16*((b*d^2*n + 4*a*d^2)*r^4 + 64*b*d^2*n - 12*(b*d^2*n + 4*a*d^2)*r^3 +
256*a*d^2 + 52*(b*d^2*n + 4*a*d^2)*r^2 - 96*(b*d^2*n + 4*a*d^2)*r - 4*(2*(b
*r^3 - 10*b*r^2 + 32*b*r - 32*b)*e^2*log(c) + 2*(b*n*r^3 - 10*b*n*r^2 + 32*
b*n*r - 32*b*n)*e^2*log(x) + (2*a*r^3 - (b*n + 20*a)*r^2 - 16*b*n + 8*(b*n
+ 8*a)*r - 64*a)*e^2)*x^(2*r) - 32*((b*d*r^3 - 8*b*d*r^2 + 20*b*d*r - 16*b*
d)*e*log(c) + (b*d*n*r^3 - 8*b*d*n*r^2 + 20*b*d*n*r - 16*b*d*n)*e*log(x) +
(a*d*r^3 - 4*b*d*n - (b*d*n + 8*a*d)*r^2 - 16*a*d + 4*(b*d*n + 5*a*d)*r)*e)
*x^r + 4*(b*d^2*r^4 - 12*b*d^2*r^3 + 52*b*d^2*r^2 - 96*b*d^2*r + 64*b*d^2)*
log(c) + 4*(b*d^2*n*r^4 - 12*b*d^2*n*r^3 + 52*b*d^2*n*r^2 - 96*b*d^2*n*r +
64*b*d^2*n)*log(x))/((r^4 - 12*r^3 + 52*r^2 - 96*r + 64)*x^4)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 2127 vs. 2(119) = 238.
time = 8.59, size = 2127, normalized size = 15.76

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**5,x)
```

```
[Out] Piecewise((-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*x
**4) - log(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2))
 - b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), Tru
```

e)), Eq(r, 2)), (-a*d**2/(4*x**4) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**4/4 -
b*d**2*n/(16*x**4) - b*d**2*log(c*x**n)/(4*x**4) + b*d*e*log(c*x**n)**2/n
- b*e**2*n*x**4/16 + b*e**2*x**4*log(c*x**n)/4, Eq(r, 4)), (-4*a*d**2*r**4/
(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) +
48*a*d**2*r**3/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4
+ 1024*x**4) - 208*a*d**2*r**2/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**
4 - 1536*r*x**4 + 1024*x**4) + 384*a*d**2*r/(16*r**4*x**4 - 192*r**3*x**4 +
832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 256*a*d**2/(16*r**4*x**4 - 192*
r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 32*a*d*e*r**3*x**r/(
16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 2
56*a*d*e*r**2*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x
4 + 1024*x4) + 640*a*d*e*r*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**
2*x**4 - 1536*r*x**4 + 1024*x**4) - 512*a*d*e*x**r/(16*r**4*x**4 - 192*r**3
*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 8*a*e**2*r**3*x**(2*r)/(
16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 8
0*a*e**2*r**2*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536
*r*x**4 + 1024*x**4) + 256*a*e**2*r*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4
+ 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 256*a*e**2*x**(2*r)/(16*r**4*x
4 - 192*r3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - b*d**2*n*r
4/(16*r4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4
) + 12*b*d**2*n*r**3/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r
*x**4 + 1024*x**4) - 52*b*d**2*n*r**2/(16*r**4*x**4 - 192*r**3*x**4 + 832*r
2*x4 - 1536*r*x**4 + 1024*x**4) + 96*b*d**2*n*r/(16*r**4*x**4 - 192*r**
3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 64*b*d**2*n/(16*r**4*x*
*4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 4*b*d**2*r*
*4*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4
+ 1024*x**4) + 48*b*d**2*r**3*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 8
32*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 208*b*d**2*r**2*log(c*x**n)/(16*r
4*x4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 384*b
*d**2*r*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*
x**4 + 1024*x**4) - 256*b*d**2*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 +
832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 32*b*d*e*n*r**2*x**r/(16*r**4*x*
*4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 128*b*d*e*n
*r*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*
x**4) - 128*b*d*e*n*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 15
36*r*x**4 + 1024*x**4) + 32*b*d*e*r**3*x**r*log(c*x**n)/(16*r**4*x**4 - 192
*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 256*b*d*e*r**2*x**r
*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 +
1024*x**4) + 640*b*d*e*r*x**r*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 8
32*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 512*b*d*e*x**r*log(c*x**n)/(16*r*
*4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 4*b*e*
*2*n*r**2*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x
4 + 1024*x4) + 32*b*e**2*n*r*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 8
32*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 64*b*e**2*n*x**(2*r)/(16*r**4*x**
4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 8*b*e**2*r**

```
3*x**(2*r)*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536
*r*x**4 + 1024*x**4) - 80*b*e**2*r**2*x**(2*r)*log(c*x**n)/(16*r**4*x**4 -
192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 256*b*e**2*r*x**
(2*r)*log(c*x**n)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x*
*4 + 1024*x**4) - 256*b*e**2*x**(2*r)*log(c*x**n)/(16*r**4*x**4 - 192*r**3*
x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4), True))
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
[Out] integrate((x^r*e + d)^2*(b*log(c*x^n) + a)/x^5, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^5,x)
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^5, x)
```

3.385 $\int x^4(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=105

$$-\frac{1}{25}bd^2nx^5-\frac{2bdenx^{5+r}}{(5+r)^2}-\frac{be^2nx^{5+2r}}{(5+2r)^2}+\frac{1}{5}\left(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x^{5+2r}}{5+2r}\right)\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -1/25*b*d^2*n*x^5-2*b*d*e*n*x^(5+r)/(5+r)^2-b*e^2*n*x^(5+2*r)/(5+2*r)^2+1/5
*(d^2*x^5+10*d*e*x^(5+r)/(5+r)+5*e^2*x^(5+2*r)/(5+2*r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.11, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {276, 2371, 12, 14}

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{25}bd^2nx^5-\frac{2bdenx^{r+5}}{(r+5)^2}-\frac{be^2nx^{2r+5}}{(2r+5)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d^2*n*x^5) - (2*b*d*e*n*x^(5 + r))/(5 + r)^2 - (b*e^2*n*x^(5 + 2*r
))/(5 + 2*r)^2 + ((d^2*x^5 + (10*d*e*x^(5 + r))/(5 + r) + (5*e^2*x^(5 + 2*r
))/(5 + 2*r))*(a + b*Log[c*x^n]))/5
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^4(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx &= \frac{1}{5}\left(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x^{5+2r}}{5+2r}\right)\left(a+b\log\left(cx^n\right)\right)-(bn)\int\frac{1}{5}x^4\Big(d^2\\ &= \frac{1}{5}\left(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x^{5+2r}}{5+2r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{5}(bn)\int x^4\Big(d^2\\ &= \frac{1}{5}\left(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x^{5+2r}}{5+2r}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{5}(bn)\int\Big(d^2x^4\\ &= -\frac{1}{25}bd^2nx^5-\frac{2bdenx^{5+r}}{(5+r)^2}-\frac{be^2nx^{5+2r}}{(5+2r)^2}+\frac{1}{5}\Big(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x}{5+}\end{aligned}$$

Mathematica [A]
time = 0.17, size = 119, normalized size = 1.13

$$\frac{1}{25}x^5\left(5bd^2n\log(x)+d^2(5a-bn-5bn\log(x)+5b\log\left(cx^n\right))+\frac{50dex^r(-bn+a(5+r)+b(5+r)\log\left(cx^n\right))}{(5+r)^2}+\frac{25e^2x^{2r}(-bn+a(5+2r)+b(5+2r)\log\left(cx^n\right))}{(5+2r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^5*(5*b*d^2*n*Log[x] + d^2*(5*a - b*n - 5*b*n*Log[x] + 5*b*Log[c*x^n]) +
(50*d*e*x^r*(-(b*n) + a*(5 + r) + b*(5 + r)*Log[c*x^n]))/(5 + r)^2 + (25*e^
2*x^(2*r)*(-(b*n) + a*(5 + 2*r) + b*(5 + 2*r)*Log[c*x^n]))/(5 + 2*r)^2))/25
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.19, size = 1930, normalized size = 18.38

method	result	size
risch	Expression too large to display	1930

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/5*b*x^5*(5*e^2*(x^r)^2*r+2*d^2*r^2+20*d*e*x^r*r+25*e^2*(x^r)^2+15*d^2*r+5
0*d*e*x^r+25*d^2)/(5+2*r)/(5+r)*ln(x^n)-1/50*x^5*(-6250*e^2*(x^r)^2*a-625*I
*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-12500*d*e*x^r*a+3125*I*Pi
*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1625*I*Pi*b*d^2*r^2*csgn(I*c)*cs
gn(I*c*x^n)^2+50*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+650*b*d^2*n*r^2+150
0*b*d^2*n*r-3250*ln(c)*b*d^2*r^2-7500*ln(c)*b*d^2*r-40*ln(c)*b*d^2*r^4-600*
ln(c)*b*d^2*r^3-6250*d^2*b*ln(c)+1250*b*d^2*n-6250*a*d^2+8*b*d^2*n*r^4+120*
```

```
b*d^2*n*r^3-40*a*d^2*r^4-600*a*d^2*r^3+20*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)-3250*a*d^2*r^2-7500*a*d^2*r-2500*I*Pi*b*e^2*r*csgn(I*x^n)
*csgn(I*c*x^n)^2*(x^r)^2-6250*ln(c)*b*e^2*(x^r)^2-100*a*e^2*r^3*(x^r)^2-125
0*a*e^2*r^2*(x^r)^2-5000*a*e^2*r*(x^r)^2+1250*b*e^2*n*(x^r)^2-3125*I*Pi*b*d
^2*csgn(I*c)*csgn(I*c*x^n)^2-3125*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-50
*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-4000*a*d*e*r^2*x^r-12500*
a*d*e*r*x^r+500*b*e^2*n*r*(x^r)^2+2500*b*d*e*n*x^r+50*b*e^2*n*r^2*(x^r)^2-4
00*a*d*e*r^3*x^r-1250*ln(c)*b*e^2*r^2*(x^r)^2-5000*ln(c)*b*e^2*r*(x^r)^2-10
0*ln(c)*b*e^2*r^3*(x^r)^2-12500*ln(c)*b*d*e*x^r+3125*I*Pi*b*d^2*csgn(I*c*x^
n)^3+1625*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2000*I*Pi*b*d*
e*r^2*csgn(I*c*x^n)^3*x^r-200*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r+
3750*I*Pi*b*d^2*r*csgn(I*c*x^n)^3+20*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3+200*I*P
i*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+300*I*Pi*b*d^2*r^3*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3125*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)*(x^r)^2+6250*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r-2000*I*Pi*b*d*e*r^2*
csgn(I*c)*csgn(I*c*x^n)^2*x^r-2000*I*Pi*b*d*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)
^2*x^r-1625*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3750*I*Pi*b*d^2*r*cs
gn(I*c)*csgn(I*c*x^n)^2-3750*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2-200*I
*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-3125*I*Pi*b*e^2*csgn(I*c)*csg
n(I*c*x^n)^2*(x^r)^2-3125*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+62
50*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r-20*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^
n)^2-20*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2-300*I*Pi*b*d^2*r^3*csgn(I*
c)*csgn(I*c*x^n)^2-300*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2+200*I*Pi*
b*d*e*r^3*csgn(I*c*x^n)^3*x^r+2000*b*d*e*n*r*x^r-4000*ln(c)*b*d*e*r^2*x^r+6
25*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+50*I*Pi*b*e^2
*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+6250*I*Pi*b*d*e*r*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+2000*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*x^r-625*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-6250*
I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2500*I*Pi*b*e^2*r*csgn(I*c)*csgn(I
*c*x^n)^2*(x^r)^2-50*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+300
*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3+3125*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+375
0*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12500*ln(c)*b*d*e*r*x^r+
625*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+2500*I*Pi*b*e^2*r*csgn(I*c*x^n)^
3*(x^r)^2-6250*I*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-400*ln(c)*b*d*e*r
^3*x^r+400*b*d*e*n*r^2*x^r+1625*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3+2500*I*Pi*b*
e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-6250*I*Pi*b*d*e*r*csgn(I*
c)*csgn(I*c*x^n)^2*x^r-6250*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+62
50*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r)/(5+2*r)^2/(5+r)^2
```

Maxima [A]

time = 0.29, size = 152, normalized size = 1.45

$$-\frac{1}{25}\,bd^2nx^5+\frac{1}{5}\,bd^2x^5\log\left(cx^n\right)+\frac{1}{5}\,ad^2x^5+\frac{be^2x^{2\,r+5}\log\left(cx^n\right)}{2\,r+5}+\frac{2\,bdex^{r+5}\log\left(cx^n\right)}{r+5}-\frac{be^2nx^{2\,r+5}}{\left(2\,r+5\right)^2}+\frac{ae^2x^{2\,r+5}}{2\,r+5}-\frac{2\,bdenx^{r+5}}{\left(r+5\right)^2}+\frac{2\,adex^{r+5}}{r+5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*d^2*n*x^5 + 1/5*b*d^2*x^5*log(c*x^n) + 1/5*a*d^2*x^5 + b*e^2*x^(2*r
 + 5)*log(c*x^n)/(2*r + 5) + 2*b*d*e*x^(r + 5)*log(c*x^n)/(r + 5) - b*e^2*n
*x^(2*r + 5)/(2*r + 5)^2 + a*e^2*x^(2*r + 5)/(2*r + 5) - 2*b*d*e*n*x^(r + 5
)/(r + 5)^2 + 2*a*d*e*x^(r + 5)/(r + 5)
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 449 vs. $2(101) = 202$.
time = 0.37, size = 449, normalized size = 4.28

$$\frac{5\left(4bd^2r^4+60bd^2r^3+325bd^2r^2+750bd^2r+625bd^2\right)x^5\log(c)+5\left(4bd^2nr^4+60bd^2nr^3+325bd^2nr^2+750bd^2nr+625bd^2n\right)x^5\log(x)-\left(4\left(bd^2n-5ad^2\right)r^4+625bd^2n+60\left(bd^2n-5ad^2\right)r^3-3125ad^2+325\left(bd^2n-5ad^2\right)r^2+750\left(bd^2n-5ad^2\right)r\right)x^5+25\left(\left(2br^3+25br^2+100br+125b\right)x^5e^2\log(c)+\left(2bnr^3+25bnr^2+100bnr+125bn\right)x^5e^2\log(x)+\left(2ar^3-(bn-25a)r^2-25bn-10(bn-10a)r+125a\right)x^5e^2\right)x^{2r}+50\left(\left(4bdr^3+40bdr^2+125bdr+125bd\right)x^5e\log(c)+\left(4bdnr^3+40bdnr^2+125bdnr+125bdn\right)x^5e\log(x)+\left(4adr^3-25bdn-4(bdn-10ad)r^2+125ad-5(4bdn-25ad)r\right)x^5e\right)x^r}{25\left(4r^4+60r^3+325r^2+750r+625\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/25*(5*(4*b*d^2*r^4 + 60*b*d^2*r^3 + 325*b*d^2*r^2 + 750*b*d^2*r + 625*b*d
^2)*x^5*log(c) + 5*(4*b*d^2*n*r^4 + 60*b*d^2*n*r^3 + 325*b*d^2*n*r^2 + 750*
b*d^2*n*r + 625*b*d^2*n)*x^5*log(x) - (4*(b*d^2*n - 5*a*d^2)*r^4 + 625*b*d^
2*n + 60*(b*d^2*n - 5*a*d^2)*r^3 - 3125*a*d^2 + 325*(b*d^2*n - 5*a*d^2)*r^2
 + 750*(b*d^2*n - 5*a*d^2)*r)*x^5 + 25*((2*b*r^3 + 25*b*r^2 + 100*b*r + 125
*b)*x^5*e^2*log(c) + (2*b*n*r^3 + 25*b*n*r^2 + 100*b*n*r + 125*b*n)*x^5*e^2
*log(x) + (2*a*r^3 - (b*n - 25*a)*r^2 - 25*b*n - 10*(b*n - 10*a)*r + 125*a)
*x^5*e^2)*x^(2*r) + 50*((4*b*d*r^3 + 40*b*d*r^2 + 125*b*d*r + 125*b*d)*x^5*
e*log(c) + (4*b*d*n*r^3 + 40*b*d*n*r^2 + 125*b*d*n*r + 125*b*d*n)*x^5*e*log
(x) + (4*a*d*r^3 - 25*b*d*n - 4*(b*d*n - 10*a*d)*r^2 + 125*a*d - 5*(4*b*d*n
 - 25*a*d)*r)*x^5*e)*x^r)/(4*r^4 + 60*r^3 + 325*r^2 + 750*r + 625)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Timed out
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 746 vs. $2(101) = 202$.
time = 3.09, size = 746, normalized size = 7.10

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/25*(20*b*d^2*n*r^4*x^5*log(x) + 200*b*d*n*r^3*x^5*x^r*e*log(x) - 4*b*d^2*
n*r^4*x^5 + 20*b*d^2*r^4*x^5*log(c) + 200*b*d*r^3*x^5*x^r*e*log(c) + 300*b*
d^2*n*r^3*x^5*log(x) + 50*b*n*r^3*x^5*x^(2*r)*e^2*log(x) + 2000*b*d*n*r^2*x
^5*x^r*e*log(x) - 60*b*d^2*n*r^3*x^5 + 20*a*d^2*r^4*x^5 - 200*b*d*n*r^2*x^5
*x^r*e + 200*a*d*r^3*x^5*x^r*e + 300*b*d^2*r^3*x^5*log(c) + 50*b*r^3*x^5*x^
(2*r)*e^2*log(c) + 2000*b*d*r^2*x^5*x^r*e*log(c) + 1625*b*d^2*n*r^2*x^5*log
(x) + 625*b*n*r^2*x^5*x^(2*r)*e^2*log(x) + 6250*b*d*n*r*x^5*x^r*e*log(x) -
325*b*d^2*n*r^2*x^5 + 300*a*d^2*r^3*x^5 - 25*b*n*r^2*x^5*x^(2*r)*e^2 + 50*a
*r^3*x^5*x^(2*r)*e^2 - 1000*b*d*n*r*x^5*x^r*e + 2000*a*d*r^2*x^5*x^r*e + 16
25*b*d^2*r^2*x^5*log(c) + 625*b*r^2*x^5*x^(2*r)*e^2*log(c) + 6250*b*d*r*x^5
*x^r*e*log(c) + 3750*b*d^2*n*r*x^5*log(x) + 2500*b*n*r*x^5*x^(2*r)*e^2*log(
x) + 6250*b*d*n*x^5*x^r*e*log(x) - 750*b*d^2*n*r*x^5 + 1625*a*d^2*r^2*x^5 -
 250*b*n*r*x^5*x^(2*r)*e^2 + 625*a*r^2*x^5*x^(2*r)*e^2 - 1250*b*d*n*x^5*x^r
*e + 6250*a*d*r*x^5*x^r*e + 3750*b*d^2*r*x^5*log(c) + 2500*b*r*x^5*x^(2*r)*
e^2*log(c) + 6250*b*d*x^5*x^r*e*log(c) + 3125*b*d^2*n*x^5*log(x) + 3125*b*n
*x^5*x^(2*r)*e^2*log(x) - 625*b*d^2*n*x^5 + 3750*a*d^2*r*x^5 - 625*b*n*x^5*
x^(2*r)*e^2 + 2500*a*r*x^5*x^(2*r)*e^2 + 6250*a*d*x^5*x^r*e + 3125*b*d^2*x^
5*log(c) + 3125*b*x^5*x^(2*r)*e^2*log(c) + 3125*a*d^2*x^5 + 3125*a*x^5*x^(2
*r)*e^2)/(4*r^4 + 60*r^3 + 325*r^2 + 750*r + 625)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^4\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^4*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.386 $\int x^2(d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=105

$$-\frac{1}{9}bd^2nx^3-\frac{2bdenx^{3+r}}{(3+r)^2}-\frac{be^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^2x^3+\frac{6dex^{3+r}}{3+r}+\frac{3e^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))$$

```
[Out] -1/9*b*d^2*n*x^3-2*b*d*e*n*x^(3+r)/(3+r)^2-b*e^2*n*x^(3+2*r)/(3+2*r)^2+1/3*
(d^2*x^3+6*d*e*x^(3+r)/(3+r)+3*e^2*x^(3+2*r)/(3+2*r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.11, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{9}bd^2nx^3-\frac{2bdenx^{r+3}}{(r+3)^2}-\frac{be^2nx^{2r+3}}{(2r+3)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^2*n*x^3) - (2*b*d*e*n*x^(3 + r))/(3 + r)^2 - (b*e^2*n*x^(3 + 2*r)
)/(3 + 2*r)^2 + ((d^2*x^3 + (6*d*e*x^(3 + r))/(3 + r) + (3*e^2*x^(3 + 2*r))
/(3 + 2*r))*(a + b*Log[c*x^n]))/3
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
```

```
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^2(d+ex^r)^2(a+b\log(cx^n))\,dx = \frac{1}{3}\left(d^2x^3+\frac{6dex^{3+r}}{3+r}+\frac{3e^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))-(bn)\int\frac{1}{3}x^2\left(d^2+\right.$$
$$=\frac{1}{3}\left(d^2x^3+\frac{6dex^{3+r}}{3+r}+\frac{3e^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int x^2\left(d^2+\right.$$
$$=\frac{1}{3}\left(d^2x^3+\frac{6dex^{3+r}}{3+r}+\frac{3e^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int\left(d^2x^2+\right.$$
$$=-\frac{1}{9}bd^2nx^3-\frac{2bdenx^{3+r}}{(3+r)^2}-\frac{be^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^2x^3+\frac{6dex^{3+r}}{3+r}+\frac{3e^2x^{3+2}}{3+2r}\right.$$

Mathematica [A]
time = 0.17, size = 119, normalized size = 1.13

$$\frac{1}{9}x^3\left(3bd^2n\log(x)+d^2(3a-bn-3bn\log(x)+3b\log(cx^n))+\frac{18dex^r(-bn+a(3+r)+b(3+r)\log(cx^n))}{(3+r)^2}+\frac{9e^2x^{2r}(-bn+a(3+2r)+b(3+2r)\log(cx^n))}{(3+2r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^3*(3*b*d^2*n*Log[x] + d^2*(3*a - b*n - 3*b*n*Log[x] + 3*b*Log[c*x^n]) +
(18*d*e*x^r*(-(b*n) + a*(3 + r) + b*(3 + r)*Log[c*x^n]))/(3 + r)^2 + (9*e^2
*x^(2*r)*(-(b*n) + a*(3 + 2*r) + b*(3 + 2*r)*Log[c*x^n]))/(3 + 2*r)^2))/9
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 1930, normalized size = 18.38

method	result	size
risch	Expression too large to display	1930

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*b*x^3*(3*e^2*(x^r)^2*r+2*d^2*r^2+12*d*e*x^r*r+9*e^2*(x^r)^2+9*d^2*r+18*
d*e*x^r+9*d^2)/(3+2*r)/(3+r)*ln(x^n)-1/18*x^3*(-486*e^2*(x^r)^2*a-972*d*e*x
^r*a+234*b*d^2*n*r^2+324*b*d^2*n*r-702*ln(c)*b*d^2*r^2-972*ln(c)*b*d^2*r-24
*ln(c)*b*d^2*r^4-216*ln(c)*b*d^2*r^3-486*d^2*b*ln(c)-18*I*Pi*b*e^2*r^3*csgn
(I*c)*csgn(I*c*x^n)^2*(x^r)^2+162*b*d^2*n-486*a*d^2+8*b*d^2*n*r^4+72*b*d^2*
n*r^3+243*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2-24*a*d^2*r^4-216*a*d^2*r^3-702
*a*d^2*r^2-972*a*d^2*r-486*ln(c)*b*e^2*(x^r)^2-36*a*e^2*r^3*(x^r)^2-270*a*e
```

```
^2*r^2*(x^r)^2-648*a*e^2*r*(x^r)^2+162*b*e^2*n*(x^r)^2+243*I*Pi*b*d^2*csgn(
I*c*x^n)^3-864*a*d*e*r^2*x^r-1620*a*d*e*r*x^r+108*b*e^2*n*r*(x^r)^2+324*b*d
*e*n*x^r+18*b*e^2*n*r^2*(x^r)^2-144*a*d*e*r^3*x^r-270*ln(c)*b*e^2*r^2*(x^r)
^2-648*ln(c)*b*e^2*r*(x^r)^2-36*ln(c)*b*e^2*r^3*(x^r)^2-972*ln(c)*b*d*e*x^r
-486*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-486*I*Pi*b*d*e*csgn(I*x^n)*cs
gn(I*c*x^n)^2*x^r-243*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-243*I*Pi*b*d^2*c
sgn(I*x^n)*csgn(I*c*x^n)^2+72*I*Pi*b*d*e*r^3*csgn(I*c*x^n)^3*x^r+486*I*Pi*b
*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+324*I*Pi*b*e^2*r*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*(x^r)^2-810*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r
+351*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3+72*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)*x^r+810*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r
+243*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+108*I*Pi*b*d^2*
r^3*csgn(I*c*x^n)^3-243*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+486*
I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r+324*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2+486
*I*Pi*b*d^2*r*csgn(I*c*x^n)^3+12*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3+18*I*Pi*b*e
^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-72*I*Pi*b*d*e*r^3*csgn(I
*c)*csgn(I*c*x^n)^2*x^r+432*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r+351*I*Pi*b*d
^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-135*I*Pi*b*e^2*r^2*csgn(I*x^n)*c
sgn(I*c*x^n)^2*(x^r)^2-432*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r+486
*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-351*I*Pi*b*d^2*r^2*csgn
(I*c)*csgn(I*c*x^n)^2+12*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+108*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-810*I*Pi*b*d*e*r*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x^r-108*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2-
351*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-324*I*Pi*b*e^2*r*csgn(I*x^n)
*csgn(I*c*x^n)^2*(x^r)^2+432*b*d*e*n*r*x^r-864*ln(c)*b*d*e*r^2*x^r-432*I*Pi
*b*d*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+135*I*Pi*b*e^2*r^2*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)*(x^r)^2-324*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(
x^r)^2-72*I*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+135*I*Pi*b*e^2*r^2
*csgn(I*c*x^n)^3*(x^r)^2+432*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*x^r-135*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+810*I*Pi*b*d*
e*r*csgn(I*c*x^n)^3*x^r-486*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2+243*I*
Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1620*ln(c)*b*d*e*r*x^r-108*I*P
i*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*
c*x^n)^2-18*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+18*I*Pi*b*e^
2*r^3*csgn(I*c*x^n)^3*(x^r)^2-243*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r
)^2-12*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2-486*I*Pi*b*d^2*r*csgn(I*c
)*csgn(I*c*x^n)^2-144*ln(c)*b*d*e*r^3*x^r+144*b*d*e*n*r^2*x^r)/(3+2*r)^2/(3
+r)^2
```

Maxima [A]
time = 0.29, size = 152, normalized size = 1.45

$$-\frac{1}{9}\,bd^2nx^3+\frac{1}{3}\,bd^2x^3\log\left(cx^n\right)+\frac{1}{3}\,ad^2x^3+\frac{be^2x^{2\,r+3}\log\left(cx^n\right)}{2\,r+3}+\frac{2\,bdex^{r+3}\log\left(cx^n\right)}{r+3}-\frac{be^2nx^{2\,r+3}}{\left(2\,r+3\right)^2}+\frac{ae^2x^{2\,r+3}}{2\,r+3}-\frac{2\,bdenx^{r+3}}{\left(r+3\right)^2}+\frac{2\,adex^{r+3}}{r+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/9*b*d^2*n*x^3 + 1/3*b*d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3 + b*e^2*x^(2*r
+ 3)*log(c*x^n)/(2*r + 3) + 2*b*d*e*x^(r + 3)*log(c*x^n)/(r + 3) - b*e^2*n*
x^(2*r + 3)/(2*r + 3)^2 + a*e^2*x^(2*r + 3)/(2*r + 3) - 2*b*d*e*n*x^(r + 3)
/(r + 3)^2 + 2*a*d*e*x^(r + 3)/(r + 3)
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 449 vs. $2(101) = 202$.
time = 0.53, size = 449, normalized size = 4.28

$$\frac{3\,(4\,bd^2r^4 + 36\,bd^2r^3 + 117\,bd^2r^2 + 162\,bd^2r + 81\,bd^2)x^3\log(c) + 3\,(4\,bd^2nr^4 + 36\,bd^2nr^3 + 117\,bd^2nr^2 + 162\,bd^2nr + 81\,bd^2n)x^3\log(x) - (4\,(bd^2n - 3\,ad^2)r^4 + 81\,bd^2n + 36\,(bd^2n - 3\,ad^2)r^3 - 243\,ad^2 + 117\,(bd^2n - 3\,ad^2)r^2 + 162\,(bd^2n - 3\,ad^2)r)x^3 + 9\,((2\,br^3 + 15\,br^2 + 36\,br + 27\,b)x^3e^2\log(c) + (2\,bnr^3 + 15\,bnr^2 + 36\,bnr + 27\,bn)x^3e^2\log(x) + (2\,ar^3 - (bn - 15\,a)r^2 - 9\,bn - 6\,(bn - 6\,a)r + 27\,a)x^3e^2)x^{2\,r} + 18\,((4\,bdr^3 + 24\,bdr^2 + 45\,bdr + 27\,bd)x^3e\log(c) + (4\,bdnr^3 + 24\,bdnr^2 + 45\,bdnr + 27\,bdn)x^3e\log(x) + (4\,adr^3 - 9\,bdn - 4\,(bdn - 6\,ad)r^2 + 27\,ad - 3\,(4\,bdn - 15\,ad)r)x^3e)x^r}{9\,(4\,r^4 + 36\,r^3 + 117\,r^2 + 162\,r + 81)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/9*(3*(4*b*d^2*r^4 + 36*b*d^2*r^3 + 117*b*d^2*r^2 + 162*b*d^2*r + 81*b*d^2
)*x^3*log(c) + 3*(4*b*d^2*n*r^4 + 36*b*d^2*n*r^3 + 117*b*d^2*n*r^2 + 162*b*
d^2*n*r + 81*b*d^2*n)*x^3*log(x) - (4*(b*d^2*n - 3*a*d^2)*r^4 + 81*b*d^2*n
+ 36*(b*d^2*n - 3*a*d^2)*r^3 - 243*a*d^2 + 117*(b*d^2*n - 3*a*d^2)*r^2 + 16
2*(b*d^2*n - 3*a*d^2)*r)*x^3 + 9*((2*b*r^3 + 15*b*r^2 + 36*b*r + 27*b)*x^3*
e^2*log(c) + (2*b*n*r^3 + 15*b*n*r^2 + 36*b*n*r + 27*b*n)*x^3*e^2*log(x) +
(2*a*r^3 - (b*n - 15*a)*r^2 - 9*b*n - 6*(b*n - 6*a)*r + 27*a)*x^3*e^2)*x^(2
*r) + 18*((4*b*d*r^3 + 24*b*d*r^2 + 45*b*d*r + 27*b*d)*x^3*e*log(c) + (4*b*
d*n*r^3 + 24*b*d*n*r^2 + 45*b*d*n*r + 27*b*d*n)*x^3*e*log(x) + (4*a*d*r^3 -
 9*b*d*n - 4*(b*d*n - 6*a*d)*r^2 + 27*a*d - 3*(4*b*d*n - 15*a*d)*r)*x^3*e)*
x^r)/(4*r^4 + 36*r^3 + 117*r^2 + 162*r + 81)
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3061 deep
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 746 vs. $2(101) = 202$.
time = 1.61, size = 746, normalized size = 7.10

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/9*(12*b*d^2*n*r^4*x^3*log(x) + 72*b*d*n*r^3*x^3*x^r*e*log(x) - 4*b*d^2*n*
r^4*x^3 + 12*b*d^2*r^4*x^3*log(c) + 72*b*d*r^3*x^3*x^r*e*log(c) + 108*b*d^2
*n*r^3*x^3*log(x) + 18*b*n*r^3*x^3*x^(2*r)*e^2*log(x) + 432*b*d*n*r^2*x^3*x
^r*e*log(x) - 36*b*d^2*n*r^3*x^3 + 12*a*d^2*r^4*x^3 - 72*b*d*n*r^2*x^3*x^r*
e + 72*a*d*r^3*x^3*x^r*e + 108*b*d^2*r^3*x^3*log(c) + 18*b*r^3*x^3*x^(2*r)*
e^2*log(c) + 432*b*d*r^2*x^3*x^r*e*log(c) + 351*b*d^2*n*r^2*x^3*log(x) + 13
5*b*n*r^2*x^3*x^(2*r)*e^2*log(x) + 810*b*d*n*r*x^3*x^r*e*log(x) - 117*b*d^2
*n*r^2*x^3 + 108*a*d^2*r^3*x^3 - 9*b*n*r^2*x^3*x^(2*r)*e^2 + 18*a*r^3*x^3*x
^(2*r)*e^2 - 216*b*d*n*r*x^3*x^r*e + 432*a*d*r^2*x^3*x^r*e + 351*b*d^2*r^2*
x^3*log(c) + 135*b*r^2*x^3*x^(2*r)*e^2*log(c) + 810*b*d*r*x^3*x^r*e*log(c)
+ 486*b*d^2*n*r*x^3*log(x) + 324*b*n*r*x^3*x^(2*r)*e^2*log(x) + 486*b*d*n*x
^3*x^r*e*log(x) - 162*b*d^2*n*r*x^3 + 351*a*d^2*r^2*x^3 - 54*b*n*r*x^3*x^(2
*r)*e^2 + 135*a*r^2*x^3*x^(2*r)*e^2 - 162*b*d*n*x^3*x^r*e + 810*a*d*r*x^3*x
^r*e + 486*b*d^2*r*x^3*log(c) + 324*b*r*x^3*x^(2*r)*e^2*log(c) + 486*b*d*x^
3*x^r*e*log(c) + 243*b*d^2*n*x^3*log(x) + 243*b*n*x^3*x^(2*r)*e^2*log(x) -
81*b*d^2*n*x^3 + 486*a*d^2*r*x^3 - 81*b*n*x^3*x^(2*r)*e^2 + 324*a*r*x^3*x^(
2*r)*e^2 + 486*a*d*x^3*x^r*e + 243*b*d^2*x^3*log(c) + 243*b*x^3*x^(2*r)*e^2
*log(c) + 243*a*d^2*x^3 + 243*a*x^3*x^(2*r)*e^2)/(4*r^4 + 36*r^3 + 117*r^2
+ 162*r + 81)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\left(d+e\,x^r\right)^2\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int(x^2*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.387 $\int (d+ex^r)^2 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=113

$$-bd^2nx-\frac{2bdenx^{1+r}}{(1+r)^2}-\frac{be^2nx^{1+2r}}{(1+2r)^2}+d^2x(a+b\log(cx^n))+\frac{2dex^{1+r}(a+b\log(cx^n))}{1+r}+\frac{e^2x^{1+2r}(a+b\log(cx^n))}{1+2r}$$

```
[Out] -b*d^2*n*x-2*b*d*e*n*x^(1+r)/(1+r)^2-b*e^2*n*x^(1+2*r)/(1+2*r)^2+d^2*x*(a+b
*ln(c*x^n))+2*d*e*x^(1+r)*(a+b*ln(c*x^n))/(1+r)+e^2*x^(1+2*r)*(a+b*ln(c*x^n
))/(1+2*r)
```

Rubi [A]
time = 0.05, antiderivative size = 113, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {250, 2350}

$$d^2x(a+b\log(cx^n))+\frac{2dex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{e^2x^{2r+1}(a+b\log(cx^n))}{2r+1}-bd^2nx-\frac{2bdenx^{r+1}}{(r+1)^2}-\frac{be^2nx^{2r+1}}{(2r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d^2*n*x) - (2*b*d*e*n*x^(1 + r))/(1 + r)^2 - (b*e^2*n*x^(1 + 2*r))/(1 +
 2*r)^2 + d^2*x*(a + b*Log[c*x^n]) + (2*d*e*x^(1 + r)*(a + b*Log[c*x^n]))/(
1 + r) + (e^2*x^(1 + 2*r)*(a + b*Log[c*x^n]))/(1 + 2*r)
```

Rule 250

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[ExpandIntegrand[(a + b*
x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && IGtQ[p, 0]
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex^r)^2 (a+b\log(cx^n))\,dx &= \left(d^2x+\frac{2dex^{1+r}}{1+r}+\frac{e^2x^{1+2r}}{1+2r}\right)(a+b\log(cx^n))-(bn)\int \left(d^2+\frac{2dex^r}{1+r}+\right.\\ &= -bd^2nx-\frac{2bdenx^{1+r}}{(1+r)^2}-\frac{be^2nx^{1+2r}}{(1+2r)^2}+\left(d^2x+\frac{2dex^{1+r}}{1+r}+\frac{e^2x^{1+2r}}{1+2r}\right)(a+\end{aligned}$$

Mathematica [A]
time = 0.15, size = 106, normalized size = 0.94

$$x\left(bd^2n\log(x)+d^2(a-bn-bn\log(x)+b\log(cx^n))+\frac{2dex^r(a-bn+ar+b(1+r)\log(cx^n))}{(1+r)^2}+\frac{e^2x^{2r}(a-bn+2ar+(b+2br)\log(cx^n))}{(1+2r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(b*d^2*n*Log[x] + d^2*(a - b*n - b*n*Log[x] + b*Log[c*x^n]) + (2*d*e*x^r*
(a - b*n + a*r + b*(1 + r)*Log[c*x^n]))/(1 + r)^2 + (e^2*x^(2*r)*(a - b*n +
 2*a*r + (b + 2*b*r)*Log[c*x^n]))/(1 + 2*r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 1921, normalized size = 17.00

method	result	size
risch	Expression too large to display	1921

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(e^2*(x^r)^2*r+2*d^2*r^2+4*d*e*x^r*r+e^2*(x^r)^2+3*d^2*r+2*d*e*x^r+d^2)
/(1+2*r)/(1+r)*ln(x^n)-1/2*x*(-2*e^2*(x^r)^2*a+2*I*Pi*b*d*e*csgn(I*c*x^n)^3
*x^r-2*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+4*I*Pi*b*d^2*r^4*cs
gn(I*c*x^n)^3-I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d^2*csgn(I*x^n)*c
sgn(I*c*x^n)^2-2*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-4*d*e*x^r*a-I*Pi*
b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)*(x^r)^2+4*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2+26*b*d^2*n*r^2
+12*b*d^2*n*r-26*ln(c)*b*d^2*r^2-12*ln(c)*b*d^2*r-8*ln(c)*b*d^2*r^4-24*ln(c
)*b*d^2*r^3-2*d^2*b*ln(c)+2*b*d^2*n-2*a*d^2+8*b*d^2*n*r^4+24*b*d^2*n*r^3-8*
a*d^2*r^4-24*a*d^2*r^3-26*a*d^2*r^2-12*a*d^2*r+I*Pi*b*d^2*csgn(I*c*x^n)^3-2
*ln(c)*b*e^2*(x^r)^2-6*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2-4*a*e^2*r^3
*(x^r)^2-10*a*e^2*r^2*(x^r)^2-8*a*e^2*r*(x^r)^2+2*b*e^2*n*(x^r)^2+5*I*Pi*b*
e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-2*I*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^
r-32*a*d*e*r^2*x^r-20*a*d*e*r*x^r+4*b*e^2*n*r*(x^r)^2+4*b*d*e*n*x^r+2*b*e^2
*n*r^2*(x^r)^2-16*a*d*e*r^3*x^r-10*ln(c)*b*e^2*r^2*(x^r)^2-8*ln(c)*b*e^2*r*
(x^r)^2-4*ln(c)*b*e^2*r^3*(x^r)^2-4*ln(c)*b*d*e*x^r-10*I*Pi*b*d*e*r*csgn(I*
x^n)*csgn(I*c*x^n)^2*x^r+2*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x
^r+12*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3-4*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^
n)^2*(x^r)^2-8*I*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+4*I*Pi*b*e^2*
r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-10*I*Pi*b*d*e*r*csgn(I*c)*csg
n(I*c*x^n)^2*x^r-12*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b*d^2*
r^3*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2+
I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-5*I*Pi*b*e^2*r^2*csgn(I*c)*c
sgn(I*c*x^n)^2*(x^r)^2-5*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2
```

```
+16*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r+5*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)*(x^r)^2+16*b*d*e*n*r*x^r-32*ln(c)*b*d*e*r^2*x^r+6*I*Pi*b*d
^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*x^r+16*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*x^r-4*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2-6*I*Pi*b*d^2*r*csgn(I*c)
*csgn(I*c*x^n)^2+6*I*Pi*b*d^2*r*csgn(I*c*x^n)^3+8*I*Pi*b*d*e*r^3*csgn(I*c*x
^n)^3*x^r+10*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-16*I*Pi*b
*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-16*I*Pi*b*d*e*r^2*csgn(I*x^n)*csgn(I
*c*x^n)^2*x^r+2*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2-I*Pi*b*e^2*csgn(I*c)
*csgn(I*c*x^n)^2*(x^r)^2+I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+2*I*Pi*b*e^2*r^
3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-8*I*Pi*b*d*e*r^3*csgn(I*c)*cs
gn(I*c*x^n)^2*x^r-4*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-20*ln(c)
*b*d*e*r*x^r+13*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-13*I*Pi*
b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-13*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*
x^n)^2+13*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3-16*ln(c)*b*d*e*r^3*x^r+16*b*d*e*n*
r^2*x^r+10*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r-2*I*Pi*b*e^2*r^3*csgn(I*x^n)*cs
gn(I*c*x^n)^2*(x^r)^2+12*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+4*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/(1+2*r)^2/(1+r)^2
```

Maxima [A]
time = 0.29, size = 144, normalized size = 1.27

$$-bd^2nx+bd^2x\log\left(cx^n\right)+ad^2x+\frac{be^2x^{2r+1}\log\left(cx^n\right)}{2r+1}+\frac{2\,bdex^{r+1}\log\left(cx^n\right)}{r+1}-\frac{be^2nx^{2r+1}}{\left(2r+1\right)^2}+\frac{ae^2x^{2r+1}}{2r+1}-\frac{2\,bdenx^{r+1}}{\left(r+1\right)^2}+\frac{2\,adex^{r+1}}{r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d^2*n*x + b*d^2*x*log(c*x^n) + a*d^2*x + b*e^2*x^(2*r + 1)*log(c*x^n)/(2
*r + 1) + 2*b*d*e*x^(r + 1)*log(c*x^n)/(r + 1) - b*e^2*n*x^(2*r + 1)/(2*r +
 1)^2 + a*e^2*x^(2*r + 1)/(2*r + 1) - 2*b*d*e*n*x^(r + 1)/(r + 1)^2 + 2*a*d
*e*x^(r + 1)/(r + 1)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 416 vs. 2(113) = 226.
time = 0.37, size = 416, normalized size = 3.68

$$\frac{(4\,bd^2r^4+12\,bd^2r^3+13\,bd^2r^2+6\,bd^2r+bd^2)x\log\left(c\right)+(4\,bd^2nr^4+12\,bd^2nr^3+13\,bd^2nr^2+6\,bd^2nr+bd^2n)x\log\left(x\right)-(4\,(bd^2n-ad^2)r^4+bd^2n+12\,(bd^2n-ad^2)r^3-ad^2+13\,(bd^2n-ad^2)r^2+6\,(bd^2n-ad^2)r)x+((2\,br^3+5\,br^2+4\,br+b)xe^2\log\left(c\right)+(2\,bnr^3+5\,bnr^2+4\,bnr+bn)xe^2\log\left(x\right)+(2\,ar^3-(bn-5\,a)r^2-bn-2\,(bn-2\,a)r+a)xe^2)x^{2r}+2\,((4\,bdr^3+8\,bdr^2+5\,bdr+bd)xe\log\left(c\right)+(4\,bdnr^3+8\,bdnr^2+5\,bdnr+bdn)xe\log\left(x\right)+(4\,adr^3-bdn-4\,(bdn-2\,ad)r^2+ad-(4\,bdn-5\,ad)r)xe)x^r}{4\,r^4+12\,r^3+13\,r^2+6\,r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] ((4*b*d^2*r^4 + 12*b*d^2*r^3 + 13*b*d^2*r^2 + 6*b*d^2*r + b*d^2)*x*log(c) +
 (4*b*d^2*n*r^4 + 12*b*d^2*n*r^3 + 13*b*d^2*n*r^2 + 6*b*d^2*n*r + b*d^2*n)*
x*log(x) - (4*(b*d^2*n - a*d^2)*r^4 + b*d^2*n + 12*(b*d^2*n - a*d^2)*r^3 -
a*d^2 + 13*(b*d^2*n - a*d^2)*r^2 + 6*(b*d^2*n - a*d^2)*r)*x + ((2*b*r^3 + 5
```

```
*b*r^2 + 4*b*r + b)*x*e^2*log(c) + (2*b*n*r^3 + 5*b*n*r^2 + 4*b*n*r + b*n)*
x*e^2*log(x) + (2*a*r^3 - (b*n - 5*a)*r^2 - b*n - 2*(b*n - 2*a)*r + a)*x*e^
2)*x^(2*r) + 2*((4*b*d*r^3 + 8*b*d*r^2 + 5*b*d*r + b*d)*x*e*log(c) + (4*b*d
*n*r^3 + 8*b*d*n*r^2 + 5*b*d*n*r + b*d*n)*x*e*log(x) + (4*a*d*r^3 - b*d*n -
 4*(b*d*n - 2*a*d)*r^2 + a*d - (4*b*d*n - 5*a*d)*r)*x*e)*x^r)/(4*r^4 + 12*r
^3 + 13*r^2 + 6*r + 1)
```

Sympy [**A**]
time = 5.18, size = 211, normalized size = 1.87

$$ad^2x + 2ade\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r \neq -1\\ \log(x) & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r \neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right) - bd^2nx + bd^2x\log(cx^n) - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{xx^r}{r+1} & \text{for } r \neq -1\\ \log(x) & \text{otherwise}\end{cases}}{r+1} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq -1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 2bde\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r \neq -1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - be^2n\left(\begin{cases}\frac{\begin{cases}\frac{xx^{2r}}{2r+1} & \text{for } r \neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r+1} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq -\frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + be^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r \neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**2*x + 2*a*d*e*Piecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True
)) + a*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True)
) - b*d**2*n*x + b*d**2*x*log(c*x**n) - 2*b*d*e*n*Piecewise((Piecewise((x*x
**r/(r + 1), Ne(r, -1)), (log(x), True))/(r + 1), (r > -oo) & (r < oo) & Ne
(r, -1)), (log(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r + 1)/(r + 1), Ne(
r, -1)), (log(x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecewise((x*x**
(2*r)/(2*r + 1), Ne(r, -1/2)), (log(x), True))/(2*r + 1), (r > -oo) & (r <
oo) & Ne(r, -1/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r + 1)/(
2*r + 1), Ne(r, -1/2)), (log(x), True))*log(c*x**n)
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 244 vs. 2(113) = 226.
time = 2.47, size = 244, normalized size = 2.16

$$\frac{2\,bdnrxx^re\log(x)}{r^2+2\,r+1} + bd^2nx\log(x) + \frac{2\,bnrxx^{2\,r}e^2\log(x)}{4\,r^2+4\,r+1} + \frac{2\,bdnxx^re\log(x)}{r^2+2\,r+1} - bd^2nx - \frac{2\,bdnxx^re}{r^2+2\,r+1} + bd^2x\log(c) + \frac{2\,bdxx^re\log(c)}{r+1} + \frac{bnxx^{2\,r}e^2\log(x)}{4\,r^2+4\,r+1} + ad^2x - \frac{bnxx^{2\,r}e^2}{4\,r^2+4\,r+1} + \frac{2\,adxx^re}{r+1} + \frac{bxx^{2\,r}e^2\log(c)}{2\,r+1} + \frac{axx^{2\,r}e^2}{2\,r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 2*b*d*n*r*x*x^r*e*log(x)/(r^2 + 2*r + 1) + b*d^2*n*x*log(x) + 2*b*n*r*x*x^(
2*r)*e^2*log(x)/(4*r^2 + 4*r + 1) + 2*b*d*n*x*x^r*e*log(x)/(r^2 + 2*r + 1)
- b*d^2*n*x - 2*b*d*n*x*x^r*e/(r^2 + 2*r + 1) + b*d^2*x*log(c) + 2*b*d*x*x^
r*e*log(c)/(r + 1) + b*n*x*x^(2*r)*e^2*log(x)/(4*r^2 + 4*r + 1) + a*d^2*x -
 b*n*x*x^(2*r)*e^2/(4*r^2 + 4*r + 1) + 2*a*d*x*x^r*e/(r + 1) + b*x*x^(2*r)*
e^2*log(c)/(2*r + 1) + a*x*x^(2*r)*e^2/(2*r + 1)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int (d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^r)^2*(a + b*log(c*x^n)),x)
[Out] int((d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.388 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2} dx$

Optimal. Leaf size=123

$$-\frac{bd^2n}{x}-\frac{2bdenx^{-1+r}}{(1-r)^2}-\frac{be^2nx^{-1+2r}}{(1-2r)^2}-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{-1+r}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{-1+2r}(a+b\log(cx^n))}{1-2r}$$

```
[Out] -b*d^2*n/x-2*b*d*e*n*x^(-1+r)/(1-r)^2-b*e^2*n*x^(-1+2*r)/(1-2*r)^2-d^2*(a+b
*ln(c*x^n))/x-2*d*e*x^(-1+r)*(a+b*ln(c*x^n))/(1-r)-e^2*x^(-1+2*r)*(a+b*ln(c
*x^n))/(1-2*r)
```

Rubi [A]
time = 0.11, antiderivative size = 123, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {276, 2372, 14}

$$-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{bd^2n}{x}-\frac{2bdenx^{r-1}}{(1-r)^2}-\frac{be^2nx^{2r-1}}{(1-2r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^2*n)/x) - (2*b*d*e*n*x^(-1 + r))/(1 - r)^2 - (b*e^2*n*x^(-1 + 2*r))/
(1 - 2*r)^2 - (d^2*(a + b*Log[c*x^n]))/x - (2*d*e*x^(-1 + r)*(a + b*Log[c*x
^n]))/(1 - r) - (e^2*x^(-1 + 2*r)*(a + b*Log[c*x^n]))/(1 - 2*r)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] && !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2} dx = -\left(\frac{d^2}{x}+\frac{2dex^{-1+r}}{1-r}+\frac{e^2x^{-1+2r}}{1-2r}\right)(a+b\log(cx^n))-(bn)\int \frac{-d^2+\frac{2dex^r}{-1+r}}{x^2}$$
$$= -\left(\frac{d^2}{x}+\frac{2dex^{-1+r}}{1-r}+\frac{e^2x^{-1+2r}}{1-2r}\right)(a+b\log(cx^n))-(bn)\int \left(-\frac{d^2}{x^2}+\frac{2de}{-}\right.$$
$$= -\frac{bd^2n}{x}-\frac{2bdenx^{-1+r}}{(1-r)^2}-\frac{be^2nx^{-1+2r}}{(1-2r)^2}-\left(\frac{d^2}{x}+\frac{2dex^{-1+r}}{1-r}+\frac{e^2x^{-1+2r}}{1-2r}\right)(a$$

Mathematica [A]
time = 0.17, size = 112, normalized size = 0.91

$$\frac{-bd^2n\log(x)-d^2(a+bn-bn\log(x)+b\log(cx^n))+\frac{2dex^r(-bn+a(-1+r)+b(-1+r)\log(cx^n))}{(-1+r)^2}+\frac{e^2x^{2r}(-bn+a(-1+2r)+b(-1+2r)\log(cx^n))}{(1-2r)^2}}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] (-(b*d^2*n*Log[x]) - d^2*(a + b*n - b*n*Log[x] + b*Log[c*x^n]) + (2*d*e*x^r
*(-(b*n) + a*(-1 + r) + b*(-1 + r)*Log[c*x^n]))/(-1 + r)^2 + (e^2*x^(2*r)*(
-(b*n) + a*(-1 + 2*r) + b*(-1 + 2*r)*Log[c*x^n]))/(1 - 2*r)^2)/x
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.22, size = 1927, normalized size = 15.67

method	result	size
risch	Expression too large to display	1927

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b*(-e^2*(x^r)^2*r+2*d^2*r^2-4*d*e*x^r*r+e^2*(x^r)^2-3*d^2*r+2*d*e*x^r+d^2)
/x/(-1+2*r)/(-1+r)*ln(x^n)-1/2*(2*e^2*(x^r)^2*a-2*I*Pi*b*e^2*r^3*csgn(I*c)*
csgn(I*c*x^n)^2*(x^r)^2+4*d*e*x^r*a+4*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2+
26*b*d^2*n*r^2-12*b*d^2*n*r+26*ln(c)*b*d^2*r^2-12*ln(c)*b*d^2*r+8*ln(c)*b*d
^2*r^4-24*ln(c)*b*d^2*r^3-I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*
d^2*b*ln(c)+2*b*d^2*n+2*a*d^2+8*b*d^2*n*r^4-24*b*d^2*n*r^3+5*I*Pi*b*e^2*r^2
*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+8*a*d^2*r^4-24*a*d^2*r^3-I*Pi*b*d^2*csgn
(I*c*x^n)^3+26*a*d^2*r^2-12*a*d^2*r+2*ln(c)*b*e^2*(x^r)^2+4*I*Pi*b*d^2*r^4*
csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+13*I
*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2-16*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x
^r-5*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+13*I*Pi*b*d^2*r^2*csgn(I*x^n)*c
```

```
sgn(I*c*x^n)^2-6*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2-4*a*e^2*r^3*(x^r)
^2+10*a*e^2*r^2*(x^r)^2-8*a*e^2*r*(x^r)^2+2*b*e^2*n*(x^r)^2+32*a*d*e*r^2*x^
r-20*a*d*e*r*x^r-4*b*e^2*n*r*(x^r)^2+4*b*d*e*n*x^r+2*b*e^2*n*r^2*(x^r)^2-16
*a*d*e*r^3*x^r+10*ln(c)*b*e^2*r^2*(x^r)^2-8*ln(c)*b*e^2*r*(x^r)^2-4*ln(c)*b
*e^2*r^3*(x^r)^2+4*ln(c)*b*d*e*x^r-10*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n
)^2*x^r-2*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+I*Pi*b*e^2*csg
n(I*c)*csgn(I*c*x^n)^2*(x^r)^2+12*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3-5*I*Pi*b*e
^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+16*I*Pi*b*d*e*r^2*csgn(I
*x^n)*csgn(I*c*x^n)^2*x^r+16*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-4
*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-8*I*Pi*b*d*e*r^3*csgn(I*x
^n)*csgn(I*c*x^n)^2*x^r+4*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*
(x^r)^2-10*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-12*I*Pi*b*d^2*r^3*csg
n(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2-13*I*P
i*b*d^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-16*b*d*e*n*r*x^r+32*ln(c)*b
*d*e*r^2*x^r+6*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*I*Pi*b*d*
e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-6*I*Pi*b*d^2*r*csgn(I*c)*csgn
(I*c*x^n)^2+6*I*Pi*b*d^2*r*csgn(I*c*x^n)^3+I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*
x^n)^2*(x^r)^2-2*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r+8*I*Pi*b*d*e*r^3*csgn(I*c*x
^n)^3*x^r+10*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-4*I*Pi*b*
d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)*(x^r)^2+5*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^
2+2*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+2*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*
x^n)^2*x^r+2*I*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+2*I*Pi*b*e^2*r^3*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-8*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I
*c*x^n)^2*x^r-4*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-20*ln(c)*b*d
*e*r*x^r-4*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3-13*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3
-I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2+
I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2-16*ln(c)*b*d*e*r^3*x^r+16*b*d*e*n*r^2*
x^r-16*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+10*I*Pi*b*d*e
*r*csgn(I*c*x^n)^3*x^r-2*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2
+12*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))/(-1+2*r)^2/x/(-1+r)
^2
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-2>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 411 vs. $2(118) = 236$.
time = 0.37, size = 411, normalized size = 3.34

$$-\frac{4\,{\left(b d^{2} n + a d^{2}\right)} r^{4} + b d^{2} n - 12\,{\left(b d^{2} n + a d^{2}\right)} r^{3} + a d^{2} + 13\,{\left(b d^{2} n + a d^{2}\right)} r^{2} - 6\,{\left(b d^{2} n + a d^{2}\right)} r - {\left({\left(2\,b r^{3} - 5\,b r^{2} + 4\,b r - b\right)} e^{2} \log\left(c\right) + {\left(2\,b n r^{3} - 5\,b n r^{2} + 4\,b n r - b n\right)} e^{2} \log\left(x\right) + {\left(2\,a r^{3} - {\left(b n + 5\,a\right)} r^{2} - b n + 2\,{\left(b n + 2\,a\right)} r - a\right)} e^{2}\right)} x^{2\,r} - 2\,{\left({\left(4\,b d r^{3} - 8\,b d r^{2} + 5\,b d r - b d\right)} e \log\left(c\right) + {\left(4\,b d n r^{3} - 8\,b d n r^{2} + 5\,b d n r - b d n\right)} e \log\left(x\right) + {\left(4\,a d r^{3} - b d n - 4\,{\left(b d n + 2\,a d\right)} r^{2} - a d + {\left(4\,b d n + 5\,a d\right)} r\right)} e\right)} x^{r} + {\left(4\,b d^{2} r^{4} - 12\,b d^{2} r^{3} + 13\,b d^{2} r^{2} - 6\,b d^{2} r + b d^{2}\right)} \log\left(c\right) + {\left(4\,b d^{2} n r^{4} - 12\,b d^{2} n r^{3} + 13\,b d^{2} n r^{2} - 6\,b d^{2} n r + b d^{2} n\right)} \log\left(x\right)}{{\left(4\,r^{4} - 12\,r^{3} + 13\,r^{2} - 6\,r + 1\right)} x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] -(4*(b*d^2*n + a*d^2)*r^4 + b*d^2*n - 12*(b*d^2*n + a*d^2)*r^3 + a*d^2 + 13
*(b*d^2*n + a*d^2)*r^2 - 6*(b*d^2*n + a*d^2)*r - ((2*b*r^3 - 5*b*r^2 + 4*b*
r - b)*e^2*log(c) + (2*b*n*r^3 - 5*b*n*r^2 + 4*b*n*r - b*n)*e^2*log(x) + (2
*a*r^3 - (b*n + 5*a)*r^2 - b*n + 2*(b*n + 2*a)*r - a)*e^2)*x^(2*r) - 2*((4*
b*d*r^3 - 8*b*d*r^2 + 5*b*d*r - b*d)*e*log(c) + (4*b*d*n*r^3 - 8*b*d*n*r^2
+ 5*b*d*n*r - b*d*n)*e*log(x) + (4*a*d*r^3 - b*d*n - 4*(b*d*n + 2*a*d)*r^2
- a*d + (4*b*d*n + 5*a*d)*r)*e)*x^r + (4*b*d^2*r^4 - 12*b*d^2*r^3 + 13*b*d^
2*r^2 - 6*b*d^2*r + b*d^2)*log(c) + (4*b*d^2*n*r^4 - 12*b*d^2*n*r^3 + 13*b*
d^2*n*r^2 - 6*b*d^2*n*r + b*d^2*n)*log(x))/((4*r^4 - 12*r^3 + 13*r^2 - 6*r
+ 1)*x)
```

Sympy [A]
time = 10.13, size = 197, normalized size = 1.60

$$- \frac{a d^{2}}{x} + 2 a d e \left(\begin{cases} \frac{x^{r}}{r x - x} & \text{for}\: r \neq 1 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) + a e^{2} \left(\begin{cases} \frac{x^{2 r}}{2 r x - x} & \text{for}\: r \neq \frac{1}{2} \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) - \frac{b d^{2} n}{x} - \frac{b d^{2} \log{\left(c x^{n} \right)}}{x} - 2 b d e n \left(\begin{cases} \frac{\begin{cases} \frac{x^{r}}{r x - x} & \text{for}\: r \neq 1 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}}{r - 1} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq 1 \\ \frac{\log{\left(x \right)}^{2}}{2} & \text{otherwise} \end{cases}\right) + 2 b d e \left(\begin{cases} \frac{x^{r - 1}}{r - 1} & \text{for}\: r \neq 1 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)} - b e^{2} n \left(\begin{cases} \frac{\begin{cases} \frac{x^{2 r}}{2 r x - x} & \text{for}\: r \neq \frac{1}{2} \\ \log{\left(x \right)} & \text{otherwise} \end{cases}}{2 r - 1} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq \frac{1}{2} \\ \frac{\log{\left(x \right)}^{2}}{2} & \text{otherwise} \end{cases}\right) + b e^{2} \left(\begin{cases} \frac{x^{2 r - 1}}{2 r - 1} & \text{for}\: r \neq \frac{1}{2} \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] -a*d**2/x + 2*a*d*e*Piecewise((x**r/(r*x - x), Ne(r, 1)), (log(x), True)) +
 a*e**2*Piecewise((x**(2*r)/(2*r*x - x), Ne(r, 1/2)), (log(x), True)) - b*d
**2*n/x - b*d**2*log(c*x**n)/x - 2*b*d*e*n*Piecewise((Piecewise((x**r/(r*x
- x), Ne(r, 1)), (log(x), True))/(r - 1), (r > -oo) & (r < oo) & Ne(r, 1)),
 (log(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (
log(x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r)/(2*r*x
 - x), Ne(r, 1/2)), (log(x), True))/(2*r - 1), (r > -oo) & (r < oo) & Ne(r,
 1/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r - 1)/(2*r - 1), Ne
(r, 1/2)), (log(x), True))*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^2*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^2,x)
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^2, x)
```

3.389 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4} dx$

Optimal. Leaf size=127

$$-\frac{bd^2n}{9x^3}-\frac{2bdenx^{-3+r}}{(3-r)^2}-\frac{be^2nx^{-3+2r}}{(3-2r)^2}-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{-3+r}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{-3+2r}(a+b\log(cx^n))}{3-2r}$$

```
[Out] -1/9*b*d^2*n/x^3-2*b*d*e*n*x^(-3+r)/(3-r)^2-b*e^2*n*x^(-3+2*r)/(3-2*r)^2-1/
3*d^2*(a+b*ln(c*x^n))/x^3-2*d*e*x^(-3+r)*(a+b*ln(c*x^n))/(3-r)-e^2*x^(-3+2*
r)*(a+b*ln(c*x^n))/(3-2*r)
```

Rubi [A]
time = 0.12, antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{bd^2n}{9x^3}-\frac{2bdenx^{r-3}}{(3-r)^2}-\frac{be^2nx^{2r-3}}{(3-2r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^2*n)/x^3 - (2*b*d*e*n*x^(-3 + r))/(3 - r)^2 - (b*e^2*n*x^(-3 + 2*
r))/(3 - 2*r)^2 - (d^2*(a + b*Log[c*x^n]))/(3*x^3) - (2*d*e*x^(-3 + r)*(a +
 b*Log[c*x^n]))/(3 - r) - (e^2*x^(-3 + 2*r)*(a + b*Log[c*x^n]))/(3 - 2*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{1}{3}\left(\frac{d^2}{x^3}+\frac{6dex^{-3+r}}{3-r}+\frac{3e^2x^{-3+2r}}{3-2r}\right)(a+b\log(cx^n))-(bn)\int \frac{-d^2+\ldots}{\ldots}$$

$$= -\frac{1}{3}\left(\frac{d^2}{x^3}+\frac{6dex^{-3+r}}{3-r}+\frac{3e^2x^{-3+2r}}{3-2r}\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int \frac{-d^2+\ldots}{\ldots}$$

$$= -\frac{1}{3}\left(\frac{d^2}{x^3}+\frac{6dex^{-3+r}}{3-r}+\frac{3e^2x^{-3+2r}}{3-2r}\right)(a+b\log(cx^n))-\frac{1}{3}(bn)\int \left(-\frac{d^2}{x^4}\ldots\right.$$

$$= -\frac{bd^2n}{9x^3}-\frac{2bdenx^{-3+r}}{(3-r)^2}-\frac{be^2nx^{-3+2r}}{(3-2r)^2}-\frac{1}{3}\left(\frac{d^2}{x^3}+\frac{6dex^{-3+r}}{3-r}+\frac{3e^2x^{-3+2r}}{3-2r}\ldots\right.$$

Mathematica [A]
time = 0.17, size = 119, normalized size = 0.94

$$\frac{-3bd^2n\log(x)-d^2(3a+bn-3bn\log(x)+3b\log(cx^n))+\frac{18dex^r(-bn+a(-3+r)+b(-3+r)\log(cx^n))}{(-3+r)^2}+\frac{9e^2x^{2r}(-bn+a(-3+2r)+b(-3+2r)\log(cx^n))}{(3-2r)^2}}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] (-3*b*d^2*n*Log[x] - d^2*(3*a + b*n - 3*b*n*Log[x] + 3*b*Log[c*x^n]) + (18*
d*e*x^r*(-(b*n) + a*(-3 + r) + b*(-3 + r)*Log[c*x^n]))/(-3 + r)^2 + (9*e^2*
x^(2*r)*(-(b*n) + a*(-3 + 2*r) + b*(-3 + 2*r)*Log[c*x^n]))/(3 - 2*r)^2)/(9*
x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.25, size = 1930, normalized size = 15.20

method	result	size
risch	Expression too large to display	1930

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(-3*e^2*(x^r)^2*r+2*d^2*r^2-12*d*e*x^r*r+9*e^2*(x^r)^2-9*d^2*r+18*d*
e*x^r+9*d^2)/x^3/(-3+2*r)/(-3+r)*ln(x^n)-1/18*(486*e^2*(x^r)^2*a-243*I*Pi*b
*d^2*csgn(I*c*x^n)^3+972*d*e*x^r*a+18*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*x^n)*
```

```
csgn(I*c*x^n)*(x^r)^2-72*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r+234*b
*d^2*n*r^2-324*b*d^2*n*r+702*ln(c)*b*d^2*r^2-972*ln(c)*b*d^2*r+24*ln(c)*b*d
^2*r^4-216*ln(c)*b*d^2*r^3-486*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*c*x^n)^2+486*d
^2*b*ln(c)+72*I*Pi*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+810*I*
Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+162*b*d^2*n+486*a*d^2+8*
b*d^2*n*r^4-72*b*d^2*n*r^3+24*a*d^2*r^4-216*a*d^2*r^3+702*a*d^2*r^2-972*a*d
^2*r+486*ln(c)*b*e^2*(x^r)^2+432*I*Pi*b*d*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2
*x^r-36*a*e^2*r^3*(x^r)^2+270*a*e^2*r^2*(x^r)^2-648*a*e^2*r*(x^r)^2+162*b*e
^2*n*(x^r)^2+864*a*d*e*r^2*x^r-1620*a*d*e*r*x^r-108*b*e^2*n*r*(x^r)^2+324*b
*d*e*n*x^r+18*b*e^2*n*r^2*(x^r)^2-144*a*d*e*r^3*x^r+270*ln(c)*b*e^2*r^2*(x^
r)^2-648*ln(c)*b*e^2*r*(x^r)^2-36*ln(c)*b*e^2*r^3*(x^r)^2+972*ln(c)*b*d*e*x
^r-243*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2-351*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^
3-135*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+18*I*Pi*b*
e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+324*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-10
8*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2+486*I*Pi*b*d*e*csgn(I*x^n)*csg
n(I*c*x^n)^2*x^r-486*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+432
*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-810*I*Pi*b*d*e*r*csgn(I*c)*cs
gn(I*c*x^n)^2*x^r-810*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+108*I*Pi
*b*d^2*r^3*csgn(I*c*x^n)^3+12*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2+351*
I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-243*I*Pi*b*d^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+135*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-4
32*b*d*e*n*r*x^r+864*ln(c)*b*d*e*r^2*x^r-243*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)*(x^r)^2+243*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2
-486*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r-135*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r
)^2-486*I*Pi*b*d^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2-108*I*Pi*b*d^2*r^3*csgn(I*
c)*csgn(I*c*x^n)^2-18*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+81
0*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r+108*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+351*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2+243*I*Pi*b*e^2*
csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+135*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n
)^2*(x^r)^2-324*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-324*I*Pi*b*e
^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-12*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+72*I*Pi*b*d*e*r^3*csgn(I*c*x^n)^3*x^r-351*I*Pi*b*d^2*r^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+486*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n
)^2*x^r-1620*ln(c)*b*d*e*r*x^r+12*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^
2+486*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-18*I*Pi*b*e^2*r^3*cs
gn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-432*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r-72*I
*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+324*I*Pi*b*e^2*r*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-144*ln(c)*b*d*e*r^3*x^r+144*b*d*e*n*r^2*x^r
+486*I*Pi*b*d^2*r*csgn(I*c*x^n)^3+243*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^
2-432*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-12*I*Pi*b*d^2*
r^4*csgn(I*c*x^n)^3+243*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2)/(-3+2*r)^2/x^
3/(-3+r)^2
```

Maxima [F(-2)]

time = 0.00, size = 0, normalized size = 0.00

$$\text{Exception raised: ValueError}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-4>0)', see `assume?` for more det
ails)Is
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 422 vs. $2(118) = 236$.
time = 0.38, size = 422, normalized size = 3.32

$$-\frac{4\,(bd^2n+3\,ad^2)r^4+81\,bd^2n-36\,(bd^2n+3\,ad^2)r^3+243\,ad^2+117\,(bd^2n+3\,ad^2)r^2-162\,(bd^2n+3\,ad^2)r-9\,((2\,br^3-15\,br^2+36\,br-27\,b)e^2\log(c)+(2\,bnr^3-15\,bnr^2+36\,bnr-27\,bn)e^2\log(x)+(2\,ar^3-(bn+15\,a)r^2-9\,bn+6\,(bn+6\,a)r-27\,a)e^2)x^{2r}-18\,((4\,bdr^3-24\,bdr^2+45\,bdr-27\,bd)e\log(c)+(4\,bdnr^3-24\,bdnr^2+45\,bdnr-27\,bdn)e\log(x)+(4\,adr^3-9\,bdn-4\,(bdn+6\,ad)r^2-27\,ad+3\,(4\,bdn+15\,ad)r)e)x^r+3\,(4\,bd^2r^4-36\,bd^2r^3+117\,bd^2r^2-162\,bd^2r+81\,bd^2)\log(c)+3\,(4\,bd^2nr^4-36\,bd^2nr^3+117\,bd^2nr^2-162\,bd^2nr+81\,bd^2n)\log(x)}{9\,(4\,r^4-36\,r^3+117\,r^2-162\,r+81)x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/9*(4*(b*d^2*n + 3*a*d^2)*r^4 + 81*b*d^2*n - 36*(b*d^2*n + 3*a*d^2)*r^3 +
 243*a*d^2 + 117*(b*d^2*n + 3*a*d^2)*r^2 - 162*(b*d^2*n + 3*a*d^2)*r - 9*((
2*b*r^3 - 15*b*r^2 + 36*b*r - 27*b)*e^2*log(c) + (2*b*n*r^3 - 15*b*n*r^2 +
36*b*n*r - 27*b*n)*e^2*log(x) + (2*a*r^3 - (b*n + 15*a)*r^2 - 9*b*n + 6*(b*
n + 6*a)*r - 27*a)*e^2)*x^(2*r) - 18*((4*b*d*r^3 - 24*b*d*r^2 + 45*b*d*r -
27*b*d)*e*log(c) + (4*b*d*n*r^3 - 24*b*d*n*r^2 + 45*b*d*n*r - 27*b*d*n)*e*l
og(x) + (4*a*d*r^3 - 9*b*d*n - 4*(b*d*n + 6*a*d)*r^2 - 27*a*d + 3*(4*b*d*n
+ 15*a*d)*r)*e)*x^r + 3*(4*b*d^2*r^4 - 36*b*d^2*r^3 + 117*b*d^2*r^2 - 162*b
*d^2*r + 81*b*d^2)*log(c) + 3*(4*b*d^2*n*r^4 - 36*b*d^2*n*r^3 + 117*b*d^2*n
*r^2 - 162*b*d^2*n*r + 81*b*d^2*n)*log(x))/((4*r^4 - 36*r^3 + 117*r^2 - 162
*r + 81)*x^3)
```

Sympy [**A**]
time = 36.09, size = 228, normalized size = 1.80

$$-\frac{ad^2}{3x^3}+2ade\left(\begin{cases}\frac{x^r}{rx^3-3x^3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}\right)+ae^2\left(\begin{cases}\frac{x^{2r}}{2rx^3-3x^3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)-\frac{bd^2n}{9x^3}-\frac{bd^2\log(cx^n)}{3x^3}-2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{rx^3-3x^3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}}{r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 3\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)+2bde\left(\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)-be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r}}{2rx^3-3x^3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{3}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)+be^2\left(\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d**2/(3*x**3) + 2*a*d*e*Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3)), (l
og(x), True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x**3 - 3*x**3), Ne(r, 3/2))
, (log(x), True)) - b*d**2*n/(9*x**3) - b*d**2*log(c*x**n)/(3*x**3) - 2*b*d
*e*n*Piecewise((Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3)), (log(x), True
```

```
))/(r - 3), (r > -oo) & (r < oo) & Ne(r, 3)), (log(x)**2/2, True)) + 2*b*d*
e*Piecewise((x**(r - 3)/(r - 3), Ne(r, 3)), (log(x), True))*log(c*x**n) - b
*e**2*n*Piecewise((Piecewise((x**(2*r)/(2*r*x**3 - 3*x**3), Ne(r, 3/2)), (l
og(x), True))/(2*r - 3), (r > -oo) & (r < oo) & Ne(r, 3/2)), (log(x)**2/2,
True)) + b*e**2*Piecewise((x**(2*r - 3)/(2*r - 3), Ne(r, 3/2)), (log(x), Tr
ue))*log(c*x**n)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^2*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^4,x)
```

```
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^4, x)
```

3.390 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=127

$$-\frac{bd^2n}{25x^5}-\frac{2bdenx^{-5+r}}{(5-r)^2}-\frac{be^2nx^{-5+2r}}{(5-2r)^2}-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{-5+r}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{-5+2r}(a+b\log(cx^n))}{5-2r}$$

```
[Out] -1/25*b*d^2*n/x^5-2*b*d*e*n*x^(-5+r)/(5-r)^2-b*e^2*n*x^(-5+2*r)/(5-2*r)^2-1
/5*d^2*(a+b*ln(c*x^n))/x^5-2*d*e*x^(-5+r)*(a+b*ln(c*x^n))/(5-r)-e^2*x^(-5+2
*r)*(a+b*ln(c*x^n))/(5-2*r)
```

Rubi [A]
time = 0.12, antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{bd^2n}{25x^5}-\frac{2bdenx^{r-5}}{(5-r)^2}-\frac{be^2nx^{2r-5}}{(5-2r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d^2*n)/x^5 - (2*b*d*e*n*x^(-5 + r))/(5 - r)^2 - (b*e^2*n*x^(-5 + 2
*r))/(5 - 2*r)^2 - (d^2*(a + b*Log[c*x^n]))/(5*x^5) - (2*d*e*x^(-5 + r)*(a
+ b*Log[c*x^n]))/(5 - r) - (e^2*x^(-5 + 2*r)*(a + b*Log[c*x^n]))/(5 - 2*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$
\begin{aligned}
\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6}\,dx &= -\frac{1}{5}\left(\frac{d^2}{x^5}+\frac{10dex^{-5+r}}{5-r}+\frac{5e^2x^{-5+2r}}{5-2r}\right)(a+b\log(cx^n))-(bn)\int \frac{-d^2+\frac{10}{-}
\\
&= -\frac{1}{5}\left(\frac{d^2}{x^5}+\frac{10dex^{-5+r}}{5-r}+\frac{5e^2x^{-5+2r}}{5-2r}\right)(a+b\log(cx^n))-\frac{1}{5}(bn)\int \frac{-d^2+
\\
&= -\frac{1}{5}\left(\frac{d^2}{x^5}+\frac{10dex^{-5+r}}{5-r}+\frac{5e^2x^{-5+2r}}{5-2r}\right)(a+b\log(cx^n))-\frac{1}{5}(bn)\int \left(-\frac{d^2}{x^6}\right.
\\
&= -\frac{bd^2n}{25x^5}-\frac{2bdenx^{-5+r}}{(5-r)^2}-\frac{be^2nx^{-5+2r}}{(5-2r)^2}-\frac{1}{5}\left(\frac{d^2}{x^5}+\frac{10dex^{-5+r}}{5-r}+\frac{5e^2x^{-5+2r}}{5-2r}\right.
\end{aligned}
$$

Mathematica [A]
time = 0.17, size = 119, normalized size = 0.94

$$
\frac{-5bd^2n\log(x)-d^2(5a+bn-5bn\log(x)+5b\log(cx^n))+\frac{50dex^r(-bn+a(-5+r)+b(-5+r)\log(cx^n))}{(-5+r)^2}+\frac{25e^2x^{2r}(-bn+a(-5+2r)+b(-5+2r)\log(cx^n))}{(5-2r)^2}}{25x^5}
$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] (-5*b*d^2*n*Log[x] - d^2*(5*a + b*n - 5*b*n*Log[x] + 5*b*Log[c*x^n]) + (50*
d*e*x^r*(-(b*n) + a*(-5 + r) + b*(-5 + r)*Log[c*x^n]))/(-5 + r)^2 + (25*e^2
*x^(2*r)*(-(b*n) + a*(-5 + 2*r) + b*(-5 + 2*r)*Log[c*x^n]))/(5 - 2*r)^2)/(2
5*x^5)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.23, size = 1930, normalized size = 15.20

method	result	size
risch	Expression too large to display	1930

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/5*b*(-5*e^2*(x^r)^2*r+2*d^2*r^2-20*d*e*x^r*r+25*e^2*(x^r)^2-15*d^2*r+50*
d*e*x^r+25*d^2)/x^5/(-5+2*r)/(-5+r)*ln(x^n)-1/50*(6250*e^2*(x^r)^2*a+12500*
d*e*x^r*a+650*b*d^2*n*r^2-1500*b*d^2*n*r+3250*ln(c)*b*d^2*r^2-7500*ln(c)*b*
```

```
d^2*r+40*ln(c)*b*d^2*r^4-600*ln(c)*b*d^2*r^3+6250*d^2*b*ln(c)+1250*b*d^2*n+
6250*a*d^2+8*b*d^2*n*r^4-120*b*d^2*n*r^3+40*a*d^2*r^4-600*a*d^2*r^3-3125*I*
Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-2500*I*Pi*b*e^2*r*csgn
(I*c)*csgn(I*c*x^n)^2*(x^r)^2+3250*a*d^2*r^2-7500*a*d^2*r+20*I*Pi*b*d^2*r^4
*csgn(I*c)*csgn(I*c*x^n)^2+6250*ln(c)*b*e^2*(x^r)^2-2500*I*Pi*b*e^2*r*csgn(
I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+3750*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+625*I*Pi*b*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-100*a*e^2*
r^3*(x^r)^2+1250*a*e^2*r^2*(x^r)^2-5000*a*e^2*r*(x^r)^2+1250*b*e^2*n*(x^r)^
2+4000*a*d*e*r^2*x^r-12500*a*d*e*r*x^r-500*b*e^2*n*r*(x^r)^2+2500*b*d*e*n*x
^r+50*b*e^2*n*r^2*(x^r)^2-400*a*d*e*r^3*x^r+1250*ln(c)*b*e^2*r^2*(x^r)^2-50
00*ln(c)*b*e^2*r*(x^r)^2-100*ln(c)*b*e^2*r^3*(x^r)^2+12500*ln(c)*b*d*e*x^r-
3125*I*Pi*b*d^2*csgn(I*c*x^n)^3-3125*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2-162
5*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3-20*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3+2500*I*P
i*b*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-3125*I*Pi*b*d^2*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1625*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^
2+50*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-200*I*Pi*b*
d*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r-20*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+1625*I*Pi*b*d^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+200*I*Pi*b
*d*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-6250*I*Pi*b*d*e*r*csgn(I*c
)*csgn(I*c*x^n)^2*x^r-6250*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-625
*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+2000*I*Pi*b*d*e
*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-6250*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)*x^r+6250*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r
+50*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+3750*I*Pi*b*d^2*r*csgn(I*c*x^n)^
3+300*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3+3125*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n
)^2*(x^r)^2+3125*I*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-6250*I*Pi*b
*d*e*csgn(I*c*x^n)^3*x^r-2000*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r-2000*b*d*e
*n*r*x^r+4000*ln(c)*b*d*e*r^2*x^r-625*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^
2+2500*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-300*I*Pi*b*d^2*r^3*csgn(I*c)*cs
gn(I*c*x^n)^2+3125*I*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+3125*I*Pi*b*d^2*csg
n(I*x^n)*csgn(I*c*x^n)^2+6250*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r+300*I*Pi*b*d
^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+20*I*Pi*b*d^2*r^4*csgn(I*x^n)*cs
gn(I*c*x^n)^2-200*I*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+200*I*Pi*b
*d*e*r^3*csgn(I*c*x^n)^3*x^r-50*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x
^r)^2-1625*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12500*ln(c)*b
*d*e*r*x^r+6250*I*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+625*I*Pi*b*e^2*r
^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-300*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*
c*x^n)^2-3750*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*c*x^n)^2-3750*I*Pi*b*d^2*r*csgn
(I*x^n)*csgn(I*c*x^n)^2-50*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)
^2+2000*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-400*ln(c)*b*d*e*r^3*x^
r+400*b*d*e*n*r^2*x^r+6250*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2000*I*
Pi*b*d*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r)/(-5+2*r)^2/x^5/(-5+r)
^2
```

<u>**Maxima**</u> [**F(-2)**]

time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-6>0)', see `assume?` for more det
ails)Is
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 422 vs. 2(118) = 236.
time = 0.36, size = 422, normalized size = 3.32

$$-\frac{4\,{\left(b d^{2} n + 5\,a d^{2}\right)} r^{4} + 625\,b d^{2} n - 60\,{\left(b d^{2} n + 5\,a d^{2}\right)} r^{3} + 3125\,a d^{2} + 325\,{\left(b d^{2} n + 5\,a d^{2}\right)} r^{2} - 750\,{\left(b d^{2} n + 5\,a d^{2}\right)} r - 25\,{\left({\left(2\,b r^{3} - 25\,b r^{2} + 100\,b r - 125\,b\right)} e^{2} \log\left(c\right) + {\left(2\,b n r^{3} - 25\,b n r^{2} + 100\,b n r - 125\,b n\right)} e^{2} \log\left(x\right) + {\left(2\,a r^{3} - {\left(b n + 25\,a\right)} r^{2} - 25\,b n + 10\,{\left(b n + 10\,a\right)} r - 125\,a\right)} e^{2}\right)} x^{2\,r} - 50\,{\left({\left(4\,b d r^{3} - 40\,b d r^{2} + 125\,b d r - 125\,b d\right)} e \log\left(c\right) + {\left(4\,b d n r^{3} - 40\,b d n r^{2} + 125\,b d n r - 125\,b d n\right)} e \log\left(x\right) + {\left(4\,a d r^{3} - 25\,b d n - 4\,{\left(b d n + 10\,a d\right)} r^{2} - 125\,a d + 5\,{\left(4\,b d n + 25\,a d\right)} r\right)} e\right)} x^{r} + 5\,{\left(4\,b d^{2} r^{4} - 60\,b d^{2} r^{3} + 325\,b d^{2} r^{2} - 750\,b d^{2} r + 625\,b d^{2}\right)} \log\left(c\right) + 5\,{\left(4\,b d^{2} n r^{4} - 60\,b d^{2} n r^{3} + 325\,b d^{2} n r^{2} - 750\,b d^{2} n r + 625\,b d^{2} n\right)} \log\left(x\right)}{25\,{\left(4\,r^{4} - 60\,r^{3} + 325\,r^{2} - 750\,r + 625\right)} x^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/25*(4*(b*d^2*n + 5*a*d^2)*r^4 + 625*b*d^2*n - 60*(b*d^2*n + 5*a*d^2)*r^3
 + 3125*a*d^2 + 325*(b*d^2*n + 5*a*d^2)*r^2 - 750*(b*d^2*n + 5*a*d^2)*r - 2
5*((2*b*r^3 - 25*b*r^2 + 100*b*r - 125*b)*e^2*log(c) + (2*b*n*r^3 - 25*b*n*
r^2 + 100*b*n*r - 125*b*n)*e^2*log(x) + (2*a*r^3 - (b*n + 25*a)*r^2 - 25*b*
n + 10*(b*n + 10*a)*r - 125*a)*e^2)*x^(2*r) - 50*((4*b*d*r^3 - 40*b*d*r^2 +
 125*b*d*r - 125*b*d)*e*log(c) + (4*b*d*n*r^3 - 40*b*d*n*r^2 + 125*b*d*n*r
- 125*b*d*n)*e*log(x) + (4*a*d*r^3 - 25*b*d*n - 4*(b*d*n + 10*a*d)*r^2 - 12
5*a*d + 5*(4*b*d*n + 25*a*d)*r)*e)*x^r + 5*(4*b*d^2*r^4 - 60*b*d^2*r^3 + 32
5*b*d^2*r^2 - 750*b*d^2*r + 625*b*d^2)*log(c) + 5*(4*b*d^2*n*r^4 - 60*b*d^2
*n*r^3 + 325*b*d^2*n*r^2 - 750*b*d^2*n*r + 625*b*d^2*n)*log(x))/((4*r^4 - 6
0*r^3 + 325*r^2 - 750*r + 625)*x^5)
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3877 deep
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^2*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^6,x)
```

```
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^6, x)
```

3.391 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8} dx$

Optimal. Leaf size=127

$$-\frac{bd^2n}{49x^7}-\frac{2bdenx^{-7+r}}{(7-r)^2}-\frac{be^2nx^{-7+2r}}{(7-2r)^2}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{-7+r}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{-7+2r}(a+b\log(cx^n))}{7-2r}$$

```
[Out] -1/49*b*d^2*n/x^7-2*b*d*e*n*x^(-7+r)/(7-r)^2-b*e^2*n*x^(-7+2*r)/(7-2*r)^2-1
/7*d^2*(a+b*ln(c*x^n))/x^7-2*d*e*x^(-7+r)*(a+b*ln(c*x^n))/(7-r)-e^2*x^(-7+2
*r)*(a+b*ln(c*x^n))/(7-2*r)
```

Rubi [A]
time = 0.12, antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{bd^2n}{49x^7}-\frac{2bdenx^{r-7}}{(7-r)^2}-\frac{be^2nx^{2r-7}}{(7-2r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^2*n)/x^7 - (2*b*d*e*n*x^(-7 + r))/(7 - r)^2 - (b*e^2*n*x^(-7 + 2
*r))/(7 - 2*r)^2 - (d^2*(a + b*Log[c*x^n]))/(7*x^7) - (2*d*e*x^(-7 + r)*(a
+ b*Log[c*x^n]))/(7 - r) - (e^2*x^(-7 + 2*r)*(a + b*Log[c*x^n]))/(7 - 2*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
```

```
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{1}{7}\left(\frac{d^2}{x^7}+\frac{14dex^{-7+r}}{7-r}+\frac{7e^2x^{-7+2r}}{7-2r}\right)(a+b\log(cx^n)) - (bn)\int \frac{-d^2+$$
$$= -\frac{1}{7}\left(\frac{d^2}{x^7}+\frac{14dex^{-7+r}}{7-r}+\frac{7e^2x^{-7+2r}}{7-2r}\right)(a+b\log(cx^n)) - \frac{1}{7}(bn)\int \frac{-d^2-$$
$$= -\frac{1}{7}\left(\frac{d^2}{x^7}+\frac{14dex^{-7+r}}{7-r}+\frac{7e^2x^{-7+2r}}{7-2r}\right)(a+b\log(cx^n)) - \frac{1}{7}(bn)\int \left(-\frac{d^2}{x^8}$$
$$= -\frac{bd^2n}{49x^7} - \frac{2bdenx^{-7+r}}{(7-r)^2} - \frac{be^2nx^{-7+2r}}{(7-2r)^2} - \frac{1}{7}\left(\frac{d^2}{x^7}+\frac{14dex^{-7+r}}{7-r}+\frac{7e^2x^{-7+2}}{7-2r}$$

Mathematica [A]
time = 0.17, size = 119, normalized size = 0.94

$$\frac{-7bd^2n\log(x) - d^2(7a+bn-7bn\log(x)+7b\log(cx^n)) + \frac{98dex^r(-bn+a(-7+r)+b(-7+r)\log(cx^n))}{(-7+r)^2} + \frac{49e^2x^{2r}(-bn+a(-7+2r)+b(-7+2r)\log(cx^n))}{(7-2r)^2}}{49x^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] (-7*b*d^2*n*Log[x] - d^2*(7*a + b*n - 7*b*n*Log[x] + 7*b*Log[c*x^n]) + (98*
d*e*x^r*(-(b*n) + a*(-7 + r) + b*(-7 + r)*Log[c*x^n]))/(-7 + r)^2 + (49*e^2
*x^(2*r)*(-(b*n) + a*(-7 + 2*r) + b*(-7 + 2*r)*Log[c*x^n]))/(7 - 2*r)^2)/(4
9*x^7)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.22, size = 1930, normalized size = 15.20

method	result	size
risch	Expression too large to display	1930

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

```
[Out] -1/7*b*(-7*e^2*(x^r)^2*r+2*d^2*r^2-28*d*e*x^r*r+49*e^2*(x^r)^2-21*d^2*r+98*
d*e*x^r+49*d^2)/x^7/(-7+2*r)/(-7+r)*ln(x^n)-1/98*(33614*e^2*(x^r)^2*a+67228
*d*e*x^r*a+1274*b*d^2*n*r^2-4116*b*d^2*n*r+8918*ln(c)*b*d^2*r^2-28812*ln(c)
```

```
*b*d^2*r+56*ln(c)*b*d^2*r^4-1176*ln(c)*b*d^2*r^3+33614*d^2*b*ln(c)+392*I*Pi
*b*d*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+4802*b*d^2*n+33614*a*d^2
+8*b*d^2*n*r^4-168*b*d^2*n*r^3+56*a*d^2*r^4-1176*a*d^2*r^3-4459*I*Pi*b*d^2*
r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1715*I*Pi*b*e^2*r^2*csgn(I*x^n)*csg
n(I*c*x^n)^2*(x^r)^2-16807*I*Pi*b*d^2*csgn(I*c*x^n)^3+8918*a*d^2*r^2-28812*
a*d^2*r+33614*ln(c)*b*e^2*(x^r)^2-5488*I*Pi*b*d*e*r^2*csgn(I*c*x^n)^3*x^r-9
604*I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-196*a*e^2*r^3*(x^r)^2+34
30*a*e^2*r^2*(x^r)^2-19208*a*e^2*r*(x^r)^2+4802*b*e^2*n*(x^r)^2+10976*a*d*e
*r^2*x^r-48020*a*d*e*r*x^r-1372*b*e^2*n*r*(x^r)^2+9604*b*d*e*n*x^r+98*b*e^2
*n*r^2*(x^r)^2-784*a*d*e*r^3*x^r+3430*ln(c)*b*e^2*r^2*(x^r)^2-19208*ln(c)*b
*e^2*r*(x^r)^2-196*ln(c)*b*e^2*r^3*(x^r)^2+67228*ln(c)*b*d*e*x^r-24010*I*Pi
*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+5488*I*Pi*b*d*e*r^2*csgn(I*c)*csgn(I
*c*x^n)^2*x^r-1715*I*Pi*b*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+28*I*Pi*b*d^2*r^4
*csgn(I*c)*csgn(I*c*x^n)^2-588*I*Pi*b*d^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2+548
8*I*Pi*b*d*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+9604*I*Pi*b*e^2*r*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-9604*I*Pi*b*e^2*r*csgn(I*x^n)*csgn(I*c*
x^n)^2*(x^r)^2-28*I*Pi*b*d^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+24010*
I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-5488*I*Pi*b*d*e*r^2*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-1715*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*(x^r)^2-24010*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x
^r-33614*I*Pi*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+98*I*Pi*b*e^2*r
^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-392*I*Pi*b*d*e*r^3*csgn(I*c)
*csgn(I*c*x^n)^2*x^r-392*I*Pi*b*d*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+445
9*I*Pi*b*d^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2+98*I*Pi*b*e^2*r^3*csgn(I*c*x^n)^
3*(x^r)^2+9604*I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2+16807*I*Pi*b*e^2*csgn(I
*x^n)*csgn(I*c*x^n)^2*(x^r)^2+14406*I*Pi*b*d^2*r*csgn(I*c*x^n)^3+14406*I*Pi
*b*d^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-5488*b*d*e*n*r*x^r+10976*ln(c)
*b*d*e*r^2*x^r-588*I*Pi*b*d^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4459*I*Pi*b*d
^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+28*I*Pi*b*d^2*r^4*csgn(I*x^n)*csgn(I*c*x
^n)^2-16807*I*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+392*I*Pi
*b*d*e*r^3*csgn(I*c*x^n)^3*x^r-28*I*Pi*b*d^2*r^4*csgn(I*c*x^n)^3+24010*I*Pi
*b*d*e*r*csgn(I*c*x^n)^3*x^r+1715*I*Pi*b*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*
(x^r)^2-98*I*Pi*b*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-48020*ln(c)*b
*d*e*r*x^r+16807*I*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+588*I*Pi*b*d^
2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-784*ln(c)*b*d*e*r^3*x^r+784*b*d*e
*n*r^2*x^r-14406*I*Pi*b*d^2*r*csgn(I*c)*csgn(I*c*x^n)^2-14406*I*Pi*b*d^2*r*
csgn(I*x^n)*csgn(I*c*x^n)^2-16807*I*Pi*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+33614*I*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+33614*I*Pi*b*d*e*csgn(
I*x^n)*csgn(I*c*x^n)^2*x^r+16807*I*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-168
07*I*Pi*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+588*I*Pi*b*d^2*r^3*csgn(I*c*x^n)^3-44
59*I*Pi*b*d^2*r^2*csgn(I*c*x^n)^3-98*I*Pi*b*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)
^2*(x^r)^2-33614*I*Pi*b*d*e*csgn(I*c*x^n)^3*x^r+16807*I*Pi*b*d^2*csgn(I*c)*
csgn(I*c*x^n)^2)/(-7+2*r)^2/x^7/(-7+r)^2
```

Maxima [F(-2)]

time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-8>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 422 vs. $2(118) = 236$.
time = 0.35, size = 422, normalized size = 3.32

$$-\frac{4\,(bd^2n+7\,ad^2)r^4+2401\,bd^2n-84\,(bd^2n+7\,ad^2)r^3+16807\,ad^2+637\,(bd^2n+7\,ad^2)r^2-2058\,(bd^2n+7\,ad^2)r-49\,((2\,br^3-35\,br^2+196\,br-343\,b)e^2\log(c)+(2\,bnr^3-35\,bnr^2+196\,bnr-343\,bn)e^2\log(x)+(2\,ar^3-(bn+35\,a)r^2-49\,bn+14\,(bn+14\,a)r-343\,a)e^2)x^{2r}-98\,((4\,bdr^3-56\,bdr^2+245\,bdr-343\,bd)e\log(c)+(4\,bdnr^3-56\,bdnr^2+245\,bdnr-343\,bdn)e\log(x)+(4\,adr^3-49\,bdn-4\,(bdn+14\,ad)r^2-343\,ad+7\,(4\,bdn+35\,ad)r)e)x^r+7\,(4\,bd^2r^4-84\,bd^2r^3+637\,bd^2r^2-2058\,bd^2r+2401\,bd^2)\log(c)+7\,(4\,bd^2nr^4-84\,bd^2nr^3+637\,bd^2nr^2-2058\,bd^2nr+2401\,bd^2n)\log(x)}{49\,(4\,r^4-84\,r^3+637\,r^2-2058\,r+2401)x^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

```
[Out] -1/49*(4*(b*d^2*n + 7*a*d^2)*r^4 + 2401*b*d^2*n - 84*(b*d^2*n + 7*a*d^2)*r^
3 + 16807*a*d^2 + 637*(b*d^2*n + 7*a*d^2)*r^2 - 2058*(b*d^2*n + 7*a*d^2)*r
- 49*((2*b*r^3 - 35*b*r^2 + 196*b*r - 343*b)*e^2*log(c) + (2*b*n*r^3 - 35*b
*n*r^2 + 196*b*n*r - 343*b*n)*e^2*log(x) + (2*a*r^3 - (b*n + 35*a)*r^2 - 49
*b*n + 14*(b*n + 14*a)*r - 343*a)*e^2)*x^(2*r) - 98*((4*b*d*r^3 - 56*b*d*r^
2 + 245*b*d*r - 343*b*d)*e*log(c) + (4*b*d*n*r^3 - 56*b*d*n*r^2 + 245*b*d*n
*r - 343*b*d*n)*e*log(x) + (4*a*d*r^3 - 49*b*d*n - 4*(b*d*n + 14*a*d)*r^2 -
 343*a*d + 7*(4*b*d*n + 35*a*d)*r)*e)*x^r + 7*(4*b*d^2*r^4 - 84*b*d^2*r^3 +
 637*b*d^2*r^2 - 2058*b*d^2*r + 2401*b*d^2)*log(c) + 7*(4*b*d^2*n*r^4 - 84*
b*d^2*n*r^3 + 637*b*d^2*n*r^2 - 2058*b*d^2*n*r + 2401*b*d^2*n)*log(x))/((4*
r^4 - 84*r^3 + 637*r^2 - 2058*r + 2401)*x^7)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**8,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 8856 deep
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^2*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^8,x)
```

```
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^8, x)
```

3.392 $\int x^5(d+ex^r)^3 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=147

$$-\frac{1}{36}bd^3nx^6-\frac{be^3nx^{3(2+r)}}{9(2+r)^2}-\frac{3bde^2nx^{2(3+r)}}{4(3+r)^2}-\frac{3bd^2enx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(d^3x^6+\frac{2e^3x^{3(2+r)}}{2+r}+\frac{9de^2x^{2(3+r)}}{3+r}+\frac{18d^2ex^{6+r}}{6+r}\right)$$

```
[Out] -1/36*b*d^3*n*x^6-1/9*b*e^3*n*x^(6+3*r)/(2+r)^2-3/4*b*d*e^2*n*x^(6+2*r)/(3+
r)^2-3*b*d^2*e*n*x^(6+r)/(6+r)^2+1/6*(d^3*x^6+2*e^3*x^(6+3*r)/(2+r)+9*d*e^2
*x^(6+2*r)/(3+r)+18*d^2*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.25, antiderivative size = 147, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{36}bd^3nx^6-\frac{3bd^2enx^{r+6}}{(r+6)^2}-\frac{3bde^2nx^{2(r+3)}}{4(r+3)^2}-\frac{be^3nx^{3(r+2)}}{9(r+2)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^5*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/36*(b*d^3*n*x^6) - (b*e^3*n*x^(3*(2 + r)))/(9*(2 + r)^2) - (3*b*d*e^2*n*
x^(2*(3 + r)))/(4*(3 + r)^2) - (3*b*d^2*e*n*x^(6 + r))/(6 + r)^2 + ((d^3*x^
6 + (2*e^3*x^(3*(2 + r)))/(2 + r) + (9*d*e^2*x^(2*(3 + r)))/(3 + r) + (18*d
^2*e*x^(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
```

```
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx &= \frac{1}{6}\left(d^3x^6+\frac{2e^3x^{3(2+r)}}{2+r}+\frac{9de^2x^{2(3+r)}}{3+r}+\frac{18d^2ex^{6+r}}{6+r}\right)(a+b\log(cx^n))-\\ &= \frac{1}{6}\left(d^3x^6+\frac{2e^3x^{3(2+r)}}{2+r}+\frac{9de^2x^{2(3+r)}}{3+r}+\frac{18d^2ex^{6+r}}{6+r}\right)(a+b\log(cx^n))-\\ &= \frac{1}{6}\left(d^3x^6+\frac{2e^3x^{3(2+r)}}{2+r}+\frac{9de^2x^{2(3+r)}}{3+r}+\frac{18d^2ex^{6+r}}{6+r}\right)(a+b\log(cx^n))-\\ &= -\frac{1}{36}bd^3nx^6-\frac{be^3nx^{3(2+r)}}{9(2+r)^2}-\frac{3bde^2nx^{2(3+r)}}{4(3+r)^2}-\frac{3bd^2enx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(d^3x^6+\right.\end{aligned}$$

Mathematica [A]
time = 0.17, size = 156, normalized size = 1.06

$$\frac{1}{36}x^6\left(6bd^3n\log(x)+d^3(6a-bn-6bn\log(x)+6b\log(cx^n))+\frac{4e^3x^{3r}(-bn+3a(2+r)+3b(2+r)\log(cx^n))}{(2+r)^2}+\frac{27de^2x^{2r}(-bn+2a(3+r)+2b(3+r)\log(cx^n))}{(3+r)^2}+\frac{108d^2ex^r(-bn+a(6+r)+b(6+r)\log(cx^n))}{(6+r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^6*(6*b*d^3*n*Log[x] + d^3*(6*a - b*n - 6*b*n*Log[x] + 6*b*Log[c*x^n]) +
(4*e^3*x^(3*r)*(-(b*n) + 3*a*(2 + r) + 3*b*(2 + r)*Log[c*x^n]))/(2 + r)^2 +
 (27*d*e^2*x^(2*r)*(-(b*n) + 2*a*(3 + r) + 2*b*(3 + r)*Log[c*x^n]))/(3 + r)
^2 + (108*d^2*e*x^r*(-(b*n) + a*(6 + r) + b*(6 + r)*Log[c*x^n]))/(6 + r)^2)
)/36
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.27, size = 4021, normalized size = 27.35

method	result	size
risch	Expression too large to display	4021

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/6*x^6*b*(2*e^3*r^2*(x^r)^3+9*d*e^2*r^2*(x^r)^2+18*e^3*r*(x^r)^3+d^3*r^3+1
8*d^2*e*r^2*x^r+72*d*e^2*r*(x^r)^2+36*e^3*(x^r)^3+11*d^3*r^2+90*d^2*e*r*x^r
+108*d*e^2*(x^r)^2+36*d^3*r+108*d^2*e*x^r+36*d^3)/(2+r)/(3+r)/(6+r)*ln(x^n)
-1/36*x^6*(-7776*e^3*(x^r)^3*a-23328*d^2*e*x^r*a-23328*d*e^2*(x^r)^2*a+2592
```

*I*Pi*b*d^3*r^3*csgn(I*c*x^n)^3+6264*I*Pi*b*d^3*r^2*csgn(I*c*x^n)^3+3*I*Pi*
b*d^3*r^6*csgn(I*c*x^n)^3+1080*b*d^2*e*n*r^3*x^r-24624*ln(c)*b*d*e^2*r^2*(x
^r)^2-38880*ln(c)*b*d*e^2*r*(x^r)^2-6*a*d^3*r^6-132*a*d^3*r^5-1158*a*d^3*r^
4+27*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^2+3888*I*Pi*b*d^3*csgn(I*c*x^n)
^3+27*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+54*I*Pi*
b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-66*I*Pi*b*d^3*r^5*csgn(
I*x^n)*csgn(I*c*x^n)^2-7776*a*d^3-7344*a*d*e^2*r^3*(x^r)^2-24624*a*d*e^2*r^
2*(x^r)^2-38880*a*d*e^2*r*(x^r)^2-10476*a*d^2*e*r^3*x^r-30456*a*d^2*e*r^2*x
^r-42768*a*d^2*e*r*x^r+b*d^3*n*r^6+22*b*d^3*n*r^5+193*b*d^3*n*r^4-3672*I*Pi
*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-3672*I*Pi*b*d*e^2*r^3*csgn(I
*x^n)*csgn(I*c*x^n)^2*(x^r)^2-6*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x
^r)^3+3996*b*d^2*e*n*r^2*x^r+5184*b*d*e^2*n*r*(x^r)^2+6480*b*d^2*e*n*r*x^r+
27*b*d*e^2*n*r^4*(x^r)^2+432*b*d*e^2*n*r^3*(x^r)^2+108*b*d^2*e*n*r^4*x^r-51
84*a*d^3*r^3-12528*a*d^3*r^2-15552*a*d^3*r-6*ln(c)*b*d^3*r^6-132*ln(c)*b*d^
3*r^5-1158*ln(c)*b*d^3*r^4-5184*ln(c)*b*d^3*r^3-12528*ln(c)*b*d^3*r^2-15552
*ln(c)*b*d^3*r+1296*b*d^3*n-12*a*e^3*r^5*(x^r)^3-240*a*e^3*r^4*(x^r)^3-7776
*ln(c)*b*e^3*(x^r)^3+1296*b*e^3*n*(x^r)^3-1836*a*e^3*r^3*(x^r)^3-7776*d^3*b
*ln(c)-579*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*c*x^n)^2-579*I*Pi*b*d^3*r^4*csgn
(I*x^n)*csgn(I*c*x^n)^2-7776*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2+864*b
*d^3*n*r^3+2088*b*d^3*n*r^2+2592*b*d^3*n*r+468*b*e^3*n*r^2*(x^r)^3+1296*b*e
^3*n*r*(x^r)^3+3888*b*d*e^2*n*(x^r)^2+3888*b*d^2*e*n*x^r-23328*ln(c)*b*d^2*
e*x^r-19440*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-19440*I*Pi*b*d
*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-6696*a*e^3*r^2*(x^r)^3-11664*a*e
^3*r*(x^r)^3-23328*ln(c)*b*d*e^2*(x^r)^2-1836*ln(c)*b*e^3*r^3*(x^r)^3-6696*
ln(c)*b*e^3*r^2*(x^r)^3-11664*ln(c)*b*e^3*r*(x^r)^3-12*ln(c)*b*e^3*r^5*(x^r
)^3-240*ln(c)*b*e^3*r^4*(x^r)^3+4*b*e^3*n*r^4*(x^r)^3+72*b*e^3*n*r^3*(x^r)^
3-54*a*d*e^2*r^5*(x^r)^2-1026*a*d*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r-1728*
a*d^2*e*r^4*x^r-5238*I*Pi*b*d^2*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-15228
*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-15228*I*Pi*b*d^2*e*r^2*csgn
(I*x^n)*csgn(I*c*x^n)^2*x^r-21384*I*Pi*b*d^2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^
2*x^r+6*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-27*I*Pi*
b*d*e^2*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+918*I*Pi*b*e^3*r^3*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+19440*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)*(x^r)^2+21384*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)*x^r+3672*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2
+2376*b*d*e^2*n*r^2*(x^r)^2+7776*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+3*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2592*I*Pi*b*d^3
*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3348*I*Pi*b*e^3*r^2*csgn(I*c)*csgn
(I*c*x^n)^2*(x^r)^3-108*ln(c)*b*d^2*e*r^5*x^r-513*I*Pi*b*d*e^2*r^4*csgn(I*c
)*csgn(I*c*x^n)^2*(x^r)^2-3888*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+66*I*
Pi*b*d^3*r^5*csgn(I*c*x^n)^3+579*I*Pi*b*d^3*r^4*csgn(I*c*x^n)^3+11664*I*Pi*
b*d^2*e*csgn(I*c*x^n)^3*x^r+6*I*Pi*b*e^3*r^5*csgn(I*c*x^n)^3*(x^r)^3+3888*I
*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3888*I*Pi*b*e^3*csgn(I*x^n)*c
sgn(I*c*x^n)^2*(x^r)^3+11664*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2+3888*I*Pi
*b*e^3*csgn(I*c*x^n)^3*(x^r)^3+7776*I*Pi*b*d^3*r*csgn(I*c*x^n)^3-21384*I*Pi

```
*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+3348*I*Pi*b*e^3*r^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*(x^r)^3+5238*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r+123
12*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-5832*I*Pi*b*e^3*r*csgn(I*c)*csg
n(I*c*x^n)^2*(x^r)^3+6264*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)-11664*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-11664*I*Pi*b*d^2*e*c
sgn(I*c)*csgn(I*c*x^n)^2*x^r-3348*I*Pi*b*e^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^
2*(x^r)^3-2592*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2-2592*I*Pi*b*d^3*r^3
*csgn(I*x^n)*csgn(I*c*x^n)^2-1026*ln(c)*b*d*e^2*r^4*(x^r)^2-10476*ln(c)*b*d
^2*e*r^3*x^r-30456*ln(c)*b*d^2*e*r^2*x^r-42768*ln(c)*b*d^2*e*r*x^r-7344*ln(
c)*b*d*e^2*r^3*(x^r)^2-120*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)
^3-513*I*Pi*b*d*e^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+5832*I*Pi*b*e^3
*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+918*I*Pi*b*e^3*r^3*csgn(I*c*
x^n)^3*(x^r)^3-3*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*c*x^n)^2-3*I*Pi*b*d^3*r^6*
csgn(I*x^n)*csgn(I*c*x^n)^2-918*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x
^r)^3+21384*I*Pi*b*d^2*e*r*csgn(I*c*x^n)^3*x^r+3348*I*Pi*b*e^3*r^2*csgn(I*c
*x^n)^3*(x^r)^3+5832*I*Pi*b*e^3*r*csgn(I*c*x^n)^3*(x^r)^3-3888*I*Pi*b*e^3*c
sgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+513*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)*(x^r)^2+864*I*Pi*b*d^2*e*r^4*csg...
```

Maxima [A]
time = 0.29, size = 218, normalized size = 1.48

$$-\frac{1}{36}\,bd^3nx^6+\frac{1}{6}\,bd^3x^6\log\left(cx^n\right)+\frac{1}{6}\,ad^3x^6+\frac{be^3x^{3\,r+6}\log\left(cx^n\right)}{3\,(r+2)}+\frac{3\,bde^2x^{2\,r+6}\log\left(cx^n\right)}{2\,(r+3)}+\frac{3\,bd^2ex^{r+6}\log\left(cx^n\right)}{r+6}-\frac{be^3nx^{3\,r+6}}{9\,(r+2)^2}+\frac{ae^3x^{3\,r+6}}{3\,(r+2)}-\frac{3\,bde^2nx^{2\,r+6}}{4\,(r+3)^2}+\frac{3\,ade^2x^{2\,r+6}}{2\,(r+3)}-\frac{3\,bd^2enx^{r+6}}{(r+6)^2}+\frac{3\,ad^2ex^{r+6}}{r+6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/36*b*d^3*n*x^6 + 1/6*b*d^3*x^6*log(c*x^n) + 1/6*a*d^3*x^6 + 1/3*b*e^3*x^
(3*r + 6)*log(c*x^n)/(r + 2) + 3/2*b*d*e^2*x^(2*r + 6)*log(c*x^n)/(r + 3) +
 3*b*d^2*e*x^(r + 6)*log(c*x^n)/(r + 6) - 1/9*b*e^3*n*x^(3*r + 6)/(r + 2)^2
 + 1/3*a*e^3*x^(3*r + 6)/(r + 2) - 3/4*b*d*e^2*n*x^(2*r + 6)/(r + 3)^2 + 3/
2*a*d*e^2*x^(2*r + 6)/(r + 3) - 3*b*d^2*e*n*x^(r + 6)/(r + 6)^2 + 3*a*d^2*e
*x^(r + 6)/(r + 6)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 868 vs. 2(137) = 274.
time = 0.38, size = 868, normalized size = 5.90

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/36*(6*(b*d^3*r^6 + 22*b*d^3*r^5 + 193*b*d^3*r^4 + 864*b*d^3*r^3 + 2088*b*
d^3*r^2 + 2592*b*d^3*r + 1296*b*d^3)*x^6*log(c) + 6*(b*d^3*n*r^6 + 22*b*d^3
*n*r^5 + 193*b*d^3*n*r^4 + 864*b*d^3*n*r^3 + 2088*b*d^3*n*r^2 + 2592*b*d^3*
```

```
n*r + 1296*b*d^3*n)*x^6*log(x) - ((b*d^3*n - 6*a*d^3)*r^6 + 22*(b*d^3*n - 6
*a*d^3)*r^5 + 1296*b*d^3*n + 193*(b*d^3*n - 6*a*d^3)*r^4 - 7776*a*d^3 + 864
*(b*d^3*n - 6*a*d^3)*r^3 + 2088*(b*d^3*n - 6*a*d^3)*r^2 + 2592*(b*d^3*n - 6
*a*d^3)*r)*x^6 + 4*(3*(b*r^5 + 20*b*r^4 + 153*b*r^3 + 558*b*r^2 + 972*b*r +
 648*b)*x^6*e^3*log(c) + 3*(b*n*r^5 + 20*b*n*r^4 + 153*b*n*r^3 + 558*b*n*r^
2 + 972*b*n*r + 648*b*n)*x^6*e^3*log(x) + (3*a*r^5 - (b*n - 60*a)*r^4 - 9*(
2*b*n - 51*a)*r^3 - 9*(13*b*n - 186*a)*r^2 - 324*b*n - 324*(b*n - 9*a)*r +
1944*a)*x^6*e^3)*x^(3*r) + 27*(2*(b*d*r^5 + 19*b*d*r^4 + 136*b*d*r^3 + 456*
b*d*r^2 + 720*b*d*r + 432*b*d)*x^6*e^2*log(c) + 2*(b*d*n*r^5 + 19*b*d*n*r^4
 + 136*b*d*n*r^3 + 456*b*d*n*r^2 + 720*b*d*n*r + 432*b*d*n)*x^6*e^2*log(x)
+ (2*a*d*r^5 - (b*d*n - 38*a*d)*r^4 - 16*(b*d*n - 17*a*d)*r^3 - 144*b*d*n -
 8*(11*b*d*n - 114*a*d)*r^2 + 864*a*d - 96*(2*b*d*n - 15*a*d)*r)*x^6*e^2)*x
^(2*r) + 108*((b*d^2*r^5 + 16*b*d^2*r^4 + 97*b*d^2*r^3 + 282*b*d^2*r^2 + 39
6*b*d^2*r + 216*b*d^2)*x^6*e*log(c) + (b*d^2*n*r^5 + 16*b*d^2*n*r^4 + 97*b*
d^2*n*r^3 + 282*b*d^2*n*r^2 + 396*b*d^2*n*r + 216*b*d^2*n)*x^6*e*log(x) + (
a*d^2*r^5 - (b*d^2*n - 16*a*d^2)*r^4 - 36*b*d^2*n - (10*b*d^2*n - 97*a*d^2)
*r^3 + 216*a*d^2 - (37*b*d^2*n - 282*a*d^2)*r^2 - 12*(5*b*d^2*n - 33*a*d^2)
*r)*x^6*e)*x^r)/(r^6 + 22*r^5 + 193*r^4 + 864*r^3 + 2088*r^2 + 2592*r + 129
6)
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3655 deep
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1586 vs. 2(137) = 274.
time = 1.70, size = 1586, normalized size = 10.79

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/36*(6*b*d^3*n*r^6*x^6*log(x) + 108*b*d^2*n*r^5*x^6*x^r*e*log(x) - b*d^3*n
*r^6*x^6 + 6*b*d^3*r^6*x^6*log(c) + 108*b*d^2*r^5*x^6*x^r*e*log(c) + 132*b*
d^3*n*r^5*x^6*log(x) + 54*b*d*n*r^5*x^6*x^(2*r)*e^2*log(x) + 1728*b*d^2*n*r
^4*x^6*x^r*e*log(x) - 22*b*d^3*n*r^5*x^6 + 6*a*d^3*r^6*x^6 - 108*b*d^2*n*r^
4*x^6*x^r*e + 108*a*d^2*r^5*x^6*x^r*e + 132*b*d^3*r^5*x^6*log(c) + 54*b*d*r
^5*x^6*x^(2*r)*e^2*log(c) + 1728*b*d^2*r^4*x^6*x^r*e*log(c) + 1158*b*d^3*n*
r^4*x^6*log(x) + 12*b*n*r^5*x^6*x^(3*r)*e^3*log(x) + 1026*b*d*n*r^4*x^6*x^(
```

```
2*r)*e^2*log(x) + 10476*b*d^2*n*r^3*x^6*x^r*e*log(x) - 193*b*d^3*n*r^4*x^6
+ 132*a*d^3*r^5*x^6 - 27*b*d*n*r^4*x^6*x^(2*r)*e^2 + 54*a*d*r^5*x^6*x^(2*r)
*e^2 - 1080*b*d^2*n*r^3*x^6*x^r*e + 1728*a*d^2*r^4*x^6*x^r*e + 1158*b*d^3*r
^4*x^6*log(c) + 12*b*r^5*x^6*x^(3*r)*e^3*log(c) + 1026*b*d*r^4*x^6*x^(2*r)*
e^2*log(c) + 10476*b*d^2*r^3*x^6*x^r*e*log(c) + 5184*b*d^3*n*r^3*x^6*log(x)
 + 240*b*n*r^4*x^6*x^(3*r)*e^3*log(x) + 7344*b*d*n*r^3*x^6*x^(2*r)*e^2*log(
x) + 30456*b*d^2*n*r^2*x^6*x^r*e*log(x) - 864*b*d^3*n*r^3*x^6 + 1158*a*d^3*
r^4*x^6 - 4*b*n*r^4*x^6*x^(3*r)*e^3 + 12*a*r^5*x^6*x^(3*r)*e^3 - 432*b*d*n*
r^3*x^6*x^(2*r)*e^2 + 1026*a*d*r^4*x^6*x^(2*r)*e^2 - 3996*b*d^2*n*r^2*x^6*x
^r*e + 10476*a*d^2*r^3*x^6*x^r*e + 5184*b*d^3*r^3*x^6*log(c) + 240*b*r^4*x^
6*x^(3*r)*e^3*log(c) + 7344*b*d*r^3*x^6*x^(2*r)*e^2*log(c) + 30456*b*d^2*r^
2*x^6*x^r*e*log(c) + 12528*b*d^3*n*r^2*x^6*log(x) + 1836*b*n*r^3*x^6*x^(3*r
)*e^3*log(x) + 24624*b*d*n*r^2*x^6*x^(2*r)*e^2*log(x) + 42768*b*d^2*n*r*x^6
*x^r*e*log(x) - 2088*b*d^3*n*r^2*x^6 + 5184*a*d^3*r^3*x^6 - 72*b*n*r^3*x^6*
x^(3*r)*e^3 + 240*a*r^4*x^6*x^(3*r)*e^3 - 2376*b*d*n*r^2*x^6*x^(2*r)*e^2 +
7344*a*d*r^3*x^6*x^(2*r)*e^2 - 6480*b*d^2*n*r*x^6*x^r*e + 30456*a*d^2*r^2*x
^6*x^r*e + 12528*b*d^3*r^2*x^6*log(c) + 1836*b*r^3*x^6*x^(3*r)*e^3*log(c) +
 24624*b*d*r^2*x^6*x^(2*r)*e^2*log(c) + 42768*b*d^2*r*x^6*x^r*e*log(c) + 15
552*b*d^3*n*r*x^6*log(x) + 6696*b*n*r^2*x^6*x^(3*r)*e^3*log(x) + 38880*b*d*
n*r*x^6*x^(2*r)*e^2*log(x) + 23328*b*d^2*n*x^6*x^r*e*log(x) - 2592*b*d^3*n*
r*x^6 + 12528*a*d^3*r^2*x^6 - 468*b*n*r^2*x^6*x^(3*r)*e^3 + 1836*a*r^3*x^6*
x^(3*r)*e^3 - 5184*b*d*n*r*x^6*x^(2*r)*e^2 + 24624*a*d*r^2*x^6*x^(2*r)*e^2
- 3888*b*d^2*n*x^6*x^r*e + 42768*a*d^2*r*x^6*x^r*e + 15552*b*d^3*r*x^6*log(
c) + 6696*b*r^2*x^6*x^(3*r)*e^3*log(c) + 38880*b*d*r*x^6*x^(2*r)*e^2*log(c)
 + 23328*b*d^2*x^6*x^r*e*log(c) + 7776*b*d^3*n*x^6*log(x) + 11664*b*n*r*x^6
*x^(3*r)*e^3*log(x) + 23328*b*d*n*x^6*x^(2*r)*e^2*log(x) - 1296*b*d^3*n*x^6
 + 15552*a*d^3*r*x^6 - 1296*b*n*r*x^6*x^(3*r)*e^3 + 6696*a*r^2*x^6*x^(3*r)*
e^3 - 3888*b*d*n*x^6*x^(2*r)*e^2 + 38880*a*d*r*x^6*x^(2*r)*e^2 + 23328*a*d^
2*x^6*x^r*e + 7776*b*d^3*x^6*log(c) + 11664*b*r*x^6*x^(3*r)*e^3*log(c) + 23
328*b*d*x^6*x^(2*r)*e^2*log(c) + 7776*b*n*x^6*x^(3*r)*e^3*log(x) + 7776*a*d
^3*x^6 - 1296*b*n*x^6*x^(3*r)*e^3 + 11664*a*r*x^6*x^(3*r)*e^3 + 23328*a*d*x
^6*x^(2*r)*e^2 + 7776*b*x^6*x^(3*r)*e^3*log(c) + 7776*a*x^6*x^(3*r)*e^3)/(r
^6 + 22*r^5 + 193*r^4 + 864*r^3 + 2088*r^2 + 2592*r + 1296)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int x^5\left(d+e\,x^r\right)^3\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
[Out] int(x^5*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.393 $\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx$

Optimal. Leaf size=149

$$-\frac{1}{16}bd^3nx^4-\frac{3bde^2nx^{2(2+r)}}{4(2+r)^2}-\frac{3bd^2enx^{4+r}}{(4+r)^2}-\frac{be^3nx^{4+3r}}{(4+3r)^2}+\frac{1}{4}\left(d^3x^4+\frac{6de^2x^{2(2+r)}}{2+r}+\frac{12d^2ex^{4+r}}{4+r}+\frac{4e^3x^{4+3r}}{4+3r}\right)(a$$

```
[Out] -1/16*b*d^3*n*x^4-3/4*b*d*e^2*n*x^(4+2*r)/(2+r)^2-3*b*d^2*e*n*x^(4+r)/(4+r)
^2-b*e^3*n*x^(4+3*r)/(4+3*r)^2+1/4*(d^3*x^4+6*d*e^2*x^(4+2*r)/(2+r)+12*d^2*
e*x^(4+r)/(4+r)+4*e^3*x^(4+3*r)/(4+3*r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.26, antiderivative size = 149, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{16}bd^3nx^4-\frac{3bd^2enx^{r+4}}{(r+4)^2}-\frac{3bde^2nx^{2(r+2)}}{4(r+2)^2}-\frac{be^3nx^{3r+4}}{(3r+4)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/16*(b*d^3*n*x^4) - (3*b*d*e^2*n*x^(2*(2 + r)))/(4*(2 + r)^2) - (3*b*d^2*
e*n*x^(4 + r))/(4 + r)^2 - (b*e^3*n*x^(4 + 3*r))/(4 + 3*r)^2 + ((d^3*x^4 +
(6*d*e^2*x^(2*(2 + r)))/(2 + r) + (12*d^2*e*x^(4 + r))/(4 + r) + (4*e^3*x^(
4 + 3*r))/(4 + 3*r))*(a + b*Log[c*x^n]))/4
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
```

```
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^3(d+ex^r)^3\,(a+b\log(cx^n))\,dx &= \frac{1}{4}\left(d^3x^4+\frac{6de^2x^{2(2+r)}}{2+r}+\frac{12d^2ex^{4+r}}{4+r}+\frac{4e^3x^{4+3r}}{4+3r}\right)(a+b\log(cx^n))-(b\\ &= \frac{1}{4}\left(d^3x^4+\frac{6de^2x^{2(2+r)}}{2+r}+\frac{12d^2ex^{4+r}}{4+r}+\frac{4e^3x^{4+3r}}{4+3r}\right)(a+b\log(cx^n))-\frac{1}{4}\\ &= \frac{1}{4}\left(d^3x^4+\frac{6de^2x^{2(2+r)}}{2+r}+\frac{12d^2ex^{4+r}}{4+r}+\frac{4e^3x^{4+3r}}{4+3r}\right)(a+b\log(cx^n))-\frac{1}{4}\\ &= -\frac{1}{16}bd^3nx^4-\frac{3bde^2nx^{2(2+r)}}{4(2+r)^2}-\frac{3bd^2enx^{4+r}}{(4+r)^2}-\frac{be^3nx^{4+3r}}{(4+3r)^2}+\frac{1}{4}\left(d^3x^4+\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 160, normalized size = 1.07

$$\frac{1}{16}x^4\left(4bd^3n\log(x)+d^3(4a-bn-4bn\log(x)+4b\log(cx^n))+\frac{12de^2x^{2r}(-bn+2a(2+r)+2b(2+r)\log(cx^n))}{(2+r)^2}+\frac{48d^2ex^r(-bn+a(4+r)+b(4+r)\log(cx^n))}{(4+r)^2}+\frac{16e^3x^{3r}(-bn+a(4+3r)+b(4+3r)\log(cx^n))}{(4+3r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^4*(4*b*d^3*n*Log[x] + d^3*(4*a - b*n - 4*b*n*Log[x] + 4*b*Log[c*x^n]) +
(12*d*e^2*x^(2*r)*(-(b*n) + 2*a*(2 + r) + 2*b*(2 + r)*Log[c*x^n]))/(2 + r)^
2 + (48*d^2*e*x^r*(-(b*n) + a*(4 + r) + b*(4 + r)*Log[c*x^n]))/(4 + r)^2 +
(16*e^3*x^(3*r)*(-(b*n) + a*(4 + 3*r) + b*(4 + 3*r)*Log[c*x^n]))/(4 + 3*r)^
2))/16
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.27, size = 4027, normalized size = 27.03

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*b*(4*e^3*r^2*(x^r)^3+18*d*e^2*r^2*(x^r)^2+24*e^3*r*(x^r)^3+3*d^3*r^
3+36*d^2*e*r^2*x^r+96*d*e^2*r*(x^r)^2+32*e^3*(x^r)^3+22*d^3*r^2+120*d^2*e*r
*x^r+96*d*e^2*(x^r)^2+48*d^3*r+96*d^2*e*x^r+32*d^3)/(4+3*r)/(2+r)/(4+r)*ln(
x^n)-1/16*x^4*(-4096*e^3*(x^r)^3*a-12288*d^2*e*x^r*a-12288*d*e^2*(x^r)^2*a+
```

2048*I*Pi*b*e^3*csgn(I*c*x^n)^3*(x^r)^3+6144*I*Pi*b*d^3*r*csgn(I*c*x^n)^3+2
880*b*d^2*e*n*r^3*x^r-29184*ln(c)*b*d*e^2*r^2*(x^r)^2-30720*ln(c)*b*d*e^2*r
*(x^r)^2-36*a*d^3*r^6-528*a*d^3*r^5-3088*a*d^3*r^4+2048*I*Pi*b*e^3*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+2304*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x
^r+6144*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+18*I*Pi*b*d^3*r^6*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2304*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*x^r+6528*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c
x^n)(x^r)^2+108*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r
)^2+216*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+1368*I*Pi*
b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-4096*a*d^3-13056*a*
d*e^2*r^3*(x^r)^2-29184*a*d*e^2*r^2*(x^r)^2-30720*a*d*e^2*r*(x^r)^2-18624*a
*d^2*e*r^3*x^r-36096*a*d^2*e*r^2*x^r-33792*a*d^2*e*r*x^r+9*b*d^3*n*r^6+132*
b*d^3*n*r^5+772*b*d^3*n*r^4+7104*b*d^2*e*n*r^2*x^r+6144*b*d*e^2*n*r*(x^r)^2
+7680*b*d^2*e*n*r*x^r+108*b*d*e^2*n*r^4*(x^r)^2+1152*b*d*e^2*n*r^3*(x^r)^2+
432*b*d^2*e*n*r^4*x^r-9216*a*d^3*r^3-14848*a*d^3*r^2-12288*a*d^3*r-2048*I*P
i*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2-24*I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^
n)^2*(x^r)^3-3968*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-1632*I*P
i*b*e^3*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-36*ln(c)*b*d^3*r^6-528*ln(c
)*b*d^3*r^5-3088*ln(c)*b*d^3*r^4-9216*ln(c)*b*d^3*r^3-14848*ln(c)*b*d^3*r^2
-12288*ln(c)*b*d^3*r+1024*b*d^3*n-48*a*e^3*r^5*(x^r)^3-640*a*e^3*r^4*(x^r)^
3-4096*ln(c)*b*e^3*(x^r)^3+1024*b*e^3*n*(x^r)^3-3264*a*e^3*r^3*(x^r)^3-4096
*d^3*b*ln(c)-7424*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2-7424*I*Pi*b*d^3*
r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-6144*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*c*x^n)^2
+2304*b*d^3*n*r^3+3712*b*d^3*n*r^2+3072*b*d^3*n*r+832*b*e^3*n*r^2*(x^r)^3+1
536*b*e^3*n*r*(x^r)^3+3072*b*d*e^2*n*(x^r)^2+3072*b*d^2*e*n*x^r-12288*ln(c)
*b*d^2*e*x^r-7936*a*e^3*r^2*(x^r)^3-9216*a*e^3*r*(x^r)^3-12288*ln(c)*b*d*e^
2*(x^r)^2-3264*ln(c)*b*e^3*r^3*(x^r)^3-7936*ln(c)*b*e^3*r^2*(x^r)^3-9216*ln
(c)*b*e^3*r*(x^r)^3-48*ln(c)*b*e^3*r^5*(x^r)^3-640*ln(c)*b*e^3*r^4*(x^r)^3+
16*b*e^3*n*r^4*(x^r)^3+192*b*e^3*n*r^3*(x^r)^3-216*a*d*e^2*r^5*(x^r)^2-2736
*a*d*e^2*r^4*(x^r)^2-432*a*d^2*e*r^5*x^r+2048*I*Pi*b*d^3*csgn(I*c*x^n)^3-46
08*a*d^2*e*r^4*x^r-16896*I*Pi*b*d^2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+614
4*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+6144*I*Pi*b*d^2*
e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+9312*I*Pi*b*d^2*e*r^3*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*x^r+14592*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*(x^r)^2+4224*b*d*e^2*n*r^2*(x^r)^2-3968*I*Pi*b*e^3*r^2*csgn(I*
x^n)*csgn(I*c*x^n)^2*(x^r)^3+9312*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r+1459
2*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-432*ln(c)*b*d^2*e*r^5*x^r+18*I*P
i*b*d^3*r^6*csgn(I*c*x^n)^3-18*I*Pi*b*d^3*r^6*csgn(I*x^n)*csgn(I*c*x^n)^2-2
64*I*Pi*b*d^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2-264*I*Pi*b*d^3*r^5*csgn(I*x^n)*
csgn(I*c*x^n)^2-6144*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2+2048*I*Pi*b*d
^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-18*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*c
*x^n)^2+4608*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+7424*I*Pi*b
*d^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-6144*I*Pi*b*d*e^2*csgn(I*c)*cs
gn(I*c*x^n)^2*(x^r)^2+16896*I*Pi*b*d^2*e*r*csgn(I*c*x^n)^3*x^r+1368*I*Pi*b*
d*e^2*r^4*csgn(I*c*x^n)^3*(x^r)^2+6144*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2

```
-6144*I*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+1544*I*Pi*b*d^3*r^4*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+108*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^
2-24*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-216*I*Pi*b*d^2*e*r^5*
csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-1368*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*c*x^
n)^2*(x^r)^2-1544*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*c*x^n)^2-1544*I*Pi*b*d^3*
r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+1632*I*Pi*b*e^3*r^3*csgn(I*c*x^n)^3*(x^r)^3
+3968*I*Pi*b*e^3*r^2*csgn(I*c*x^n)^3*(x^r)^3-4608*I*Pi*b*e^3*r*csgn(I*c)*cs
gn(I*c*x^n)^2*(x^r)^3-4608*I*Pi*b*e^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3
-2304*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2304*I*Pi*b*d^2*e*r^4*
csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-14592*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*c*x
^n)^2*(x^r)^2-14592*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-27
36*ln(c)*b*d*e^2*r^4*(x^r)^2-18624*ln(c)*b*d^2*e*r^3*x^r-36096*ln(c)*b*d^2*
e*r^2*x^r-33792*ln(c)*b*d^2*e*r*x^r-13056*ln(c)*b*d*e^2*r^3*(x^r)^2-320*I*P
i*b*e^3*r^4*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-320*I*Pi*b*e^3*r^4*csgn(I*x^n
)*csgn(I*c*x^n)^2*(x^r)^3+216*I*Pi*b*d^2*e*r^5*csgn(I*c*x^n)^3*x^r-4608*I*P
i*b*d^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2-4608*I*Pi*b*d^3*r^3*csgn(I*x^n)*csgn(
I*c*x^n)^2-108*I*Pi*b*d*e^2*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-18048*I
*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-1...
```

Maxima [A]
time = 0.29, size = 222, normalized size = 1.49

$$-\frac{1}{16}\,bd^3nx^4+\frac{1}{4}\,bd^3x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^3x^4+\frac{be^3x^{3\,r+4}\log\left(cx^n\right)}{3\,r+4}+\frac{3\,bde^2x^{2\,r+4}\log\left(cx^n\right)}{2\,(r+2)}+\frac{3\,bd^2ex^{r+4}\log\left(cx^n\right)}{r+4}-\frac{be^3nx^{3\,r+4}}{(3\,r+4)^2}+\frac{ae^3x^{3\,r+4}}{3\,r+4}-\frac{3\,bde^2nx^{2\,r+4}}{4\,(r+2)^2}+\frac{3\,ade^2x^{2\,r+4}}{2\,(r+2)}-\frac{3\,bd^2enx^{r+4}}{(r+4)^2}+\frac{3\,ad^2ex^{r+4}}{r+4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/16*b*d^3*n*x^4 + 1/4*b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4 + b*e^3*x^(3*r
 + 4)*log(c*x^n)/(3*r + 4) + 3/2*b*d*e^2*x^(2*r + 4)*log(c*x^n)/(r + 2) + 3
*b*d^2*e*x^(r + 4)*log(c*x^n)/(r + 4) - b*e^3*n*x^(3*r + 4)/(3*r + 4)^2 + a
*e^3*x^(3*r + 4)/(3*r + 4) - 3/4*b*d*e^2*n*x^(2*r + 4)/(r + 2)^2 + 3/2*a*d*
e^2*x^(2*r + 4)/(r + 2) - 3*b*d^2*e*n*x^(r + 4)/(r + 4)^2 + 3*a*d^2*e*x^(r
+ 4)/(r + 4)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 879 vs. 2(141) = 282.
time = 0.36, size = 879, normalized size = 5.90

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/16*(4*(9*b*d^3*r^6 + 132*b*d^3*r^5 + 772*b*d^3*r^4 + 2304*b*d^3*r^3 + 371
2*b*d^3*r^2 + 3072*b*d^3*r + 1024*b*d^3)*x^4*log(c) + 4*(9*b*d^3*n*r^6 + 13
2*b*d^3*n*r^5 + 772*b*d^3*n*r^4 + 2304*b*d^3*n*r^3 + 3712*b*d^3*n*r^2 + 307
```

```
2*b*d^3*n*r + 1024*b*d^3*n)*x^4*log(x) - (9*(b*d^3*n - 4*a*d^3)*r^6 + 132*(
b*d^3*n - 4*a*d^3)*r^5 + 1024*b*d^3*n + 772*(b*d^3*n - 4*a*d^3)*r^4 - 4096*
a*d^3 + 2304*(b*d^3*n - 4*a*d^3)*r^3 + 3712*(b*d^3*n - 4*a*d^3)*r^2 + 3072*
(b*d^3*n - 4*a*d^3)*r)*x^4 + 16*((3*b*r^5 + 40*b*r^4 + 204*b*r^3 + 496*b*r^
2 + 576*b*r + 256*b)*x^4*e^3*log(c) + (3*b*n*r^5 + 40*b*n*r^4 + 204*b*n*r^3
 + 496*b*n*r^2 + 576*b*n*r + 256*b*n)*x^4*e^3*log(x) + (3*a*r^5 - (b*n - 40
*a)*r^4 - 12*(b*n - 17*a)*r^3 - 4*(13*b*n - 124*a)*r^2 - 64*b*n - 96*(b*n -
 6*a)*r + 256*a)*x^4*e^3)*x^(3*r) + 12*(2*(9*b*d*r^5 + 114*b*d*r^4 + 544*b*
d*r^3 + 1216*b*d*r^2 + 1280*b*d*r + 512*b*d)*x^4*e^2*log(c) + 2*(9*b*d*n*r^
5 + 114*b*d*n*r^4 + 544*b*d*n*r^3 + 1216*b*d*n*r^2 + 1280*b*d*n*r + 512*b*d
*n)*x^4*e^2*log(x) + (18*a*d*r^5 - 3*(3*b*d*n - 76*a*d)*r^4 - 32*(3*b*d*n -
 34*a*d)*r^3 - 256*b*d*n - 32*(11*b*d*n - 76*a*d)*r^2 + 1024*a*d - 512*(b*d
*n - 5*a*d)*r)*x^4*e^2)*x^(2*r) + 48*((9*b*d^2*r^5 + 96*b*d^2*r^4 + 388*b*d
^2*r^3 + 752*b*d^2*r^2 + 704*b*d^2*r + 256*b*d^2)*x^4*e*log(c) + (9*b*d^2*n
*r^5 + 96*b*d^2*n*r^4 + 388*b*d^2*n*r^3 + 752*b*d^2*n*r^2 + 704*b*d^2*n*r +
 256*b*d^2*n)*x^4*e*log(x) + (9*a*d^2*r^5 - 3*(3*b*d^2*n - 32*a*d^2)*r^4 -
64*b*d^2*n - 4*(15*b*d^2*n - 97*a*d^2)*r^3 + 256*a*d^2 - 4*(37*b*d^2*n - 18
8*a*d^2)*r^2 - 32*(5*b*d^2*n - 22*a*d^2)*r)*x^4*e)*x^r)/(9*r^6 + 132*r^5 +
772*r^4 + 2304*r^3 + 3712*r^2 + 3072*r + 1024)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Timed out
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1588 vs. $2(141) = 282$.
time = 2.48, size = 1588, normalized size = 10.66

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/16*(36*b*d^3*n*r^6*x^4*log(x) + 432*b*d^2*n*r^5*x^4*x^r*e*log(x) - 9*b*d^
3*n*r^6*x^4 + 36*b*d^3*r^6*x^4*log(c) + 432*b*d^2*r^5*x^4*x^r*e*log(c) + 52
8*b*d^3*n*r^5*x^4*log(x) + 216*b*d*n*r^5*x^4*x^(2*r)*e^2*log(x) + 4608*b*d^
2*n*r^4*x^4*x^r*e*log(x) - 132*b*d^3*n*r^5*x^4 + 36*a*d^3*r^6*x^4 - 432*b*d
^2*n*r^4*x^4*x^r*e + 432*a*d^2*r^5*x^4*x^r*e + 528*b*d^3*r^5*x^4*log(c) + 2
16*b*d*r^5*x^4*x^(2*r)*e^2*log(c) + 4608*b*d^2*r^4*x^4*x^r*e*log(c) + 3088*
b*d^3*n*r^4*x^4*log(x) + 48*b*n*r^5*x^4*x^(3*r)*e^3*log(x) + 2736*b*d*n*r^4
```

```
*x^4*x^(2*r)*e^2*log(x) + 18624*b*d^2*n*r^3*x^4*x^r*e*log(x) - 772*b*d^3*n*
r^4*x^4 + 528*a*d^3*r^5*x^4 - 108*b*d*n*r^4*x^4*x^(2*r)*e^2 + 216*a*d*r^5*x
^4*x^(2*r)*e^2 - 2880*b*d^2*n*r^3*x^4*x^r*e + 4608*a*d^2*r^4*x^4*x^r*e + 30
88*b*d^3*r^4*x^4*log(c) + 48*b*r^5*x^4*x^(3*r)*e^3*log(c) + 2736*b*d*r^4*x^
4*x^(2*r)*e^2*log(c) + 18624*b*d^2*r^3*x^4*x^r*e*log(c) + 9216*b*d^3*n*r^3*
x^4*log(x) + 640*b*n*r^4*x^4*x^(3*r)*e^3*log(x) + 13056*b*d*n*r^3*x^4*x^(2*
r)*e^2*log(x) + 36096*b*d^2*n*r^2*x^4*x^r*e*log(x) - 2304*b*d^3*n*r^3*x^4 +
 3088*a*d^3*r^4*x^4 - 16*b*n*r^4*x^4*x^(3*r)*e^3 + 48*a*r^5*x^4*x^(3*r)*e^3
 - 1152*b*d*n*r^3*x^4*x^(2*r)*e^2 + 2736*a*d*r^4*x^4*x^(2*r)*e^2 - 7104*b*d
^2*n*r^2*x^4*x^r*e + 18624*a*d^2*r^3*x^4*x^r*e + 9216*b*d^3*r^3*x^4*log(c)
+ 640*b*r^4*x^4*x^(3*r)*e^3*log(c) + 13056*b*d*r^3*x^4*x^(2*r)*e^2*log(c) +
 36096*b*d^2*r^2*x^4*x^r*e*log(c) + 14848*b*d^3*n*r^2*x^4*log(x) + 3264*b*n
*r^3*x^4*x^(3*r)*e^3*log(x) + 29184*b*d*n*r^2*x^4*x^(2*r)*e^2*log(x) + 3379
2*b*d^2*n*r*x^4*x^r*e*log(x) - 3712*b*d^3*n*r^2*x^4 + 9216*a*d^3*r^3*x^4 -
192*b*n*r^3*x^4*x^(3*r)*e^3 + 640*a*r^4*x^4*x^(3*r)*e^3 - 4224*b*d*n*r^2*x^
4*x^(2*r)*e^2 + 13056*a*d*r^3*x^4*x^(2*r)*e^2 - 7680*b*d^2*n*r*x^4*x^r*e +
36096*a*d^2*r^2*x^4*x^r*e + 14848*b*d^3*r^2*x^4*log(c) + 3264*b*r^3*x^4*x^(
3*r)*e^3*log(c) + 29184*b*d*r^2*x^4*x^(2*r)*e^2*log(c) + 33792*b*d^2*r*x^4*
x^r*e*log(c) + 12288*b*d^3*n*r*x^4*log(x) + 7936*b*n*r^2*x^4*x^(3*r)*e^3*lo
g(x) + 30720*b*d*n*r*x^4*x^(2*r)*e^2*log(x) + 12288*b*d^2*n*x^4*x^r*e*log(x
) - 3072*b*d^3*n*r*x^4 + 14848*a*d^3*r^2*x^4 - 832*b*n*r^2*x^4*x^(3*r)*e^3
+ 3264*a*r^3*x^4*x^(3*r)*e^3 - 6144*b*d*n*r*x^4*x^(2*r)*e^2 + 29184*a*d*r^2
*x^4*x^(2*r)*e^2 - 3072*b*d^2*n*x^4*x^r*e + 33792*a*d^2*r*x^4*x^r*e + 12288
*b*d^3*r*x^4*log(c) + 7936*b*r^2*x^4*x^(3*r)*e^3*log(c) + 30720*b*d*r*x^4*x
^(2*r)*e^2*log(c) + 12288*b*d^2*x^4*x^r*e*log(c) + 4096*b*d^3*n*x^4*log(x)
+ 9216*b*n*r*x^4*x^(3*r)*e^3*log(x) + 12288*b*d*n*x^4*x^(2*r)*e^2*log(x) -
1024*b*d^3*n*x^4 + 12288*a*d^3*r*x^4 - 1536*b*n*r*x^4*x^(3*r)*e^3 + 7936*a*
r^2*x^4*x^(3*r)*e^3 - 3072*b*d*n*x^4*x^(2*r)*e^2 + 30720*a*d*r*x^4*x^(2*r)*
e^2 + 12288*a*d^2*x^4*x^r*e + 4096*b*d^3*x^4*log(c) + 9216*b*r*x^4*x^(3*r)*
e^3*log(c) + 12288*b*d*x^4*x^(2*r)*e^2*log(c) + 4096*b*n*x^4*x^(3*r)*e^3*lo
g(x) + 4096*a*d^3*x^4 - 1024*b*n*x^4*x^(3*r)*e^3 + 9216*a*r*x^4*x^(3*r)*e^3
 + 12288*a*d*x^4*x^(2*r)*e^2 + 4096*b*x^4*x^(3*r)*e^3*log(c) + 4096*a*x^4*x
^(3*r)*e^3)/(9*r^6 + 132*r^5 + 772*r^4 + 2304*r^3 + 3712*r^2 + 3072*r + 102
4)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\,(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
[Out] int(x^3*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.394 $\int x(d+ex^r)^3(a+b\log(cx^n))\,dx$

Optimal. Leaf size=149

$$-\frac{1}{4}bd^3nx^2-\frac{3bde^2nx^{2(1+r)}}{4(1+r)^2}-\frac{3bd^2enx^{2+r}}{(2+r)^2}-\frac{be^3nx^{2+3r}}{(2+3r)^2}+\frac{1}{2}\left(d^3x^2+\frac{3de^2x^{2(1+r)}}{1+r}+\frac{6d^2ex^{2+r}}{2+r}+\frac{2e^3x^{2+3r}}{2+3r}\right)(a+$$

```
[Out] -1/4*b*d^3*n*x^2-3/4*b*d*e^2*n*x^(2+2*r)/(1+r)^2-3*b*d^2*e*n*x^(2+r)/(2+r)^
2-b*e^3*n*x^(2+3*r)/(2+3*r)^2+1/2*(d^3*x^2+3*d*e^2*x^(2+2*r)/(1+r)+6*d^2*e*
x^(2+r)/(2+r)+2*e^3*x^(2+3*r)/(2+3*r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.24, antiderivative size = 149, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {276, 2371, 12, 14}

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{4}bd^3nx^2-\frac{3bd^2enx^{r+2}}{(r+2)^2}-\frac{3bde^2nx^{2(r+1)}}{4(r+1)^2}-\frac{be^3nx^{3r+2}}{(3r+2)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/4*(b*d^3*n*x^2) - (3*b*d*e^2*n*x^(2*(1 + r)))/(4*(1 + r)^2) - (3*b*d^2*e
*n*x^(2 + r))/(2 + r)^2 - (b*e^3*n*x^(2 + 3*r))/(2 + 3*r)^2 + ((d^3*x^2 + (
3*d*e^2*x^(2*(1 + r)))/(1 + r) + (6*d^2*e*x^(2 + r))/(2 + r) + (2*e^3*x^(2
+ 3*r))/(2 + 3*r))*(a + b*Log[c*x^n]))/2
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
```

```
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x(d+ex^r)^3(a+b\log(cx^n))\,dx = \frac{1}{2}\left(d^3x^2+\frac{3de^2x^{2(1+r)}}{1+r}+\frac{6d^2ex^{2+r}}{2+r}+\frac{2e^3x^{2+3r}}{2+3r}\right)(a+b\log(cx^n))-(bn$$

$$=\frac{1}{2}\left(d^3x^2+\frac{3de^2x^{2(1+r)}}{1+r}+\frac{6d^2ex^{2+r}}{2+r}+\frac{2e^3x^{2+3r}}{2+3r}\right)(a+b\log(cx^n))-\frac{1}{2}(b$$

$$=\frac{1}{2}\left(d^3x^2+\frac{3de^2x^{2(1+r)}}{1+r}+\frac{6d^2ex^{2+r}}{2+r}+\frac{2e^3x^{2+3r}}{2+3r}\right)(a+b\log(cx^n))-\frac{1}{2}(b$$

$$=-\frac{1}{4}bd^3nx^2-\frac{3bde^2nx^{2(1+r)}}{4(1+r)^2}-\frac{3bd^2enx^{2+r}}{(2+r)^2}-\frac{be^3nx^{2+3r}}{(2+3r)^2}+\frac{1}{2}\left(d^3x^2+\frac{3d}{}\right.$$

Mathematica [A]
time = 0.16, size = 160, normalized size = 1.07

$$\frac{1}{4}x^2\left(2bd^3n\log(x)+d^3(2a-bn-2bn\log(x)+2b\log(cx^n))+\frac{3de^2x^{2r}(-bn+2a(1+r)+2b(1+r)\log(cx^n))}{(1+r)^2}+\frac{12d^2ex^r(-bn+a(2+r)+b(2+r)\log(cx^n))}{(2+r)^2}+\frac{4e^3x^{3r}(-bn+a(2+3r)+b(2+3r)\log(cx^n))}{(2+3r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^2*(2*b*d^3*n*Log[x] + d^3*(2*a - b*n - 2*b*n*Log[x] + 2*b*Log[c*x^n]) +
(3*d*e^2*x^(2*r)*(-(b*n) + 2*a*(1 + r) + 2*b*(1 + r)*Log[c*x^n]))/(1 + r)^2
 + (12*d^2*e*x^r*(-(b*n) + a*(2 + r) + b*(2 + r)*Log[c*x^n]))/(2 + r)^2 + (
4*e^3*x^(3*r)*(-(b*n) + a*(2 + 3*r) + b*(2 + 3*r)*Log[c*x^n]))/(2 + 3*r)^2)
)/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.26, size = 4027, normalized size = 27.03

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*x^2*(2*e^3*r^2*(x^r)^3+9*d*e^2*r^2*(x^r)^2+6*e^3*r*(x^r)^3+3*d^3*r^3+
18*d^2*e*r^2*x^r+24*d*e^2*r*(x^r)^2+4*e^3*(x^r)^3+11*d^3*r^2+30*d^2*e*r*x^r
+12*d*e^2*(x^r)^2+12*d^3*r+12*d^2*e*x^r+4*d^3)/(2+3*r)/(1+r)/(2+r)*ln(x^n)-
1/4*x^2*(-32*e^3*(x^r)^3*a-96*d^2*e*x^r*a-96*d*e^2*(x^r)^2*a+360*b*d^2*e*n*
```

r^3*x^r-912*ln(c)*b*d*e^2*r^2*(x^r)^2-480*ln(c)*b*d*e^2*r*(x^r)^2+72*I*Pi*b
*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+102*I*Pi*b*e^3*r^3*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-18*a*d^3*r^6-132*a*d^3*r^5-386*a*d^3
*r^4+27*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^2+27*I*Pi*b*d*e^2*r^5*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+54*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*x^r-240*I*Pi*b*d*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)
^2-66*I*Pi*b*d^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2+288*I*Pi*b*d^2*e*r^4*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-32*a*d^3-816*a*d*e^2*r^3*(x^r)^2-912*a*d
*e^2*r^2*(x^r)^2-480*a*d*e^2*r*(x^r)^2-1164*a*d^2*e*r^3*x^r-1128*a*d^2*e*r^
2*x^r-528*a*d^2*e*r*x^r+9*b*d^3*n*r^6+66*b*d^3*n*r^5+193*b*d^3*n*r^4+124*I*
Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+40*I*Pi*b*e^3*r^4*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-171*I*Pi*b*d*e^2*r^4*csgn(I*c)*
csgn(I*c*x^n)^2*(x^r)^2-6*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+
444*b*d^2*e*n*r^2*x^r+192*b*d*e^2*n*r*(x^r)^2+240*b*d^2*e*n*r*x^r+27*b*d*e^
2*n*r^4*(x^r)^2+144*b*d*e^2*n*r^3*(x^r)^2+108*b*d^2*e*n*r^4*x^r-576*a*d^3*r
^3-464*a*d^3*r^2-192*a*d^3*r-264*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x
^r-72*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-48*I*Pi*b*d^2*e*csgn(I
*c)*csgn(I*c*x^n)^2*x^r-124*I*Pi*b*e^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r
)^3-18*ln(c)*b*d^3*r^6-132*ln(c)*b*d^3*r^5-386*ln(c)*b*d^3*r^4-576*ln(c)*b*
d^3*r^3-464*ln(c)*b*d^3*r^2-192*ln(c)*b*d^3*r+16*b*d^3*n-12*a*e^3*r^5*(x^r)
^3-80*a*e^3*r^4*(x^r)^3-32*ln(c)*b*e^3*(x^r)^3+16*b*e^3*n*(x^r)^3-204*a*e^3
r^3(x^r)^3-32*d^3*b*ln(c)-564*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^
2*x^r+288*b*d^3*n*r^3+232*b*d^3*n*r^2+96*b*d^3*n*r+52*b*e^3*n*r^2*(x^r)^3+4
8*b*e^3*n*r*(x^r)^3+48*b*d*e^2*n*(x^r)^2+48*b*d^2*e*n*x^r-96*ln(c)*b*d^2*e*
x^r+408*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-248*a*
e^3*r^2*(x^r)^3-144*a*e^3*r*(x^r)^3+16*I*Pi*b*d^3*csgn(I*c*x^n)^3-96*ln(c)*
b*d*e^2*(x^r)^2-204*ln(c)*b*e^3*r^3*(x^r)^3-248*ln(c)*b*e^3*r^2*(x^r)^3-144
*ln(c)*b*e^3*r*(x^r)^3-12*ln(c)*b*e^3*r^5*(x^r)^3-80*ln(c)*b*e^3*r^4*(x^r)^
3+4*b*e^3*n*r^4*(x^r)^3+24*b*e^3*n*r^3*(x^r)^3-54*a*d*e^2*r^5*(x^r)^2-342*a
*d*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r-576*a*d^2*e*r^4*x^r+48*I*Pi*b*d*e^2*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+48*I*Pi*b*d^2*e*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^r+6*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*(x^r)^3-27*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+456*I*Pi*b
*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+564*I*Pi*b*d^2*e*r^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+193*I*Pi*b*d^3*r^4*csgn(I*c*x^n)^3
+288*I*Pi*b*d^3*r^3*csgn(I*c*x^n)^3+232*I*Pi*b*d^3*r^2*csgn(I*c*x^n)^3-96*I
*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2+16*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)-9*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*c*x^n)^2+264*b*d*e^2*n*r^2
*(x^r)^2-108*ln(c)*b*d^2*e*r^5*x^r+582*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)*x^r-456*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2
-456*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+66*I*Pi*b*d^3*r^5
*csgn(I*c*x^n)^3-16*I*Pi*b*e^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-16*I*Pi*b*
e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+48*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^
r)^2-408*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-264*I*Pi*b*d^
2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+6*I*Pi*b*e^3*r^5*csgn(I*c*x^n)^3*(x^r

```
)^3-408*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+288*I*Pi*b*d^3*r
^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+232*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)-48*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+288*I*
Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r+96*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+456*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+564*I*Pi*b*d^2*e*r
^2*csgn(I*c*x^n)^3*x^r+16*I*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x
^r)^3-342*ln(c)*b*d*e^2*r^4*(x^r)^2-1164*ln(c)*b*d^2*e*r^3*x^r-1128*ln(c)*b
*d^2*e*r^2*x^r-528*ln(c)*b*d^2*e*r*x^r-816*ln(c)*b*d*e^2*r^3*(x^r)^2-582*I*
Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r-582*I*Pi*b*d^2*e*r^3*csgn(I*x^
n)*csgn(I*c*x^n)^2*x^r-564*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2
40*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+171*I*Pi*b*d*e^2*r^4*cs
gn(I*c*x^n)^3*(x^r)^2+9*I*Pi*b*d^3*r^6*csgn(I*c*x^n)^3+102*I*Pi*b*e^3*r^3*c
sgn(I*c*x^n)^3*(x^r)^3+124*I*Pi*b*e^3*r^2*csgn(I*c*x^n)^3*(x^r)^3+72*I*Pi*b
*e^3*r*csgn(I*c*x^n)^3*(x^r)^3-6*I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2
*(x^r)^3+240*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+264
*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+171*I*Pi*b*d*e^2*r^
4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-48*I*Pi*b*d^2*e*csgn(I*x^n)*c
sgn(I*c*x^n)^2*x^r+193*I*Pi*b*d^3*r^4*csgn(I*c)...
```

Maxima [**A**]
time = 0.29, size = 222, normalized size = 1.49

$$-\frac{1}{4}bd^3nx^2+\frac{1}{2}bd^3x^2\log(cx^n)+\frac{1}{2}ad^3x^2+\frac{be^3x^{3r+2}\log(cx^n)}{3r+2}+\frac{3bde^2x^{2r+2}\log(cx^n)}{2(r+1)}+\frac{3bd^2ex^{r+2}\log(cx^n)}{r+2}-\frac{be^3nx^{3r+2}}{(3r+2)^2}+\frac{ae^3x^{3r+2}}{3r+2}-\frac{3bde^2nx^{2r+2}}{4(r+1)^2}+\frac{3ade^2x^{2r+2}}{2(r+1)}-\frac{3bd^2enx^{r+2}}{(r+2)^2}+\frac{3ad^2ex^{r+2}}{r+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/4*b*d^3*n*x^2 + 1/2*b*d^3*x^2*log(c*x^n) + 1/2*a*d^3*x^2 + b*e^3*x^(3*r
+ 2)*log(c*x^n)/(3*r + 2) + 3/2*b*d*e^2*x^(2*r + 2)*log(c*x^n)/(r + 1) + 3*
b*d^2*e*x^(r + 2)*log(c*x^n)/(r + 2) - b*e^3*n*x^(3*r + 2)/(3*r + 2)^2 + a*
e^3*x^(3*r + 2)/(3*r + 2) - 3/4*b*d*e^2*n*x^(2*r + 2)/(r + 1)^2 + 3/2*a*d*e
^2*x^(2*r + 2)/(r + 1) - 3*b*d^2*e*n*x^(r + 2)/(r + 2)^2 + 3*a*d^2*e*x^(r +
 2)/(r + 2)
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 881 vs. 2(141) = 282.
time = 0.38, size = 881, normalized size = 5.91

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/4*(2*(9*b*d^3*r^6 + 66*b*d^3*r^5 + 193*b*d^3*r^4 + 288*b*d^3*r^3 + 232*b*
d^3*r^2 + 96*b*d^3*r + 16*b*d^3)*x^2*log(c) + 2*(9*b*d^3*n*r^6 + 66*b*d^3*n
*r^5 + 193*b*d^3*n*r^4 + 288*b*d^3*n*r^3 + 232*b*d^3*n*r^2 + 96*b*d^3*n*r +
```

```
16*b*d^3*n)*x^2*log(x) - (9*(b*d^3*n - 2*a*d^3)*r^6 + 66*(b*d^3*n - 2*a*d^
3)*r^5 + 16*b*d^3*n + 193*(b*d^3*n - 2*a*d^3)*r^4 - 32*a*d^3 + 288*(b*d^3*n
 - 2*a*d^3)*r^3 + 232*(b*d^3*n - 2*a*d^3)*r^2 + 96*(b*d^3*n - 2*a*d^3)*r)*x
^2 + 4*((3*b*r^5 + 20*b*r^4 + 51*b*r^3 + 62*b*r^2 + 36*b*r + 8*b)*x^2*e^3*l
og(c) + (3*b*n*r^5 + 20*b*n*r^4 + 51*b*n*r^3 + 62*b*n*r^2 + 36*b*n*r + 8*b*
n)*x^2*e^3*log(x) + (3*a*r^5 - (b*n - 20*a)*r^4 - 3*(2*b*n - 17*a)*r^3 - (1
3*b*n - 62*a)*r^2 - 4*b*n - 12*(b*n - 3*a)*r + 8*a)*x^2*e^3)*x^(3*r) + 3*(2
*(9*b*d*r^5 + 57*b*d*r^4 + 136*b*d*r^3 + 152*b*d*r^2 + 80*b*d*r + 16*b*d)*x
^2*e^2*log(c) + 2*(9*b*d*n*r^5 + 57*b*d*n*r^4 + 136*b*d*n*r^3 + 152*b*d*n*r
^2 + 80*b*d*n*r + 16*b*d*n)*x^2*e^2*log(x) + (18*a*d*r^5 - 3*(3*b*d*n - 38*
a*d)*r^4 - 16*(3*b*d*n - 17*a*d)*r^3 - 16*b*d*n - 8*(11*b*d*n - 38*a*d)*r^2
 + 32*a*d - 32*(2*b*d*n - 5*a*d)*r)*x^2*e^2)*x^(2*r) + 12*((9*b*d^2*r^5 + 4
8*b*d^2*r^4 + 97*b*d^2*r^3 + 94*b*d^2*r^2 + 44*b*d^2*r + 8*b*d^2)*x^2*e*log
(c) + (9*b*d^2*n*r^5 + 48*b*d^2*n*r^4 + 97*b*d^2*n*r^3 + 94*b*d^2*n*r^2 + 4
4*b*d^2*n*r + 8*b*d^2*n)*x^2*e*log(x) + (9*a*d^2*r^5 - 3*(3*b*d^2*n - 16*a*
d^2)*r^4 - 4*b*d^2*n - (30*b*d^2*n - 97*a*d^2)*r^3 + 8*a*d^2 - (37*b*d^2*n
- 94*a*d^2)*r^2 - 4*(5*b*d^2*n - 11*a*d^2)*r)*x^2*e)*x^r)/(9*r^6 + 66*r^5 +
 193*r^4 + 288*r^3 + 232*r^2 + 96*r + 16)
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
[Out] Exception raised: SystemError >> excessive stack use: stack is 3061 deep
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1588 vs. 2(141) = 282.
time = 1.95, size = 1588, normalized size = 10.66

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
[Out] 1/4*(18*b*d^3*n*r^6*x^2*log(x) + 108*b*d^2*n*r^5*x^2*x^r*e*log(x) - 9*b*d^3
*n*r^6*x^2 + 18*b*d^3*r^6*x^2*log(c) + 108*b*d^2*r^5*x^2*x^r*e*log(c) + 132
*b*d^3*n*r^5*x^2*log(x) + 54*b*d*n*r^5*x^2*x^(2*r)*e^2*log(x) + 576*b*d^2*n
*r^4*x^2*x^r*e*log(x) - 66*b*d^3*n*r^5*x^2 + 18*a*d^3*r^6*x^2 - 108*b*d^2*n
*r^4*x^2*x^r*e + 108*a*d^2*r^5*x^2*x^r*e + 132*b*d^3*r^5*x^2*log(c) + 54*b*
d*r^5*x^2*x^(2*r)*e^2*log(c) + 576*b*d^2*r^4*x^2*x^r*e*log(c) + 386*b*d^3*n
*r^4*x^2*log(x) + 12*b*n*r^5*x^2*x^(3*r)*e^3*log(x) + 342*b*d*n*r^4*x^2*x^(
2*r)*e^2*log(x) + 1164*b*d^2*n*r^3*x^2*x^r*e*log(x) - 193*b*d^3*n*r^4*x^2 +
```

```
132*a*d^3*r^5*x^2 - 27*b*d*n*r^4*x^2*x^(2*r)*e^2 + 54*a*d*r^5*x^2*x^(2*r)*
e^2 - 360*b*d^2*n*r^3*x^2*x^r*e + 576*a*d^2*r^4*x^2*x^r*e + 386*b*d^3*r^4*x
^2*log(c) + 12*b*r^5*x^2*x^(3*r)*e^3*log(c) + 342*b*d*r^4*x^2*x^(2*r)*e^2*l
og(c) + 1164*b*d^2*r^3*x^2*x^r*e*log(c) + 576*b*d^3*n*r^3*x^2*log(x) + 80*b
*n*r^4*x^2*x^(3*r)*e^3*log(x) + 816*b*d*n*r^3*x^2*x^(2*r)*e^2*log(x) + 1128
*b*d^2*n*r^2*x^2*x^r*e*log(x) - 288*b*d^3*n*r^3*x^2 + 386*a*d^3*r^4*x^2 - 4
*b*n*r^4*x^2*x^(3*r)*e^3 + 12*a*r^5*x^2*x^(3*r)*e^3 - 144*b*d*n*r^3*x^2*x^(
2*r)*e^2 + 342*a*d*r^4*x^2*x^(2*r)*e^2 - 444*b*d^2*n*r^2*x^2*x^r*e + 1164*a
*d^2*r^3*x^2*x^r*e + 576*b*d^3*r^3*x^2*log(c) + 80*b*r^4*x^2*x^(3*r)*e^3*lo
g(c) + 816*b*d*r^3*x^2*x^(2*r)*e^2*log(c) + 1128*b*d^2*r^2*x^2*x^r*e*log(c)
 + 464*b*d^3*n*r^2*x^2*log(x) + 204*b*n*r^3*x^2*x^(3*r)*e^3*log(x) + 912*b*
d*n*r^2*x^2*x^(2*r)*e^2*log(x) + 528*b*d^2*n*r*x^2*x^r*e*log(x) - 232*b*d^3
*n*r^2*x^2 + 576*a*d^3*r^3*x^2 - 24*b*n*r^3*x^2*x^(3*r)*e^3 + 80*a*r^4*x^2*
x^(3*r)*e^3 - 264*b*d*n*r^2*x^2*x^(2*r)*e^2 + 816*a*d*r^3*x^2*x^(2*r)*e^2 -
 240*b*d^2*n*r*x^2*x^r*e + 1128*a*d^2*r^2*x^2*x^r*e + 464*b*d^3*r^2*x^2*log
(c) + 204*b*r^3*x^2*x^(3*r)*e^3*log(c) + 912*b*d*r^2*x^2*x^(2*r)*e^2*log(c)
 + 528*b*d^2*r*x^2*x^r*e*log(c) + 192*b*d^3*n*r*x^2*log(x) + 248*b*n*r^2*x^
2*x^(3*r)*e^3*log(x) + 480*b*d*n*r*x^2*x^(2*r)*e^2*log(x) + 96*b*d^2*n*x^2*
x^r*e*log(x) - 96*b*d^3*n*r*x^2 + 464*a*d^3*r^2*x^2 - 52*b*n*r^2*x^2*x^(3*r
)*e^3 + 204*a*r^3*x^2*x^(3*r)*e^3 - 192*b*d*n*r*x^2*x^(2*r)*e^2 + 912*a*d*r
^2*x^2*x^(2*r)*e^2 - 48*b*d^2*n*x^2*x^r*e + 528*a*d^2*r*x^2*x^r*e + 192*b*d
^3*r*x^2*log(c) + 248*b*r^2*x^2*x^(3*r)*e^3*log(c) + 480*b*d*r*x^2*x^(2*r)*
e^2*log(c) + 96*b*d^2*x^2*x^r*e*log(c) + 32*b*d^3*n*x^2*log(x) + 144*b*n*r*
x^2*x^(3*r)*e^3*log(x) + 96*b*d*n*x^2*x^(2*r)*e^2*log(x) - 16*b*d^3*n*x^2 +
 192*a*d^3*r*x^2 - 48*b*n*r*x^2*x^(3*r)*e^3 + 248*a*r^2*x^2*x^(3*r)*e^3 - 4
8*b*d*n*x^2*x^(2*r)*e^2 + 480*a*d*r*x^2*x^(2*r)*e^2 + 96*a*d^2*x^2*x^r*e +
32*b*d^3*x^2*log(c) + 144*b*r*x^2*x^(3*r)*e^3*log(c) + 96*b*d*x^2*x^(2*r)*e
^2*log(c) + 32*b*n*x^2*x^(3*r)*e^3*log(x) + 32*a*d^3*x^2 - 16*b*n*x^2*x^(3*
r)*e^3 + 144*a*r*x^2*x^(3*r)*e^3 + 96*a*d*x^2*x^(2*r)*e^2 + 32*b*x^2*x^(3*r
)*e^3*log(c) + 32*a*x^2*x^(3*r)*e^3)/(9*r^6 + 66*r^5 + 193*r^4 + 288*r^3 +
232*r^2 + 96*r + 16)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
[Out] int(x*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.395 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=152

$$-\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}}{}$$

[Out] -3*b*d^2*e*n*x^r/r^2-3/4*b*d*e^2*n*x^(2*r)/r^2-1/9*b*e^3*n*x^(3*r)/r^2-1/2*b*d^3*n*ln(x)^2+3*d^2*e*x^r*(a+b*ln(c*x^n))/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n))/r+d^3*ln(x)*(a+b*ln(c*x^n))

Rubi [A]
time = 0.12, antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}-\frac{1}{2}bd^3n\log^2(x)-\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}$$

Antiderivative was successfully verified.

[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]

[Out] (-3*b*d^2*e*n*x^r)/r^2 - (3*b*d*e^2*n*x^(2*r))/(4*r^2) - (b*e^3*n*x^(3*r))/(9*r^2) - (b*d^3*n*Log[x]^2)/2 + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/r + (3*d*e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(3*r) + d^3*Log[x]*(a + b*Log[c*x^n])

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !MatchQ[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x], x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_) + (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$
\begin{aligned}
\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx &= \frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}+6d^3\log(x)\right)(a+b\log(cx^n))-(bn)\int \\
&= \frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}+6d^3\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int}{} \\
&= \frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}+6d^3\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int}{} \\
&= -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}+\frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}\right. \\
&= -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{1}{6}\left(\frac{18d^2ex^r}{r}+\right.
\end{aligned}
$$

Mathematica [A]
time = 0.19, size = 129, normalized size = 0.85

$$-\frac{1}{2}bd^3n\log^2(x)+d^3\log(x)\,(a+b\log(cx^n))+\frac{ex^r(6ar(18d^2+9dex^r+2e^2x^{2r})-bn(108d^2+27dex^r+4e^2x^{2r})+6br(18d^2+9dex^r+2e^2x^{2r})\log(cx^n))}{36r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/2*(b*d^3*n*Log[x]^2) + d^3*Log[x]*(a + b*Log[c*x^n]) + (e*x^r*(6*a*r*(18
*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - b*n*(108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*
r)) + 6*b*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r))*Log[c*x^n]))/(36*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.16, size = 693, normalized size = 4.56

method	result
risch	$-\frac{b\,e^{3} n\,x^{3 r}}{9 r^{2}}+a\,d^{3} \ln \left(x\right)+\frac{3 a\,x^{2 r} d\,e^{2}}{2 r}+\frac{\ln \left(c\right) b\,e^{3} x^{3 r}}{3 r}+\frac{i \ln \left(x\right) \pi b\,d^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{2}-\frac{i \pi b\,e^{3} \operatorname{csgn}\left(i c\,x^{n}\right)^{3} x^{3 r}}{6 r}+3$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] 3/2*a/r*(x^r)^2*d*e^2-1/6*I/r*Pi*b*e^3*csgn(I*c*x^n)^3*(x^r)^3+1/2*I*ln(x)*
Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(x)*Pi*b*d^3*csgn(I*x^n)*csgn(I*
c*x^n)^2+1/3*a/r*(x^r)^3*e^3+a*d^3*ln(x)+3*a/r*x^r*d^2*e+1/3/r*ln(c)*b*e^3*
(x^r)^3-1/9/r^2*b*e^3*n*(x^r)^3-3*b*d^2*e*n*x^r/r^2+ln(x)*ln(c)*b*d^3+1/6*b
*(2*e^3*(x^r)^3+6*d^3*ln(x)*r+9*d*e^2*(x^r)^2+18*d^2*e*x^r)/r*ln(x^n)-1/2*b
*d^3*n*ln(x)^2-1/6*I/r*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3
+3/4*I/r*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+3/4*I/r*Pi*b*d*e^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+3/2*I/r*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n
)^2*x^r+3/2*I/r*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+1/6*I/r*Pi*b*e^3
*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+1/6*I/r*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^
n)^2*(x^r)^3-1/2*I*ln(x)*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3/4*I
/r*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2-3/2*I/r*Pi*b*d^2*e*csgn(I*c*x^n)^3*x^
r+3/2/r*ln(c)*b*d*e^2*(x^r)^2-3/4/r^2*b*d*e^2*n*(x^r)^2+3/r*ln(c)*b*d^2*e*x
^r-1/2*I*ln(x)*Pi*b*d^3*csgn(I*c*x^n)^3-3/4*I/r*Pi*b*d*e^2*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)*(x^r)^2-3/2*I/r*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)*x^r
```

Maxima [A]
time = 0.29, size = 172, normalized size = 1.13

$$\frac{be^{3}x^{3\,r}\log\left(cx^{n}\right)}{3\,r}+\frac{3\,bde^{2}x^{2\,r}\log\left(cx^{n}\right)}{2\,r}+\frac{3\,bd^{2}ex^{r}\log\left(cx^{n}\right)}{r}+\frac{bd^{3}\log\left(cx^{n}\right)^{2}}{2\,n}+ad^{3}\log\left(x\right)-\frac{be^{3}nx^{3\,r}}{9\,r^{2}}+\frac{ae^{3}x^{3\,r}}{3\,r}-\frac{3\,bde^{2}nx^{2\,r}}{4\,r^{2}}+\frac{3\,ade^{2}x^{2\,r}}{2\,r}-\frac{3\,bd^{2}enx^{r}}{r^{2}}+\frac{3\,ad^{2}ex^{r}}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/3*b*e^3*x^(3*r)*log(c*x^n)/r + 3/2*b*d*e^2*x^(2*r)*log(c*x^n)/r + 3*b*d^2
*e*x^r*log(c*x^n)/r + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x) - 1/9*b*e^3*n
*x^(3*r)/r^2 + 1/3*a*e^3*x^(3*r)/r - 3/4*b*d*e^2*n*x^(2*r)/r^2 + 3/2*a*d*e^
2*x^(2*r)/r - 3*b*d^2*e*n*x^r/r^2 + 3*a*d^2*e*x^r/r
```

Fricas [A]
time = 0.35, size = 166, normalized size = 1.09

$$\frac{18\,bd^{3}nr^{2}\log\left(x\right)^{2}+4\,{\left(3\,bnre^{3}\log\left(x\right)+3\,bre^{3}\log\left(c\right)-{\left(bn-3\,ar\right)}e^{3}\right)}x^{3\,r}+27\,{\left(2\,bdnre^{2}\log\left(x\right)+2\,bdre^{2}\log\left(c\right)-{\left(bdn-2\,adr\right)}e^{2}\right)}x^{2\,r}+108\,{\left(bd^{2}nre\log\left(x\right)+bd^{2}re\log\left(c\right)-{\left(bd^{2}n-ad^{2}r\right)}e\right)}x^{r}+36\,{\left(bd^{3}r^{2}\log\left(c\right)+ad^{3}r^{2}\right)}\log\left(x\right)}{36\,r^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/36*(18*b*d^3*n*r^2*log(x)^2 + 4*(3*b*n*r*e^3*log(x) + 3*b*r*e^3*log(c) -
(b*n - 3*a*r)*e^3)*x^(3*r) + 27*(2*b*d*n*r*e^2*log(x) + 2*b*d*r*e^2*log(c)
- (b*d*n - 2*a*d*r)*e^2)*x^(2*r) + 108*(b*d^2*n*r*e*log(x) + b*d^2*r*e*log(
c) - (b*d^2*n - a*d^2*r)*e)*x^r + 36*(b*d^3*r^2*log(c) + a*d^3*r^2)*log(x))
/r^2
```

Sympy [A]
time = 7.27, size = 299, normalized size = 1.97

$$\begin{cases} (a + b\log{(c)})\,(d+e)^3\log{(x)} & \text{for}\ n = 0 \wedge r = 0 \\ (d+e)^3 \left(\begin{cases} a\log{(x)} & \text{for}\ b = 0 \\ -(-a - b\log{(c)})\log{(x)} & \text{for}\ n = 0 \\ \frac{(-a-b\log{(cx^n)})^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for}\ r = 0 \\ (a + b\log{(c)})\left(d^3\log{(x)} + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) & \text{for}\ n = 0 \\ \frac{ad^3\log{(cx^n)}}{n} + \frac{3ad^2ex^r}{r} + \frac{3ade^2x^{2r}}{2r} + \frac{ae^3x^{3r}}{3r} + \frac{bd^3\log{(cx^n)}^2}{2n} - \frac{3bd^2enx^r}{r^2} + \frac{3bd^2ex^r\log{(cx^n)}}{r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3bde^2x^{2r}\log{(cx^n)}}{2r} - \frac{be^3nx^{3r}}{9r^2} + \frac{be^3x^{3r}\log{(cx^n)}}{3r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise(((a + b*log(c))*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)
**3*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((
-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), ((a + b*log(c))*(d**3*lo
g(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) + e**3*x**(3*r)/(3*r)), Eq
(n, 0)), (a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**r/r + 3*a*d*e**2*x**(2*r)/(2
*r) + a*e**3*x**(3*r)/(3*r) + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x*
*r/r**2 + 3*b*d**2*e*x**r*log(c*x**n)/r - 3*b*d*e**2*n*x**(2*r)/(4*r**2) +
3*b*d*e**2*x**(2*r)*log(c*x**n)/(2*r) - b*e**3*n*x**(3*r)/(9*r**2) + b*e**3
*x**(3*r)*log(c*x**n)/(3*r), True))
```

Giac [A]
time = 2.32, size = 210, normalized size = 1.38

$$\frac{1}{2}\,bd^3n\log{(x)}^2 + \frac{3\,bd^2nx^re\log{(x)}}{r} + bd^3\log{(c)}\log{(x)} + \frac{3\,bd^2x^re\log{(c)}}{r} + ad^3\log{(x)} + \frac{3\,bdnx^{2\,r}e^2\log{(x)}}{2\,r} - \frac{3\,bd^2nx^re}{r^2} + \frac{3\,ad^2x^re}{r} + \frac{3\,bdx^{2\,r}e^2\log{(c)}}{2\,r} + \frac{bnx^{3\,r}e^3\log{(x)}}{3\,r} - \frac{3\,bdnx^{2\,r}e^2}{4\,r^2} + \frac{3\,adx^{2\,r}e^2}{2\,r} + \frac{bx^{3\,r}e^3\log{(c)}}{3\,r} - \frac{bnx^{3\,r}e^3}{9\,r^2} + \frac{ax^{3\,r}e^3}{3\,r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*d^3*n*log(x)^2 + 3*b*d^2*n*x^r*e*log(x)/r + b*d^3*log(c)*log(x) + 3*b
*d^2*x^r*e*log(c)/r + a*d^3*log(x) + 3/2*b*d*n*x^(2*r)*e^2*log(x)/r - 3*b*d
^2*n*x^r*e/r^2 + 3*a*d^2*x^r*e/r + 3/2*b*d*x^(2*r)*e^2*log(c)/r + 1/3*b*n*x
^(3*r)*e^3*log(x)/r - 3/4*b*d*n*x^(2*r)*e^2/r^2 + 3/2*a*d*x^(2*r)*e^2/r + 1
/3*b*x^(3*r)*e^3*log(c)/r - 1/9*b*n*x^(3*r)*e^3/r^2 + 1/3*a*x^(3*r)*e^3/r
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x, x)
```

3.396 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=191

$$-\frac{bd^3n}{4x^2}-\frac{3bde^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{3bd^2enx^{-2+r}}{(2-r)^2}-\frac{be^3nx^{-2+3r}}{(2-3r)^2}-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-3d$$

```
[Out] -1/4*b*d^3*n/x^2-3/4*b*d*e^2*n/(1-r)^2/(x^(2-2*r))-3*b*d^2*e*n*x^(-2+r)/(2-
r)^2-b*e^3*n*x^(-2+3*r)/(2-3*r)^2-1/2*d^3*(a+b*ln(c*x^n))/x^2-3/2*d*e^2*(a+
b*ln(c*x^n))/(1-r)/(x^(2-2*r))-3*d^2*e*x^(-2+r)*(a+b*ln(c*x^n))/(2-r)-e^3*x
^(-2+3*r)*(a+b*ln(c*x^n))/(2-3*r)
```

Rubi [A]
time = 0.26, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}-\frac{bd^3n}{4x^2}-\frac{3bd^2enx^{r-2}}{(2-r)^2}-\frac{3bde^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{be^3nx^{3r-2}}{(2-3r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] -1/4*(b*d^3*n)/x^2 - (3*b*d*e^2*n)/(4*(1 - r)^2*x^(2*(1 - r))) - (3*b*d^2*e
*n*x^(-2 + r))/(2 - r)^2 - (b*e^3*n*x^(-2 + 3*r))/(2 - 3*r)^2 - (d^3*(a + b
*Log[c*x^n]))/(2*x^2) - (3*d*e^2*(a + b*Log[c*x^n]))/(2*(1 - r)*x^(2*(1 - r
))) - (3*d^2*e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r) - (e^3*x^(-2 + 3*r)*(
a + b*Log[c*x^n]))/(2 - 3*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^3}\,dx &= -\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{3de^2x^{-2(1-r)}}{1-r}+\frac{6d^2ex^{-2+r}}{2-r}+\frac{2e^3x^{-2+3r}}{2-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{3de^2x^{-2(1-r)}}{1-r}+\frac{6d^2ex^{-2+r}}{2-r}+\frac{2e^3x^{-2+3r}}{2-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{3de^2x^{-2(1-r)}}{1-r}+\frac{6d^2ex^{-2+r}}{2-r}+\frac{2e^3x^{-2+3r}}{2-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{bd^3n}{4x^2}-\frac{3bde^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{3bd^2enx^{-2+r}}{(2-r)^2}-\frac{be^3nx^{-2+3r}}{(2-3r)^2}-\frac{1}{2}\left(\frac{d^3}{x^2}+\frac{3de}{}\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 160, normalized size = 0.84

$$\frac{-2bd^3n\log(x)-d^3(2a+bn-2bn\log(x)+2b\log(cx^n))+\frac{12d^2ex^r(-bn+a(-2+r)+b(-2+r)\log(cx^n))}{(-2+r)^2}+\frac{3de^2x^{2r}(-bn+2a(-1+r)+2b(-1+r)\log(cx^n))}{(-1+r)^2}+\frac{4e^3x^{3r}(-bn+a(-2+3r)+b(-2+3r)\log(cx^n))}{(2-3r)^2}}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^3,x]
```

```
[Out] (-2*b*d^3*n*Log[x] - d^3*(2*a + b*n - 2*b*n*Log[x] + 2*b*Log[c*x^n]) + (12*
d^2*e*x^r*(-(b*n) + a*(-2 + r) + b*(-2 + r)*Log[c*x^n]))/(-2 + r)^2 + (3*d*
e^2*x^(2*r)*(-(b*n) + 2*a*(-1 + r) + 2*b*(-1 + r)*Log[c*x^n]))/(-1 + r)^2 +
 (4*e^3*x^(3*r)*(-(b*n) + a*(-2 + 3*r) + b*(-2 + 3*r)*Log[c*x^n]))/(2 - 3*r
)^2)/(4*x^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 4027, normalized size = 21.08

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

[Out] -1/2*b*(-2*e^3*r^2*(x^r)^3-9*d*e^2*r^2*(x^r)^2+6*e^3*r*(x^r)^3+3*d^3*r^3-18*d^2*e*r^2*x^r+24*d*e^2*r*(x^r)^2-4*e^3*(x^r)^3-11*d^3*r^2+30*d^2*e*r*x^r-12*d*e^2*(x^r)^2+12*d^3*r-12*d^2*e*x^r-4*d^3)/x^2/(-2+3*r)/(-1+r)/(-2+r)*ln(x^n)-1/4*(32*e^3*(x^r)^3*a+96*d^2*e*x^r*a+96*d*e^2*(x^r)^2*a+16*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-360*b*d^2*e*n*r^3*x^r+912*ln(c)*b*d*e^2*r^2*(x^r)^2-480*ln(c)*b*d*e^2*r*(x^r)^2+72*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+102*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+18*a*d^3*r^6-132*a*d^3*r^5+386*a*d^3*r^4+27*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^2+27*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+54*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+48*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-9*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-240*I*Pi*b*d*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-66*I*Pi*b*d^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2+32*a*d^3-816*a*d*e^2*r^3*(x^r)^2+912*a*d*e^2*r^2*(x^r)^2-480*a*d*e^2*r*(x^r)^2-1164*a*d^2*e*r^3*x^r+1128*a*d^2*e*r^2*x^r-528*a*d^2*e*r*x^r+9*b*d^3*n*r^6-66*b*d^3*n*r^5+193*b*d^3*n*r^4-6*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+444*b*d^2*e*n*r^2*x^r-192*b*d*e^2*n*r*(x^r)^2-240*b*d^2*e*n*r*x^r+27*b*d*e^2*n*r^4*(x^r)^2-144*b*d*e^2*n*r^3*(x^r)^2+108*b*d^2*e*n*r^4*x^r-576*a*d^3*r^3+464*a*d^3*r^2-192*a*d^3*r-264*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-72*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+18*ln(c)*b*d^3*r^6-132*ln(c)*b*d^3*r^5+386*ln(c)*b*d^3*r^4-576*ln(c)*b*d^3*r^3+464*ln(c)*b*d^3*r^2-192*ln(c)*b*d^3*r+16*b*d^3*n-12*a*e^3*r^5*(x^r)^3+80*a*e^3*r^4*(x^r)^3+32*ln(c)*b*e^3*(x^r)^3+16*b*e^3*n*(x^r)^3-204*a*e^3*r^3*(x^r)^3+32*d^3*b*ln(c)-288*b*d^3*n*r^3+232*b*d^3*n*r^2-96*b*d^3*n*r+52*b*e^3*n*r^2*(x^r)^3-48*b*e^3*n*r*(x^r)^3+48*b*d*e^2*n*(x^r)^2+48*b*d^2*e*n*x^r+96*ln(c)*b*d^2*e*x^r+408*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+248*a*e^3*r^2*(x^r)^3-144*a*e^3*r*(x^r)^3-193*I*Pi*b*d^3*r^4*csgn(I*c*x^n)^3+96*ln(c)*b*d*e^2*(x^r)^2-204*ln(c)*b*e^3*r^3*(x^r)^3+248*ln(c)*b*e^3*r^2*(x^r)^3-144*ln(c)*b*e^3*r*(x^r)^3-12*ln(c)*b*e^3*r^5*(x^r)^3+80*ln(c)*b*e^3*r^4*(x^r)^3+4*b*e^3*n*r^4*(x^r)^3-24*b*e^3*n*r^3*(x^r)^3-54*a*d*e^2*r^5*(x^r)^2+342*a*d*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r+576*a*d^2*e*r^4*x^r-16*I*Pi*b*d^3*csgn(I*c*x^n)^3+564*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r+564*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-48*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+6*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-27*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-456*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-564*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-171*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+288*I*Pi*b*d^3*r^3*csgn(I*c*x^n)^3-232*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+40*I*Pi*b*e^3*r^4*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+40*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+16*I*Pi*b*e^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+16*I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+232*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2-288*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r+48*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-96*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2+264*b*d*e^2*n*r^2*(x^r)^2-108*ln(c)*b*d^2*e*r^5*x^r+582*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+66*

```
I*Pi*b*d^3*r^5*csgn(I*c*x^n)^3-408*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^
n)^2*(x^r)^2-264*I*Pi*b*d^2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+6*I*Pi*b*e^
3*r^5*csgn(I*c*x^n)^3*(x^r)^3-408*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^
2*(x^r)^2+288*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+96*I*Pi*b*
d^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+232*I*Pi*b*d^3*r^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2+9*I*Pi*b*d^3*r^6*csgn(I*x^n)*csgn(I*c*x^n)^2+193*I*Pi*b*d^3*r
^4*csgn(I*c)*csgn(I*c*x^n)^2+193*I*Pi*b*d^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2
-124*I*Pi*b*e^3*r^2*csgn(I*c*x^n)^3*(x^r)^3-48*I*Pi*b*d*e^2*csgn(I*c*x^n)^3
*(x^r)^2+342*ln(c)*b*d*e^2*r^4*(x^r)^2-1164*ln(c)*b*d^2*e*r^3*x^r+1128*ln(c
)*b*d^2*e*r^2*x^r-528*ln(c)*b*d^2*e*r*x^r-816*ln(c)*b*d*e^2*r^3*(x^r)^2-582
*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r-582*I*Pi*b*d^2*e*r^3*csgn(I
*x^n)*csgn(I*c*x^n)^2*x^r-240*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r
)^2+48*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+124*I*Pi*b*e^3*r^2*
csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-456*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x
^r)^2-564*I*Pi*b*d^2*e*r^2*csgn(I*c*x^n)^3*x^r-16*I*Pi*b*e^3*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*(x^r)^3+102*I*Pi*b*e^3*r^3*csgn(I*c*x^n)^3*(x^r)^3+72
*I*Pi*b*e^3*r*csgn(I*c*x^n)^3*(x^r)^3-6*I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c
*x^n)^2*(x^r)^3+240*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r
)^2+264*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-288*I*Pi*b*d
^2*e*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-171*I*Pi*b*d*e^2*r^4*csgn(
I*c*x^n)^3*(x^r)^2-193*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4
8*I*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+...
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-3>0)', see `assume?` for more det
ails)Is
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 844 vs. $2(172) = 344$.
time = 0.35, size = 844, normalized size = 4.42

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(9*(b*d^3*n + 2*a*d^3)*r^6 - 66*(b*d^3*n + 2*a*d^3)*r^5 + 16*b*d^3*n +
 193*(b*d^3*n + 2*a*d^3)*r^4 + 32*a*d^3 - 288*(b*d^3*n + 2*a*d^3)*r^3 + 232
*(b*d^3*n + 2*a*d^3)*r^2 - 96*(b*d^3*n + 2*a*d^3)*r - 4*((3*b*r^5 - 20*b*r^
4 + 51*b*r^3 - 62*b*r^2 + 36*b*r - 8*b)*e^3*log(c) + (3*b*n*r^5 - 20*b*n*r^
4 + 51*b*n*r^3 - 62*b*n*r^2 + 36*b*n*r - 8*b*n)*e^3*log(x) + (3*a*r^5 - (b*
n + 20*a)*r^4 + 3*(2*b*n + 17*a)*r^3 - (13*b*n + 62*a)*r^2 - 4*b*n + 12*(b*
n + 3*a)*r - 8*a)*e^3)*x^(3*r) - 3*(2*(9*b*d*r^5 - 57*b*d*r^4 + 136*b*d*r^3
 - 152*b*d*r^2 + 80*b*d*r - 16*b*d)*e^2*log(c) + 2*(9*b*d*n*r^5 - 57*b*d*n*
r^4 + 136*b*d*n*r^3 - 152*b*d*n*r^2 + 80*b*d*n*r - 16*b*d*n)*e^2*log(x) + (
18*a*d*r^5 - 3*(3*b*d*n + 38*a*d)*r^4 + 16*(3*b*d*n + 17*a*d)*r^3 - 16*b*d*
n - 8*(11*b*d*n + 38*a*d)*r^2 - 32*a*d + 32*(2*b*d*n + 5*a*d)*r)*e^2)*x^(2*
r) - 12*((9*b*d^2*r^5 - 48*b*d^2*r^4 + 97*b*d^2*r^3 - 94*b*d^2*r^2 + 44*b*d
^2*r - 8*b*d^2)*e*log(c) + (9*b*d^2*n*r^5 - 48*b*d^2*n*r^4 + 97*b*d^2*n*r^3
 - 94*b*d^2*n*r^2 + 44*b*d^2*n*r - 8*b*d^2*n)*e*log(x) + (9*a*d^2*r^5 - 3*(
3*b*d^2*n + 16*a*d^2)*r^4 - 4*b*d^2*n + (30*b*d^2*n + 97*a*d^2)*r^3 - 8*a*d
^2 - (37*b*d^2*n + 94*a*d^2)*r^2 + 4*(5*b*d^2*n + 11*a*d^2)*r)*e)*x^r + 2*(
9*b*d^3*r^6 - 66*b*d^3*r^5 + 193*b*d^3*r^4 - 288*b*d^3*r^3 + 232*b*d^3*r^2
 - 96*b*d^3*r + 16*b*d^3)*log(c) + 2*(9*b*d^3*n*r^6 - 66*b*d^3*n*r^5 + 193*b
*d^3*n*r^4 - 288*b*d^3*n*r^3 + 232*b*d^3*n*r^2 - 96*b*d^3*n*r + 16*b*d^3*n)
*log(x))/((9*r^6 - 66*r^5 + 193*r^4 - 288*r^3 + 232*r^2 - 96*r + 16)*x^2)
```

Sympy [A]
time = 75.88, size = 338, normalized size = 1.77

$$-\frac{ad^3}{2x^2} + 3ad^2e\left(\begin{cases}\frac{x^r}{rx^2-2x^2} & \text{for } r \neq 2\\ \log(x) & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r}}{2rx^2-2x^2} & \text{for } r \neq 1\\ \log(x) & \text{otherwise}\end{cases}\right) + ae^3\left(\begin{cases}\frac{x^{3r}}{3rx^2-2x^2} & \text{for } r \neq \frac{2}{3}\\ \log(x) & \text{otherwise}\end{cases}\right) - \frac{bd^3n}{4x^2} - \frac{bd^3\log(cx^n)}{2x^2} - 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{rx^2-2x^2} & \text{for } r \neq 2\\ \log(x) & \text{otherwise}\end{cases}}{r-2} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq 2\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 3bd^2e\left(\begin{cases}\frac{x^{r-2}}{r-2} & \text{for } r \neq 2\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r}}{2rx^2-2x^2} & \text{for } r \neq 1\\ \log(x) & \text{otherwise}\end{cases}}{2r-2} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq 1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 3bde^2\left(\begin{cases}\frac{x^{2r-2}}{2r-2} & \text{for } r \neq 1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r}}{3rx^2-2x^2} & \text{for } r \neq \frac{2}{3}\\ \log(x) & \text{otherwise}\end{cases}}{3r-2} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq \frac{2}{3}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + be^3\left(\begin{cases}\frac{x^{3r-2}}{3r-2} & \text{for } r \neq \frac{2}{3}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] -a*d**3/(2*x**2) + 3*a*d**2*e*Piecewise((x**r/(r*x**2 - 2*x**2), Ne(r, 2)),
 (log(x), True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x**2 - 2*x**2), Ne(r
, 1)), (log(x), True)) + a*e**3*Piecewise((x**(3*r)/(3*r*x**2 - 2*x**2), Ne
(r, 2/3)), (log(x), True)) - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2
) - 3*b*d**2*e*n*Piecewise((Piecewise((x**r/(r*x**2 - 2*x**2), Ne(r, 2)), (
log(x), True))/(r - 2), (r > -oo) & (r < oo) & Ne(r, 2)), (log(x)**2/2, Tru
e)) + 3*b*d**2*e*Piecewise((x**(r - 2)/(r - 2), Ne(r, 2)), (log(x), True))*
log(c*x**n) - 3*b*d*e**2*n*Piecewise((Piecewise((x**(2*r)/(2*r*x**2 - 2*x**
2), Ne(r, 1)), (log(x), True))/(2*r - 2), (r > -oo) & (r < oo) & Ne(r, 1)),
 (log(x)**2/2, True)) + 3*b*d*e**2*Piecewise((x**(2*r - 2)/(2*r - 2), Ne(r,
 1)), (log(x), True))*log(c*x**n) - b*e**3*n*Piecewise((Piecewise((x**(3*r)
/(3*r*x**2 - 2*x**2), Ne(r, 2/3)), (log(x), True))/(3*r - 2), (r > -oo) & (
r < oo) & Ne(r, 2/3)), (log(x)**2/2, True)) + b*e**3*Piecewise((x**(3*r - 2
)/(3*r - 2), Ne(r, 2/3)), (log(x), True))*log(c*x**n)
```

Giac [F]

time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^3,x)
```

```
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^3, x)
```

3.397 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\,dx$

Optimal. Leaf size=191

$$-\frac{bd^3n}{16x^4}-\frac{3bde^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{3bd^2enx^{-4+r}}{(4-r)^2}-\frac{be^3nx^{-4+3r}}{(4-3r)^2}-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-3d$$

```
[Out] -1/16*b*d^3*n/x^4-3/4*b*d*e^2*n/(2-r)^2/(x^(4-2*r))-3*b*d^2*e*n*x^(-4+r)/(4
-r)^2-b*e^3*n*x^(-4+3*r)/(4-3*r)^2-1/4*d^3*(a+b*ln(c*x^n))/x^4-3/2*d*e^2*(a
+b*ln(c*x^n))/(2-r)/(x^(4-2*r))-3*d^2*e*x^(-4+r)*(a+b*ln(c*x^n))/(4-r)-e^3*
x^(-4+3*r)*(a+b*ln(c*x^n))/(4-3*r)
```

Rubi [A]
time = 0.27, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}-\frac{bd^3n}{16x^4}-\frac{3bd^2enx^{r-4}}{(4-r)^2}-\frac{3bde^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{be^3nx^{3r-4}}{(4-3r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] -1/16*(b*d^3*n)/x^4 - (3*b*d*e^2*n)/(4*(2 - r)^2*x^(2*(2 - r))) - (3*b*d^2*
e*n*x^(-4 + r))/(4 - r)^2 - (b*e^3*n*x^(-4 + 3*r))/(4 - 3*r)^2 - (d^3*(a +
b*Log[c*x^n]))/(4*x^4) - (3*d*e^2*(a + b*Log[c*x^n]))/(2*(2 - r)*x^(2*(2 -
r))) - (3*d^2*e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r) - (e^3*x^(-4 + 3*r)*
(a + b*Log[c*x^n]))/(4 - 3*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^5}\,dx &= -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6de^2x^{-2(2-r)}}{2-r}+\frac{12d^2ex^{-4+r}}{4-r}+\frac{4e^3x^{-4+3r}}{4-3r}\right)(a+b\log(cx^n))\\ &= -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6de^2x^{-2(2-r)}}{2-r}+\frac{12d^2ex^{-4+r}}{4-r}+\frac{4e^3x^{-4+3r}}{4-3r}\right)(a+b\log(cx^n))\\ &= -\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6de^2x^{-2(2-r)}}{2-r}+\frac{12d^2ex^{-4+r}}{4-r}+\frac{4e^3x^{-4+3r}}{4-3r}\right)(a+b\log(cx^n))\\ &= -\frac{bd^3n}{16x^4}-\frac{3bde^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{3bd^2enx^{-4+r}}{(4-r)^2}-\frac{be^3nx^{-4+3r}}{(4-3r)^2}-\frac{1}{4}\left(\frac{d^3}{x^4}+\frac{6de}{}\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 160, normalized size = 0.84

$$\frac{-4bd^3n\log(x)-d^3(4a+bn-4bn\log(x)+4b\log(cx^n))+\frac{48d^2ex^r(-bn+a(-4+r)+b(-4+r)\log(cx^n))}{(-4+r)^2}+\frac{12de^2x^{2r}(-bn+2a(-2+r)+2b(-2+r)\log(cx^n))}{(-2+r)^2}+\frac{16e^3x^{3r}(-bn+a(-4+3r)+b(-4+3r)\log(cx^n))}{(4-3r)^2}}{16x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^5,x]
```

```
[Out] (-4*b*d^3*n*Log[x] - d^3*(4*a + b*n - 4*b*n*Log[x] + 4*b*Log[c*x^n]) + (48*
d^2*e*x^r*(-(b*n) + a*(-4 + r) + b*(-4 + r)*Log[c*x^n]))/(-4 + r)^2 + (12*d
*e^2*x^(2*r)*(-(b*n) + 2*a*(-2 + r) + 2*b*(-2 + r)*Log[c*x^n]))/(-2 + r)^2
+ (16*e^3*x^(3*r)*(-(b*n) + a*(-4 + 3*r) + b*(-4 + 3*r)*Log[c*x^n]))/(4 - 3
*r)^2)/(16*x^4)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 4027, normalized size = 21.08

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

[Out] -1/4*b*(-4*e^3*r^2*(x^r)^3-18*d*e^2*r^2*(x^r)^2+24*e^3*r*(x^r)^3+3*d^3*r^3-36*d^2*e*r^2*x^r+96*d*e^2*r*(x^r)^2-32*e^3*(x^r)^3-22*d^3*r^2+120*d^2*e*r*x^r-96*d*e^2*(x^r)^2+48*d^3*r-96*d^2*e*x^r-32*d^3)/x^4/(-4+3*r)/(-2+r)/(-4+r)*ln(x^n)-1/16*(4096*e^3*(x^r)^3*a+1544*I*Pi*b*d^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2-3968*I*Pi*b*e^3*r^2*csgn(I*c*x^n)^3*(x^r)^3-6144*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2+12288*d^2*e*x^r*a+12288*d*e^2*(x^r)^2*a+6528*I*Pi*b*d*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2+264*I*Pi*b*d^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6144*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2880*b*d^2*e*n*r^3*x^r+29184*ln(c)*b*d*e^2*r^2*(x^r)^2-30720*ln(c)*b*d*e^2*r*(x^r)^2+36*a*d^3*r^6-528*a*d^3*r^5+3088*a*d^3*r^4-1368*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-2304*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+4608*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+18048*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-14592*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-18048*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+4096*a*d^3-13056*a*d*e^2*r^3*(x^r)^2+29184*a*d*e^2*r^2*(x^r)^2-30720*a*d*e^2*r*(x^r)^2-18624*a*d^2*e*r^3*x^r+36096*a*d^2*e*r^2*x^r-33792*a*d^2*e*r*x^r+9*b*d^3*n*r^6-132*b*d^3*n*r^5+772*b*d^3*n*r^4+2048*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+2048*I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-6528*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+9312*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+15360*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+16896*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+7104*b*d^2*e*n*r^2*x^r-6144*b*d*e^2*n*r*(x^r)^2-7680*b*d^2*e*n*r*x^r+108*b*d*e^2*n*r^4*(x^r)^2-1152*b*d*e^2*n*r^3*(x^r)^2+432*b*d^2*e*n*r^4*x^r-9216*a*d^3*r^3+14848*a*d^3*r^2-12288*a*d^3*r+36*ln(c)*b*d^3*r^6-528*ln(c)*b*d^3*r^5+3088*ln(c)*b*d^3*r^4-9216*ln(c)*b*d^3*r^3+14848*ln(c)*b*d^3*r^2-12288*ln(c)*b*d^3*r+1024*b*d^3*n-48*a*e^3*r^5*(x^r)^3+640*a*e^3*r^4*(x^r)^3+4096*ln(c)*b*e^3*(x^r)^3+1024*b*e^3*n*(x^r)^3-3264*a*e^3*r^3*(x^r)^3+4096*d^3*b*ln(c)+6144*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+6144*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-14592*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+9312*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r-4608*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-2304*b*d^3*n*r^3+3712*b*d^3*n*r^2-3072*b*d^3*n*r+832*b*e^3*n*r^2*(x^r)^3-1536*b*e^3*n*r*(x^r)^3+3072*b*d*e^2*n*(x^r)^2+3072*b*d^2*e*n*x^r+12288*ln(c)*b*d^2*e*x^r+7936*a*e^3*r^2*(x^r)^3-9216*a*e^3*r*(x^r)^3+2048*I*Pi*b*e^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+2048*I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+7424*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2+7424*I*Pi*b*d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3968*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+4608*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+12288*ln(c)*b*d*e^2*(x^r)^2-3264*ln(c)*b*e^3*r^3*(x^r)^3+7936*ln(c)*b*e^3*r^2*(x^r)^3-9216*ln(c)*b*e^3*r*(x^r)^3-48*ln(c)*b*e^3*r^5*(x^r)^3+640*ln(c)*b*e^3*r^4*(x^r)^3+16*b*e^3*n*r^4*(x^r)^3-192*b*e^3*n*r^3*(x^r)^3-216*a*d*e^2*r^5*(x^r)^2+2736*a*d*e^2*r^4*(x^r)^2-432*a*d^2*e*r^5*x^r+4608*a*d^2*e*r^4*x^r-4608*I*Pi*b*e^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+108*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^2-6144*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2-264*I*Pi*b*d^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2-264*I*Pi*b*d^3*r^5*csgn(I*x^n)*csgn(I*c

```
*x^n)^2-320*I*Pi*b*e^3*r^4*csgn(I*c*x^n)^3*(x^r)^3-2048*I*Pi*b*d^3*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+18*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*c*x^n)^2+180
48*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-18048*I*Pi*b*d^2*e*r^2*
csgn(I*c*x^n)^3*x^r-2048*I*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^
r)^3-6528*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+4224*b*d*e^2*n
*r^2*(x^r)^2-432*ln(c)*b*d^2*e*r^5*x^r+14592*I*Pi*b*d*e^2*r^2*csgn(I*c)*csg
n(I*c*x^n)^2*(x^r)^2+15360*I*Pi*b*d*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-1632*I*Pi
*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-216*I*Pi*b*d^2*e*r^5*csgn(I*x^
n)*csgn(I*c*x^n)^2*x^r-9312*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r+
18*I*Pi*b*d^3*r^6*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*b*e^3*r^5*csgn(I*x^n)
*csgn(I*c*x^n)^2*(x^r)^3-24*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^
3-16896*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+24*I*Pi*b*e^3*r^5*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+14592*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*
csgn(I*c*x^n)^2*(x^r)^2-6144*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*x^r+1632*I*Pi*b*e^3*r^3*csgn(I*c*x^n)^3*(x^r)^3+4608*I*Pi*b*e^3*r*csgn(I
*c*x^n)^3*(x^r)^3+2736*ln(c)*b*d*e^2*r^4*(x^r)^2-18624*ln(c)*b*d^2*e*r^3*x^
r+36096*ln(c)*b*d^2*e*r^2*x^r-33792*ln(c)*b*d^2*e*r*x^r-13056*ln(c)*b*d*e^2
*r^3*(x^r)^2+24*I*Pi*b*e^3*r^5*csgn(I*c*x^n)^3*(x^r)^3-1544*I*Pi*b*d^3*r^4*
csgn(I*c*x^n)^3-7424*I*Pi*b*d^3*r^2*csgn(I*c*x^n)^3-108*I*Pi*b*d*e^2*r^5*cs
gn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-7424*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+6144*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-18*I*Pi*b*d^3*
r^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2048*I*...
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-5>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 843 vs. 2(172) = 344.
time = 0.38, size = 843, normalized size = 4.41

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

```
[Out] -1/16*(9*(b*d^3*n + 4*a*d^3)*r^6 - 132*(b*d^3*n + 4*a*d^3)*r^5 + 1024*b*d^3
*n + 772*(b*d^3*n + 4*a*d^3)*r^4 + 4096*a*d^3 - 2304*(b*d^3*n + 4*a*d^3)*r^
3 + 3712*(b*d^3*n + 4*a*d^3)*r^2 - 3072*(b*d^3*n + 4*a*d^3)*r - 16*((3*b*r^
5 - 40*b*r^4 + 204*b*r^3 - 496*b*r^2 + 576*b*r - 256*b)*e^3*log(c) + (3*b*n
*r^5 - 40*b*n*r^4 + 204*b*n*r^3 - 496*b*n*r^2 + 576*b*n*r - 256*b*n)*e^3*lo
g(x) + (3*a*r^5 - (b*n + 40*a)*r^4 + 12*(b*n + 17*a)*r^3 - 4*(13*b*n + 124*
a)*r^2 - 64*b*n + 96*(b*n + 6*a)*r - 256*a)*e^3)*x^(3*r) - 12*(2*(9*b*d*r^5
 - 114*b*d*r^4 + 544*b*d*r^3 - 1216*b*d*r^2 + 1280*b*d*r - 512*b*d)*e^2*log
(c) + 2*(9*b*d*n*r^5 - 114*b*d*n*r^4 + 544*b*d*n*r^3 - 1216*b*d*n*r^2 + 128
0*b*d*n*r - 512*b*d*n)*e^2*log(x) + (18*a*d*r^5 - 3*(3*b*d*n + 76*a*d)*r^4
+ 32*(3*b*d*n + 34*a*d)*r^3 - 256*b*d*n - 32*(11*b*d*n + 76*a*d)*r^2 - 1024
*a*d + 512*(b*d*n + 5*a*d)*r)*e^2)*x^(2*r) - 48*((9*b*d^2*r^5 - 96*b*d^2*r^
4 + 388*b*d^2*r^3 - 752*b*d^2*r^2 + 704*b*d^2*r - 256*b*d^2)*e*log(c) + (9*
b*d^2*n*r^5 - 96*b*d^2*n*r^4 + 388*b*d^2*n*r^3 - 752*b*d^2*n*r^2 + 704*b*d^
2*n*r - 256*b*d^2*n)*e*log(x) + (9*a*d^2*r^5 - 3*(3*b*d^2*n + 32*a*d^2)*r^4
 - 64*b*d^2*n + 4*(15*b*d^2*n + 97*a*d^2)*r^3 - 256*a*d^2 - 4*(37*b*d^2*n +
 188*a*d^2)*r^2 + 32*(5*b*d^2*n + 22*a*d^2)*r)*e)*x^r + 4*(9*b*d^3*r^6 - 13
2*b*d^3*r^5 + 772*b*d^3*r^4 - 2304*b*d^3*r^3 + 3712*b*d^3*r^2 - 3072*b*d^3*
r + 1024*b*d^3)*log(c) + 4*(9*b*d^3*n*r^6 - 132*b*d^3*n*r^5 + 772*b*d^3*n*r
^4 - 2304*b*d^3*n*r^3 + 3712*b*d^3*n*r^2 - 3072*b*d^3*n*r + 1024*b*d^3*n)*l
og(x))/((9*r^6 - 132*r^5 + 772*r^4 - 2304*r^3 + 3712*r^2 - 3072*r + 1024)*x
^4)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**5,x)
[Out] Exception raised: SystemError >> excessive stack use: stack is 8856 deep
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^5, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^5,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^5, x)
```

3.398 $\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx$

Optimal. Leaf size=151

$$-\frac{1}{25}bd^3nx^5-\frac{3bd^2enx^{5+r}}{(5+r)^2}-\frac{3bde^2nx^{5+2r}}{(5+2r)^2}-\frac{be^3nx^{5+3r}}{(5+3r)^2}+\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{5+r}}{5+r}+\frac{15de^2x^{5+2r}}{5+2r}+\frac{5e^3x^{5+3r}}{5+3r}\right)(a+b$$

```
[Out] -1/25*b*d^3*n*x^5-3*b*d^2*e*n*x^(5+r)/(5+r)^2-3*b*d*e^2*n*x^(5+2*r)/(5+2*r)
^2-b*e^3*n*x^(5+3*r)/(5+3*r)^2+1/5*(d^3*x^5+15*d^2*e*x^(5+r)/(5+r)+15*d*e^2
*x^(5+2*r)/(5+2*r)+5*e^3*x^(5+3*r)/(5+3*r))*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.26, antiderivative size = 151, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{25}bd^3nx^5-\frac{3bd^2enx^{r+5}}{(r+5)^2}-\frac{3bde^2nx^{2r+5}}{(2r+5)^2}-\frac{be^3nx^{3r+5}}{(3r+5)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/25*(b*d^3*n*x^5) - (3*b*d^2*e*n*x^(5 + r))/(5 + r)^2 - (3*b*d*e^2*n*x^(5
 + 2*r))/(5 + 2*r)^2 - (b*e^3*n*x^(5 + 3*r))/(5 + 3*r)^2 + ((d^3*x^5 + (15*
d^2*e*x^(5 + r))/(5 + r) + (15*d*e^2*x^(5 + 2*r))/(5 + 2*r) + (5*e^3*x^(5 +
 3*r))/(5 + 3*r))*(a + b*Log[c*x^n]))/5
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
```

```
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\begin{aligned}\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx &= \frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{5+r}}{5+r}+\frac{15de^2x^{5+2r}}{5+2r}+\frac{5e^3x^{5+3r}}{5+3r}\right)(a+b\log(cx^n))-\\ &= \frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{5+r}}{5+r}+\frac{15de^2x^{5+2r}}{5+2r}+\frac{5e^3x^{5+3r}}{5+3r}\right)(a+b\log(cx^n))-\\ &= \frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{5+r}}{5+r}+\frac{15de^2x^{5+2r}}{5+2r}+\frac{5e^3x^{5+3r}}{5+3r}\right)(a+b\log(cx^n))-\\ &= -\frac{1}{25}bd^3nx^5-\frac{3bd^2enx^{5+r}}{(5+r)^2}-\frac{3bde^2nx^{5+2r}}{(5+2r)^2}-\frac{be^3nx^{5+3r}}{(5+3r)^2}+\frac{1}{5}\Bigg(d^3x^5+\end{aligned}$$

Mathematica [A]
time = 0.16, size = 164, normalized size = 1.09

$$\frac{1}{25}x^5\left(5bd^3n\log(x)+d^3(5a-bn-5bn\log(x)+5b\log(cx^n))+\frac{75d^2ex^r(-bn+a(5+r)+b(5+r)\log(cx^n))}{(5+r)^2}+\frac{75de^2x^{2r}(-bn+a(5+2r)+b(5+2r)\log(cx^n))}{(5+2r)^2}+\frac{25e^3x^{3r}(-bn+a(5+3r)+b(5+3r)\log(cx^n))}{(5+3r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^5*(5*b*d^3*n*Log[x] + d^3*(5*a - b*n - 5*b*n*Log[x] + 5*b*Log[c*x^n]) +
(75*d^2*e*x^r*(-(b*n) + a*(5 + r) + b*(5 + r)*Log[c*x^n]))/(5 + r)^2 + (75*
d*e^2*x^(2*r)*(-(b*n) + a*(5 + 2*r) + b*(5 + 2*r)*Log[c*x^n]))/(5 + 2*r)^2
+ (25*e^3*x^(3*r)*(-(b*n) + a*(5 + 3*r) + b*(5 + 3*r)*Log[c*x^n]))/(5 + 3*r
)^2))/25
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.29, size = 4031, normalized size = 26.70

method	result	size
risch	Expression too large to display	4031

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/5*b*x^5*(10*e^3*r^2*(x^r)^3+45*d*e^2*r^2*(x^r)^2+75*e^3*r*(x^r)^3+6*d^3*r
^3+90*d^2*e*r^2*x^r+300*d*e^2*r*(x^r)^2+125*e^3*(x^r)^3+55*d^3*r^2+375*d^2*
e*r*x^r+375*d*e^2*(x^r)^2+150*d^3*r+375*d^2*e*x^r+125*d^3)/(5+3*r)/(5+2*r)/
(5+r)*ln(x^n)-1/50*x^5*(-156250*e^3*(x^r)^3*a-5000*I*Pi*b*e^3*r^4*csgn(I*x^
```

n)*csgn(I*c*x^n)^2*(x^r)^3+181250*I*Pi*b*d^3*r^2*csgn(I*c*x^n)^3+78125*I*Pi
*b*e^3*csgn(I*c*x^n)^3*(x^r)^3-468750*d^2*e*x^r*a-468750*d*e^2*(x^r)^2*a+78
125*I*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+45000*b*d^2*e*n*
r^3*x^r-712500*ln(c)*b*d*e^2*r^2*(x^r)^2-937500*ln(c)*b*d*e^2*r*(x^r)^2-360
*a*d^3*r^6-6600*a*d^3*r^5-48250*a*d^3*r^4-468750*I*Pi*b*d*e^2*r*csgn(I*x^n)
*csgn(I*c*x^n)^2*(x^r)^2+187500*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+90000*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-156250*a*d^3
-255000*a*d*e^2*r^3*(x^r)^2-712500*a*d*e^2*r^2*(x^r)^2-937500*a*d*e^2*r*(x^
r)^2-363750*a*d^2*e*r^3*x^r-881250*a*d^2*e*r^2*x^r-1031250*a*d^2*e*r*x^r-31
875*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-31875*I*Pi*b*e^3*r^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+515625*I*Pi*b*d^2*e*r*csgn(I*c*x^n)^3*x^
r+72*b*d^3*n*r^6+1320*b*d^3*n*r^5+9650*b*d^3*n*r^4-2700*I*Pi*b*d^2*e*r^5*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x^r+440625*I*Pi*b*d^2*e*r^2*csgn(I*c*x^n)^3*x^r+2
1375*I*Pi*b*d*e^2*r^4*csgn(I*c*x^n)^3*(x^r)^2+36000*I*Pi*b*d^2*e*r^4*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+138750*b*d^2*e*n*r^2*x^r+150000*b*d*e^2*n
r(x^r)^2+187500*b*d^2*e*n*r*x^r+1350*b*d*e^2*n*r^4*(x^r)^2+18000*b*d*e^2*
n*r^3*(x^r)^2+5400*b*d^2*e*n*r^4*x^r+5000*I*Pi*b*e^3*r^4*csgn(I*c*x^n)^3*(x
^r)^3-180000*a*d^3*r^3-362500*a*d^3*r^2-375000*a*d^3*r+234375*I*Pi*b*d^2*e*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-360*ln(c)*b*d^3*r^6-6600*ln(c)*b*d^
3*r^5-48250*ln(c)*b*d^3*r^4-180000*ln(c)*b*d^3*r^3-362500*ln(c)*b*d^3*r^2-3
75000*ln(c)*b*d^3*r+31250*b*d^3*n-600*a*e^3*r^5*(x^r)^3-10000*a*e^3*r^4*(x^
r)^3-156250*ln(c)*b*e^3*(x^r)^3+31250*b*e^3*n*(x^r)^3-63750*a*e^3*r^3*(x^r)
^3-156250*d^3*b*ln(c)+36000*b*d^3*n*r^3+72500*b*d^3*n*r^2+75000*b*d^3*n*r+1
6250*b*e^3*n*r^2*(x^r)^3+37500*b*e^3*n*r*(x^r)^3+93750*b*d*e^2*n*(x^r)^2+93
750*b*d^2*e*n*x^r-468750*ln(c)*b*d^2*e*x^r-515625*I*Pi*b*d^2*e*r*csgn(I*c)*
csgn(I*c*x^n)^2*x^r-90000*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2-193750*a
*e^3*r^2*(x^r)^3-281250*a*e^3*r*(x^r)^3-78125*I*Pi*b*e^3*csgn(I*x^n)*csgn(I
*c*x^n)^2*(x^r)^3-181250*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2-181250*I*
Pi*b*d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-468750*ln(c)*b*d*e^2*(x^r)^2-63750
*ln(c)*b*e^3*r^3*(x^r)^3-193750*ln(c)*b*e^3*r^2*(x^r)^3-281250*ln(c)*b*e^3*
r*(x^r)^3-600*ln(c)*b*e^3*r^5*(x^r)^3-10000*ln(c)*b*e^3*r^4*(x^r)^3+200*b*e
^3*n*r^4*(x^r)^3+3000*b*e^3*n*r^3*(x^r)^3-2700*a*d*e^2*r^5*(x^r)^2-42750*a*
d*e^2*r^4*(x^r)^2-5400*a*d^2*e*r^5*x^r-72000*a*d^2*e*r^4*x^r-180*I*Pi*b*d^3
*r^6*csgn(I*x^n)*csgn(I*c*x^n)^2-3300*I*Pi*b*d^3*r^5*csgn(I*c)*csgn(I*c*x^n
)^2-96875*I*Pi*b*e^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+356250*I*Pi*b*
d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-1350*I*Pi*b*d*e^2*r^5*csgn(I*x^n)*csgn(I*
c*x^n)^2*(x^r)^2+78125*I*Pi*b*d^3*csgn(I*c*x^n)^3+3300*I*Pi*b*d^3*r^5*csgn(
I*c*x^n)^3+31875*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3
+82500*b*d*e^2*n*r^2*(x^r)^2-5400*ln(c)*b*d^2*e*r^5*x^r-5000*I*Pi*b*e^3*r^4
*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-127500*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn
(I*c*x^n)^2*(x^r)^2+140625*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*(x^r)^3-78125*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2-78125*I*Pi*b*d^3*csgn(I
*x^n)*csgn(I*c*x^n)^2-21375*I*Pi*b*d*e^2*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x
^r)^2+2700*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+356250*
I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+440625*I*Pi*b*

```
d^2*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+96875*I*Pi*b*e^3*r^2*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+300*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)*(x^r)^3-300*I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*
(x^r)^3+180*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+24125*I*Pi*b
*d^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-234375*I*Pi*b*d^2*e*csgn(I*x^n
)*csgn(I*c*x^n)^2*x^r-515625*I*Pi*b*d^2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r
+36000*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r-2700*I*Pi*b*d^2*e*r^5*csgn(I*c)
*csgn(I*c*x^n)^2*x^r-42750*ln(c)*b*d*e^2*r^4*(x^r)^2-363750*ln(c)*b*d^2*e*r
^3*x^r-881250*ln(c)*b*d^2*e*r^2*x^r-1031250*ln(c)*b*d^2*e*r*x^r-255000*ln(c
)*b*d*e^2*r^3*(x^r)^2+468750*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*(x^r)^2+515625*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+
21375*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+24125*I*
Pi*b*d^3*r^4*csgn(I*c*x^n)^3+90000*I*Pi*b*d^3*r^3*csgn(I*c*x^n)^3-1350*I*Pi
*b*d*e^2*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+3300*I*Pi*b*d^3*r^5*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)-234375*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(
x^r)^2-234375*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-356250*I*Pi*
b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-181875*I*Pi*b*d^2*e*r^3*csg
n(I*x^n)*csgn(I*c*x^n)^2*x^r+468750*I*Pi*b*d*e^...
```

Maxima [A]
time = 0.29, size = 228, normalized size = 1.51

$$-\frac{1}{25}\,bd^3nx^5+\frac{1}{5}\,bd^3x^5\log\left(cx^n\right)+\frac{1}{5}\,ad^3x^5+\frac{be^3x^{3\,r+5}\log\left(cx^n\right)}{3\,r+5}+\frac{3\,bde^2x^{2\,r+5}\log\left(cx^n\right)}{2\,r+5}+\frac{3\,bd^2ex^{r+5}\log\left(cx^n\right)}{r+5}-\frac{be^3nx^{3\,r+5}}{(3\,r+5)^2}+\frac{ae^3x^{3\,r+5}}{3\,r+5}-\frac{3\,bde^2nx^{2\,r+5}}{(2\,r+5)^2}+\frac{3\,ade^2x^{2\,r+5}}{2\,r+5}-\frac{3\,bd^2enx^{r+5}}{(r+5)^2}+\frac{3\,ad^2ex^{r+5}}{r+5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/25*b*d^3*n*x^5 + 1/5*b*d^3*x^5*log(c*x^n) + 1/5*a*d^3*x^5 + b*e^3*x^(3*r
 + 5)*log(c*x^n)/(3*r + 5) + 3*b*d*e^2*x^(2*r + 5)*log(c*x^n)/(2*r + 5) + 3
*b*d^2*e*x^(r + 5)*log(c*x^n)/(r + 5) - b*e^3*n*x^(3*r + 5)/(3*r + 5)^2 + a
*e^3*x^(3*r + 5)/(3*r + 5) - 3*b*d*e^2*n*x^(2*r + 5)/(2*r + 5)^2 + 3*a*d*e^
2*x^(2*r + 5)/(2*r + 5) - 3*b*d^2*e*n*x^(r + 5)/(r + 5)^2 + 3*a*d^2*e*x^(r
+ 5)/(r + 5)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 880 vs. 2(145) = 290.
time = 0.37, size = 880, normalized size = 5.83

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/25*(5*(36*b*d^3*r^6 + 660*b*d^3*r^5 + 4825*b*d^3*r^4 + 18000*b*d^3*r^3 +
36250*b*d^3*r^2 + 37500*b*d^3*r + 15625*b*d^3)*x^5*log(c) + 5*(36*b*d^3*n*r
^6 + 660*b*d^3*n*r^5 + 4825*b*d^3*n*r^4 + 18000*b*d^3*n*r^3 + 36250*b*d^3*n
```

```
*r^2 + 37500*b*d^3*n*r + 15625*b*d^3*n)*x^5*log(x) - (36*(b*d^3*n - 5*a*d^3
)*r^6 + 660*(b*d^3*n - 5*a*d^3)*r^5 + 15625*b*d^3*n + 4825*(b*d^3*n - 5*a*d
^3)*r^4 - 78125*a*d^3 + 18000*(b*d^3*n - 5*a*d^3)*r^3 + 36250*(b*d^3*n - 5*
a*d^3)*r^2 + 37500*(b*d^3*n - 5*a*d^3)*r)*x^5 + 25*((12*b*r^5 + 200*b*r^4 +
 1275*b*r^3 + 3875*b*r^2 + 5625*b*r + 3125*b)*x^5*e^3*log(c) + (12*b*n*r^5
+ 200*b*n*r^4 + 1275*b*n*r^3 + 3875*b*n*r^2 + 5625*b*n*r + 3125*b*n)*x^5*e^
3*log(x) + (12*a*r^5 - 4*(b*n - 50*a)*r^4 - 15*(4*b*n - 85*a)*r^3 - 25*(13*
b*n - 155*a)*r^2 - 625*b*n - 375*(2*b*n - 15*a)*r + 3125*a)*x^5*e^3)*x^(3*r
) + 75*((18*b*d*r^5 + 285*b*d*r^4 + 1700*b*d*r^3 + 4750*b*d*r^2 + 6250*b*d*
r + 3125*b*d)*x^5*e^2*log(c) + (18*b*d*n*r^5 + 285*b*d*n*r^4 + 1700*b*d*n*r
^3 + 4750*b*d*n*r^2 + 6250*b*d*n*r + 3125*b*d*n)*x^5*e^2*log(x) + (18*a*d*r
^5 - 3*(3*b*d*n - 95*a*d)*r^4 - 20*(6*b*d*n - 85*a*d)*r^3 - 625*b*d*n - 50*
(11*b*d*n - 95*a*d)*r^2 + 3125*a*d - 250*(4*b*d*n - 25*a*d)*r)*x^5*e^2)*x^(
2*r) + 75*((36*b*d^2*r^5 + 480*b*d^2*r^4 + 2425*b*d^2*r^3 + 5875*b*d^2*r^2
+ 6875*b*d^2*r + 3125*b*d^2)*x^5*e*log(c) + (36*b*d^2*n*r^5 + 480*b*d^2*n*r
^4 + 2425*b*d^2*n*r^3 + 5875*b*d^2*n*r^2 + 6875*b*d^2*n*r + 3125*b*d^2*n)*x
^5*e*log(x) + (36*a*d^2*r^5 - 12*(3*b*d^2*n - 40*a*d^2)*r^4 - 625*b*d^2*n -
 25*(12*b*d^2*n - 97*a*d^2)*r^3 + 3125*a*d^2 - 25*(37*b*d^2*n - 235*a*d^2)*
r^2 - 625*(2*b*d^2*n - 11*a*d^2)*r)*x^5*e)*x^r)/(36*r^6 + 660*r^5 + 4825*r^
4 + 18000*r^3 + 36250*r^2 + 37500*r + 15625)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Timed out
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1588 vs. 2(145) = 290.
time = 1.88, size = 1588, normalized size = 10.52

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/25*(180*b*d^3*n*r^6*x^5*log(x) + 2700*b*d^2*n*r^5*x^5*x^r*e*log(x) - 36*b
*d^3*n*r^6*x^5 + 180*b*d^3*r^6*x^5*log(c) + 2700*b*d^2*r^5*x^5*x^r*e*log(c)
 + 3300*b*d^3*n*r^5*x^5*log(x) + 1350*b*d*n*r^5*x^5*x^(2*r)*e^2*log(x) + 36
000*b*d^2*n*r^4*x^5*x^r*e*log(x) - 660*b*d^3*n*r^5*x^5 + 180*a*d^3*r^6*x^5
- 2700*b*d^2*n*r^4*x^5*x^r*e + 2700*a*d^2*r^5*x^5*x^r*e + 3300*b*d^3*r^5*x^
5*log(c) + 1350*b*d*r^5*x^5*x^(2*r)*e^2*log(c) + 36000*b*d^2*r^4*x^5*x^r*e*
```

```
log(c) + 24125*b*d^3*n*r^4*x^5*log(x) + 300*b*n*r^5*x^5*x^(3*r)*e^3*log(x)
+ 21375*b*d*n*r^4*x^5*x^(2*r)*e^2*log(x) + 181875*b*d^2*n*r^3*x^5*x^r*e*log
(x) - 4825*b*d^3*n*r^4*x^5 + 3300*a*d^3*r^5*x^5 - 675*b*d*n*r^4*x^5*x^(2*r)
*e^2 + 1350*a*d*r^5*x^5*x^(2*r)*e^2 - 22500*b*d^2*n*r^3*x^5*x^r*e + 36000*a
*d^2*r^4*x^5*x^r*e + 24125*b*d^3*r^4*x^5*log(c) + 300*b*r^5*x^5*x^(3*r)*e^3
*log(c) + 21375*b*d*r^4*x^5*x^(2*r)*e^2*log(c) + 181875*b*d^2*r^3*x^5*x^r*e
*log(c) + 90000*b*d^3*n*r^3*x^5*log(x) + 5000*b*n*r^4*x^5*x^(3*r)*e^3*log(x
) + 127500*b*d*n*r^3*x^5*x^(2*r)*e^2*log(x) + 440625*b*d^2*n*r^2*x^5*x^r*e*
log(x) - 18000*b*d^3*n*r^3*x^5 + 24125*a*d^3*r^4*x^5 - 100*b*n*r^4*x^5*x^(3
*r)*e^3 + 300*a*r^5*x^5*x^(3*r)*e^3 - 9000*b*d*n*r^3*x^5*x^(2*r)*e^2 + 2137
5*a*d*r^4*x^5*x^(2*r)*e^2 - 69375*b*d^2*n*r^2*x^5*x^r*e + 181875*a*d^2*r^3*
x^5*x^r*e + 90000*b*d^3*r^3*x^5*log(c) + 5000*b*r^4*x^5*x^(3*r)*e^3*log(c)
+ 127500*b*d*r^3*x^5*x^(2*r)*e^2*log(c) + 440625*b*d^2*r^2*x^5*x^r*e*log(c)
 + 181250*b*d^3*n*r^2*x^5*log(x) + 31875*b*n*r^3*x^5*x^(3*r)*e^3*log(x) + 3
56250*b*d*n*r^2*x^5*x^(2*r)*e^2*log(x) + 515625*b*d^2*n*r*x^5*x^r*e*log(x)
- 36250*b*d^3*n*r^2*x^5 + 90000*a*d^3*r^3*x^5 - 1500*b*n*r^3*x^5*x^(3*r)*e^
3 + 5000*a*r^4*x^5*x^(3*r)*e^3 - 41250*b*d*n*r^2*x^5*x^(2*r)*e^2 + 127500*a
*d*r^3*x^5*x^(2*r)*e^2 - 93750*b*d^2*n*r*x^5*x^r*e + 440625*a*d^2*r^2*x^5*x
^r*e + 181250*b*d^3*r^2*x^5*log(c) + 31875*b*r^3*x^5*x^(3*r)*e^3*log(c) + 3
56250*b*d*r^2*x^5*x^(2*r)*e^2*log(c) + 515625*b*d^2*r*x^5*x^r*e*log(c) + 18
7500*b*d^3*n*r*x^5*log(x) + 96875*b*n*r^2*x^5*x^(3*r)*e^3*log(x) + 468750*b
*d*n*r*x^5*x^(2*r)*e^2*log(x) + 234375*b*d^2*n*x^5*x^r*e*log(x) - 37500*b*d
^3*n*r*x^5 + 181250*a*d^3*r^2*x^5 - 8125*b*n*r^2*x^5*x^(3*r)*e^3 + 31875*a*
r^3*x^5*x^(3*r)*e^3 - 75000*b*d*n*r*x^5*x^(2*r)*e^2 + 356250*a*d*r^2*x^5*x^
(2*r)*e^2 - 46875*b*d^2*n*x^5*x^r*e + 515625*a*d^2*r*x^5*x^r*e + 187500*b*d
^3*r*x^5*log(c) + 96875*b*r^2*x^5*x^(3*r)*e^3*log(c) + 468750*b*d*r*x^5*x^(
2*r)*e^2*log(c) + 234375*b*d^2*x^5*x^r*e*log(c) + 78125*b*d^3*n*x^5*log(x)
+ 140625*b*n*r*x^5*x^(3*r)*e^3*log(x) + 234375*b*d*n*x^5*x^(2*r)*e^2*log(x)
 - 15625*b*d^3*n*x^5 + 187500*a*d^3*r*x^5 - 18750*b*n*r*x^5*x^(3*r)*e^3 + 9
6875*a*r^2*x^5*x^(3*r)*e^3 - 46875*b*d*n*x^5*x^(2*r)*e^2 + 468750*a*d*r*x^5
*x^(2*r)*e^2 + 234375*a*d^2*x^5*x^r*e + 78125*b*d^3*x^5*log(c) + 140625*b*r
*x^5*x^(3*r)*e^3*log(c) + 234375*b*d*x^5*x^(2*r)*e^2*log(c) + 78125*b*n*x^5
*x^(3*r)*e^3*log(x) + 78125*a*d^3*x^5 - 15625*b*n*x^5*x^(3*r)*e^3 + 140625*
a*r*x^5*x^(3*r)*e^3 + 234375*a*d*x^5*x^(2*r)*e^2 + 78125*b*x^5*x^(3*r)*e^3*
log(c) + 78125*a*x^5*x^(3*r)*e^3)/(36*r^6 + 660*r^5 + 4825*r^4 + 18000*r^3
+ 36250*r^2 + 37500*r + 15625)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int x^4 \left(d+e\,x^r\right)^3 \left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
[Out] int(x^4*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.399 $\int x^2(d+ex^r)^3\,(a+b\log(cx^n))\;dx$

Optimal. Leaf size=148

$$-\frac{1}{9}bd^3nx^3-\frac{be^3nx^{3(1+r)}}{9(1+r)^2}-\frac{3bd^2enx^{3+r}}{(3+r)^2}-\frac{3bde^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^3x^3+\frac{e^3x^{3(1+r)}}{1+r}+\frac{9d^2ex^{3+r}}{3+r}+\frac{9de^2x^{3+2r}}{3+2r}\right)(a+b\log$$

```
[Out] -1/9*b*d^3*n*x^3-1/9*b*e^3*n*x^(3+3*r)/(1+r)^2-3*b*d^2*e*n*x^(3+r)/(3+r)^2-
3*b*d*e^2*n*x^(3+2*r)/(3+2*r)^2+1/3*(d^3*x^3+e^3*x^(3+3*r)/(1+r)+9*d^2*e*x^
(3+r)/(3+r)+9*d*e^2*x^(3+2*r)/(3+2*r))*(a+b*ln(c*x^n))
```

Rubi [A]

time = 0.26, antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2371, 12, 14}

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{9}bd^3nx^3-\frac{3bd^2enx^{r+3}}{(r+3)^2}-\frac{3bde^2nx^{2r+3}}{(2r+3)^2}-\frac{be^3nx^{3(r+1)}}{9(r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -1/9*(b*d^3*n*x^3) - (b*e^3*n*x^(3*(1 + r)))/(9*(1 + r)^2) - (3*b*d^2*e*n*x
^(3 + r))/(3 + r)^2 - (3*b*d*e^2*n*x^(3 + 2*r))/(3 + 2*r)^2 + ((d^3*x^3 + (
e^3*x^(3*(1 + r)))/(1 + r) + (9*d^2*e*x^(3 + r))/(3 + r) + (9*d*e^2*x^(3 +
2*r))/(3 + 2*r))*(a + b*Log[c*x^n]))/3
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] && !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2371

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
```

```
 + b*Log[c*x^n]), x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /;
FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

Rubi steps

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx = \frac{1}{3}\left(d^3x^3+\frac{e^3x^{3(1+r)}}{1+r}+\frac{9d^2ex^{3+r}}{3+r}+\frac{9de^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n)) - (b$$
$$= \frac{1}{3}\left(d^3x^3+\frac{e^3x^{3(1+r)}}{1+r}+\frac{9d^2ex^{3+r}}{3+r}+\frac{9de^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n)) - \frac{1}{3}($$
$$= \frac{1}{3}\left(d^3x^3+\frac{e^3x^{3(1+r)}}{1+r}+\frac{9d^2ex^{3+r}}{3+r}+\frac{9de^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n)) - \frac{1}{3}($$
$$= -\frac{1}{9}bd^3nx^3-\frac{be^3nx^{3(1+r)}}{9(1+r)^2}-\frac{3bd^2enx^{3+r}}{(3+r)^2}-\frac{3bde^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^3x^3+\right.$$

Mathematica [A]
time = 0.16, size = 159, normalized size = 1.07

$$\frac{1}{9}x^3\left(3bd^3n\log(x)+d^3(3a-bn-3bn\log(x)+3b\log(cx^n))+\frac{e^3x^{3r}(-bn+3a(1+r)+3b(1+r)\log(cx^n))}{(1+r)^2}+\frac{27d^2ex^r(-bn+a(3+r)+b(3+r)\log(cx^n))}{(3+r)^2}+\frac{27de^2x^{2r}(-bn+a(3+2r)+b(3+2r)\log(cx^n))}{(3+2r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (x^3*(3*b*d^3*n*Log[x] + d^3*(3*a - b*n - 3*b*n*Log[x] + 3*b*Log[c*x^n]) +
(e^3*x^(3*r)*(-(b*n) + 3*a*(1 + r) + 3*b*(1 + r)*Log[c*x^n]))/(1 + r)^2 + (
27*d^2*e*x^r*(-(b*n) + a*(3 + r) + b*(3 + r)*Log[c*x^n]))/(3 + r)^2 + (27*d
*e^2*x^(2*r)*(-(b*n) + a*(3 + 2*r) + b*(3 + 2*r)*Log[c*x^n]))/(3 + 2*r)^2))
/9
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.28, size = 4027, normalized size = 27.21

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*x^3*b*(2*e^3*r^2*(x^r)^3+9*d*e^2*r^2*(x^r)^2+9*e^3*r*(x^r)^3+2*d^3*r^3+
18*d^2*e*r^2*x^r+36*d*e^2*r*(x^r)^2+9*e^3*(x^r)^3+11*d^3*r^2+45*d^2*e*r*x^r
+27*d*e^2*(x^r)^2+18*d^3*r+27*d^2*e*x^r+9*d^3)/(1+r)/(3+2*r)/(3+r)*ln(x^n)-
1/18*x^3*(-486*e^3*(x^r)^3*a-1458*d^2*e*x^r*a-1458*d*e^2*(x^r)^2*a-864*I*Pi
```

*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^2*x^r+132*I*Pi*b*d^3*r^5*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)-729*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-7
29*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+2430*I*Pi*b*d*e^2*r*csg
n(I*c*x^n)^3*(x^r)^2-2673*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+729*
I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+1080*b*d^2*e*n*r^3
*x^r-6156*ln(c)*b*d*e^2*r^2*(x^r)^2-4860*ln(c)*b*d*e^2*r*(x^r)^2-24*a*d^3*r
^6-264*a*d^3*r^5-1158*a*d^3*r^4-2619*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^
n)^2*x^r+837*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-12*
I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-837*I*Pi*b*e^3*r^2*csgn(
I*c)*csgn(I*c*x^n)^2*(x^r)^3-459*I*Pi*b*e^3*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2
*(x^r)^3+3807*I*Pi*b*d^2*e*r^2*csgn(I*c*x^n)^3*x^r+243*I*Pi*b*e^3*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-486*a*d^3-3672*a*d*e^2*r^3*(x^r)^2-6156*
a*d*e^2*r^2*(x^r)^2-4860*a*d*e^2*r*(x^r)^2-5238*a*d^2*e*r^3*x^r-7614*a*d^2*
e*r^2*x^r-5346*a*d^2*e*r*x^r-12*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x
^r)^3+54*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^2+8*b*d^3*n*r^6+88*b*d^3*n*
r^5+386*b*d^3*n*r^4+2673*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*x^r+2619*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+1998*b*d
^2*e*n*r^2*x^r+1296*b*d*e^2*n*r*(x^r)^2+1620*b*d^2*e*n*r*x^r+54*b*d*e^2*n*r
^4*(x^r)^2+432*b*d*e^2*n*r^3*(x^r)^2+216*b*d^2*e*n*r^4*x^r-2592*a*d^3*r^3-3
132*a*d^3*r^2-1944*a*d^3*r-24*ln(c)*b*d^3*r^6-264*ln(c)*b*d^3*r^5-1158*ln(c
)*b*d^3*r^4-2592*ln(c)*b*d^3*r^3-3132*ln(c)*b*d^3*r^2-1944*ln(c)*b*d^3*r+16
2*b*d^3*n-24*a*e^3*r^5*(x^r)^3-240*a*e^3*r^4*(x^r)^3-486*ln(c)*b*e^3*(x^r)^
3+162*b*e^3*n*(x^r)^3-918*a*e^3*r^3*(x^r)^3-486*d^3*b*ln(c)+243*I*Pi*b*d^3*
csgn(I*c*x^n)^3+864*b*d^3*n*r^3+1044*b*d^3*n*r^2+648*b*d^3*n*r+234*b*e^3*n*
r^2*(x^r)^3+324*b*e^3*n*r*(x^r)^3+486*b*d*e^2*n*(x^r)^2+486*b*d^2*e*n*x^r-1
458*ln(c)*b*d^2*e*x^r-3078*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)
^2-1674*a*e^3*r^2*(x^r)^3-1458*a*e^3*r*(x^r)^3-243*I*Pi*b*e^3*csgn(I*c)*csg
n(I*c*x^n)^2*(x^r)^3-243*I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-156
6*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2+108*I*Pi*b*d^2*e*r^5*csgn(I*c*x^
n)^3*x^r-1458*ln(c)*b*d*e^2*(x^r)^2-918*ln(c)*b*e^3*r^3*(x^r)^3-1674*ln(c)*
b*e^3*r^2*(x^r)^3-1458*ln(c)*b*e^3*r*(x^r)^3-24*ln(c)*b*e^3*r^5*(x^r)^3-240
*ln(c)*b*e^3*r^4*(x^r)^3+8*b*e^3*n*r^4*(x^r)^3+72*b*e^3*n*r^3*(x^r)^3-108*a
*d*e^2*r^5*(x^r)^2-1026*a*d*e^2*r^4*(x^r)^2-216*a*d^2*e*r^5*x^r-1728*a*d^2*
e*r^4*x^r-1566*I*Pi*b*d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+513*I*Pi*b*d*e^2*
r^4*csgn(I*c*x^n)^3*(x^r)^2+864*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r+513*I*
Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+864*I*Pi*b*d^2*e
*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+12*I*Pi*b*e^3*r^5*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-3807*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^
n)^2*x^r-3807*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-2673*I*Pi*b*
d^2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+1188*b*d*e^2*n*r^2*(x^r)^2-216*ln(c
)*b*d^2*e*r^5*x^r-243*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2-243*I*Pi*b*d^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2+132*I*Pi*b*d^3*r^5*csgn(I*c*x^n)^3+1296*I*Pi*b*d
^3*r^3*csgn(I*c*x^n)^3+1566*I*Pi*b*d^3*r^2*csgn(I*c*x^n)^3+729*I*Pi*b*e^3*r
*csgn(I*c*x^n)^3*(x^r)^3+729*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2+729*I*Pi*
b*d^2*e*csgn(I*c*x^n)^3*x^r+12*I*Pi*b*e^3*r^5*csgn(I*c*x^n)^3*(x^r)^3+108*I

```
*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+579*I*Pi*b*d^3*r^4*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-120*I*Pi*b*e^3*r^4*csgn(I*c)*csgn(I*c*x
^n)^2*(x^r)^3+2619*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r-729*I*Pi*b*e^3*r*cs
gn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-459*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^
2*(x^r)^3+729*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-2619*I*P
i*b*d^2*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+459*I*Pi*b*e^3*r^3*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+2673*I*Pi*b*d^2*e*r*csgn(I*c*x^n)^3*x^r-1
026*ln(c)*b*d*e^2*r^4*(x^r)^2-5238*ln(c)*b*d^2*e*r^3*x^r-7614*ln(c)*b*d^2*e
*r^2*x^r-5346*ln(c)*b*d^2*e*r*x^r-3672*ln(c)*b*d*e^2*r^3*(x^r)^2+3078*I*Pi*
b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+3807*I*Pi*b*d^2*e*r
^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+2430*I*Pi*b*d*e^2*r*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+579*I*Pi*b*d^3*r^4*csgn(I*c*x^n)^3-2430*I*P
i*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-2430*I*Pi*b*d*e^2*r*csgn(I*x^
n)*csgn(I*c*x^n)^2*(x^r)^2+1836*I*Pi*b*d*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2-83
7*I*Pi*b*e^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+3078*I*Pi*b*d*e^2*r^2*
csgn(I*c*x^n)^3*(x^r)^2-120*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r
)^3-729*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-1836*I*Pi*b*d*e^2*r^3*cs
gn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-1296*I*Pi*b*d^3...
```

Maxima [A]
time = 0.28, size = 224, normalized size = 1.51

$$-\frac{1}{9}\,bd^3nx^3+\frac{1}{3}\,bd^3x^3\log\left(cx^n\right)+\frac{1}{3}\,ad^3x^3+\frac{be^3x^{3\,r+3}\log\left(cx^n\right)}{3\,(r+1)}+\frac{3\,bde^2x^{2\,r+3}\log\left(cx^n\right)}{2\,r+3}+\frac{3\,bd^2ex^{r+3}\log\left(cx^n\right)}{r+3}-\frac{be^3nx^{3\,r+3}}{9\,(r+1)^2}+\frac{ae^3x^{3\,r+3}}{3\,(r+1)}-\frac{3\,bde^2nx^{2\,r+3}}{(2\,r+3)^2}+\frac{3\,ade^2x^{2\,r+3}}{2\,r+3}-\frac{3\,bd^2enx^{r+3}}{(r+3)^2}+\frac{3\,ad^2ex^{r+3}}{r+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -1/9*b*d^3*n*x^3 + 1/3*b*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3 + 1/3*b*e^3*x^(
3*r + 3)*log(c*x^n)/(r + 1) + 3*b*d*e^2*x^(2*r + 3)*log(c*x^n)/(2*r + 3) +
3*b*d^2*e*x^(r + 3)*log(c*x^n)/(r + 3) - 1/9*b*e^3*n*x^(3*r + 3)/(r + 1)^2
+ 1/3*a*e^3*x^(3*r + 3)/(r + 1) - 3*b*d*e^2*n*x^(2*r + 3)/(2*r + 3)^2 + 3*a
*d*e^2*x^(2*r + 3)/(2*r + 3) - 3*b*d^2*e*n*x^(r + 3)/(r + 3)^2 + 3*a*d^2*e*
x^(r + 3)/(r + 3)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 879 vs. $2(140) = 280$.
time = 0.37, size = 879, normalized size = 5.94

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 1/9*(3*(4*b*d^3*r^6 + 44*b*d^3*r^5 + 193*b*d^3*r^4 + 432*b*d^3*r^3 + 522*b*
d^3*r^2 + 324*b*d^3*r + 81*b*d^3)*x^3*log(c) + 3*(4*b*d^3*n*r^6 + 44*b*d^3*
n*r^5 + 193*b*d^3*n*r^4 + 432*b*d^3*n*r^3 + 522*b*d^3*n*r^2 + 324*b*d^3*n*r
```

```
 + 81*b*d^3*n)*x^3*log(x) - (4*(b*d^3*n - 3*a*d^3)*r^6 + 44*(b*d^3*n - 3*a*
d^3)*r^5 + 81*b*d^3*n + 193*(b*d^3*n - 3*a*d^3)*r^4 - 243*a*d^3 + 432*(b*d^
3*n - 3*a*d^3)*r^3 + 522*(b*d^3*n - 3*a*d^3)*r^2 + 324*(b*d^3*n - 3*a*d^3)*
r)*x^3 + (3*(4*b*r^5 + 40*b*r^4 + 153*b*r^3 + 279*b*r^2 + 243*b*r + 81*b)*x
^3*e^3*log(c) + 3*(4*b*n*r^5 + 40*b*n*r^4 + 153*b*n*r^3 + 279*b*n*r^2 + 243
*b*n*r + 81*b*n)*x^3*e^3*log(x) + (12*a*r^5 - 4*(b*n - 30*a)*r^4 - 9*(4*b*n
 - 51*a)*r^3 - 9*(13*b*n - 93*a)*r^2 - 81*b*n - 81*(2*b*n - 9*a)*r + 243*a)
*x^3*e^3)*x^(3*r) + 27*((2*b*d*r^5 + 19*b*d*r^4 + 68*b*d*r^3 + 114*b*d*r^2
+ 90*b*d*r + 27*b*d)*x^3*e^2*log(c) + (2*b*d*n*r^5 + 19*b*d*n*r^4 + 68*b*d*
n*r^3 + 114*b*d*n*r^2 + 90*b*d*n*r + 27*b*d*n)*x^3*e^2*log(x) + (2*a*d*r^5
- (b*d*n - 19*a*d)*r^4 - 4*(2*b*d*n - 17*a*d)*r^3 - 9*b*d*n - 2*(11*b*d*n -
 57*a*d)*r^2 + 27*a*d - 6*(4*b*d*n - 15*a*d)*r)*x^3*e^2)*x^(2*r) + 27*((4*b
*d^2*r^5 + 32*b*d^2*r^4 + 97*b*d^2*r^3 + 141*b*d^2*r^2 + 99*b*d^2*r + 27*b*
d^2)*x^3*e*log(c) + (4*b*d^2*n*r^5 + 32*b*d^2*n*r^4 + 97*b*d^2*n*r^3 + 141*
b*d^2*n*r^2 + 99*b*d^2*n*r + 27*b*d^2*n)*x^3*e*log(x) + (4*a*d^2*r^5 - 4*(b
*d^2*n - 8*a*d^2)*r^4 - 9*b*d^2*n - (20*b*d^2*n - 97*a*d^2)*r^3 + 27*a*d^2
- (37*b*d^2*n - 141*a*d^2)*r^2 - 3*(10*b*d^2*n - 33*a*d^2)*r)*x^3*e)*x^r)/(
4*r^6 + 44*r^5 + 193*r^4 + 432*r^3 + 522*r^2 + 324*r + 81)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 5986 deep
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 1588 vs. 2(140) = 280.
time = 3.26, size = 1588, normalized size = 10.73

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 1/9*(12*b*d^3*n*r^6*x^3*log(x) + 108*b*d^2*n*r^5*x^3*x^r*e*log(x) - 4*b*d^3
*n*r^6*x^3 + 12*b*d^3*r^6*x^3*log(c) + 108*b*d^2*r^5*x^3*x^r*e*log(c) + 132
*b*d^3*n*r^5*x^3*log(x) + 54*b*d*n*r^5*x^3*x^(2*r)*e^2*log(x) + 864*b*d^2*n
*r^4*x^3*x^r*e*log(x) - 44*b*d^3*n*r^5*x^3 + 12*a*d^3*r^6*x^3 - 108*b*d^2*n
*r^4*x^3*x^r*e + 108*a*d^2*r^5*x^3*x^r*e + 132*b*d^3*r^5*x^3*log(c) + 54*b*
d*r^5*x^3*x^(2*r)*e^2*log(c) + 864*b*d^2*r^4*x^3*x^r*e*log(c) + 579*b*d^3*n
*r^4*x^3*log(x) + 12*b*n*r^5*x^3*x^(3*r)*e^3*log(x) + 513*b*d*n*r^4*x^3*x^(
2*r)*e^2*log(x) + 2619*b*d^2*n*r^3*x^3*x^r*e*log(x) - 193*b*d^3*n*r^4*x^3 +
```

```
 132*a*d^3*r^5*x^3 - 27*b*d*n*r^4*x^3*x^(2*r)*e^2 + 54*a*d*r^5*x^3*x^(2*r)*
e^2 - 540*b*d^2*n*r^3*x^3*x^r*e + 864*a*d^2*r^4*x^3*x^r*e + 579*b*d^3*r^4*x
^3*log(c) + 12*b*r^5*x^3*x^(3*r)*e^3*log(c) + 513*b*d*r^4*x^3*x^(2*r)*e^2*l
og(c) + 2619*b*d^2*r^3*x^3*x^r*e*log(c) + 1296*b*d^3*n*r^3*x^3*log(x) + 120
*b*n*r^4*x^3*x^(3*r)*e^3*log(x) + 1836*b*d*n*r^3*x^3*x^(2*r)*e^2*log(x) + 3
807*b*d^2*n*r^2*x^3*x^r*e*log(x) - 432*b*d^3*n*r^3*x^3 + 579*a*d^3*r^4*x^3
 - 4*b*n*r^4*x^3*x^(3*r)*e^3 + 12*a*r^5*x^3*x^(3*r)*e^3 - 216*b*d*n*r^3*x^3*
x^(2*r)*e^2 + 513*a*d*r^4*x^3*x^(2*r)*e^2 - 999*b*d^2*n*r^2*x^3*x^r*e + 261
9*a*d^2*r^3*x^3*x^r*e + 1296*b*d^3*r^3*x^3*log(c) + 120*b*r^4*x^3*x^(3*r)*e
^3*log(c) + 1836*b*d*r^3*x^3*x^(2*r)*e^2*log(c) + 3807*b*d^2*r^2*x^3*x^r*e*
log(c) + 1566*b*d^3*n*r^2*x^3*log(x) + 459*b*n*r^3*x^3*x^(3*r)*e^3*log(x) +
 3078*b*d*n*r^2*x^3*x^(2*r)*e^2*log(x) + 2673*b*d^2*n*r*x^3*x^r*e*log(x) -
522*b*d^3*n*r^2*x^3 + 1296*a*d^3*r^3*x^3 - 36*b*n*r^3*x^3*x^(3*r)*e^3 + 120
*a*r^4*x^3*x^(3*r)*e^3 - 594*b*d*n*r^2*x^3*x^(2*r)*e^2 + 1836*a*d*r^3*x^3*x
^(2*r)*e^2 - 810*b*d^2*n*r*x^3*x^r*e + 3807*a*d^2*r^2*x^3*x^r*e + 1566*b*d^
3*r^2*x^3*log(c) + 459*b*r^3*x^3*x^(3*r)*e^3*log(c) + 3078*b*d*r^2*x^3*x^(2
*r)*e^2*log(c) + 2673*b*d^2*r*x^3*x^r*e*log(c) + 972*b*d^3*n*r*x^3*log(x) +
 837*b*n*r^2*x^3*x^(3*r)*e^3*log(x) + 2430*b*d*n*r*x^3*x^(2*r)*e^2*log(x) +
 729*b*d^2*n*x^3*x^r*e*log(x) - 324*b*d^3*n*r*x^3 + 1566*a*d^3*r^2*x^3 - 11
7*b*n*r^2*x^3*x^(3*r)*e^3 + 459*a*r^3*x^3*x^(3*r)*e^3 - 648*b*d*n*r*x^3*x^(
2*r)*e^2 + 3078*a*d*r^2*x^3*x^(2*r)*e^2 - 243*b*d^2*n*x^3*x^r*e + 2673*a*d^
2*r*x^3*x^r*e + 972*b*d^3*r*x^3*log(c) + 837*b*r^2*x^3*x^(3*r)*e^3*log(c) +
 2430*b*d*r*x^3*x^(2*r)*e^2*log(c) + 729*b*d^2*x^3*x^r*e*log(c) + 243*b*d^3
*n*x^3*log(x) + 729*b*n*r*x^3*x^(3*r)*e^3*log(x) + 729*b*d*n*x^3*x^(2*r)*e^
2*log(x) - 81*b*d^3*n*x^3 + 972*a*d^3*r*x^3 - 162*b*n*r*x^3*x^(3*r)*e^3 + 8
37*a*r^2*x^3*x^(3*r)*e^3 - 243*b*d*n*x^3*x^(2*r)*e^2 + 2430*a*d*r*x^3*x^(2*
r)*e^2 + 729*a*d^2*x^3*x^r*e + 243*b*d^3*x^3*log(c) + 729*b*r*x^3*x^(3*r)*e
^3*log(c) + 729*b*d*x^3*x^(2*r)*e^2*log(c) + 243*b*n*x^3*x^(3*r)*e^3*log(x)
 + 243*a*d^3*x^3 - 81*b*n*x^3*x^(3*r)*e^3 + 729*a*r*x^3*x^(3*r)*e^3 + 729*a
*d*x^3*x^(2*r)*e^2 + 243*b*x^3*x^(3*r)*e^3*log(c) + 243*a*x^3*x^(3*r)*e^3)/
(4*r^6 + 44*r^5 + 193*r^4 + 432*r^3 + 522*r^2 + 324*r + 81)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int x^2 \left(d+e\,x^r\right)^3 \left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
[Out] int(x^2*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.400 $\int (d+ex^r)^3 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=169

$$-bd^3nx-\frac{3bd^2enx^{1+r}}{(1+r)^2}-\frac{3bde^2nx^{1+2r}}{(1+2r)^2}-\frac{be^3nx^{1+3r}}{(1+3r)^2}+d^3x(a+b\log(cx^n))+\frac{3d^2ex^{1+r}(a+b\log(cx^n))}{1+r}+\frac{3de^2x^{1+2r}}{}$$

```
[Out] -b*d^3*n*x-3*b*d^2*e*n*x^(1+r)/(1+r)^2-3*b*d*e^2*n*x^(1+2*r)/(1+2*r)^2-b*e^
3*n*x^(1+3*r)/(1+3*r)^2+d^3*x*(a+b*ln(c*x^n))+3*d^2*e*x^(1+r)*(a+b*ln(c*x^n
))/(1+r)+3*d*e^2*x^(1+2*r)*(a+b*ln(c*x^n))/(1+2*r)+e^3*x^(1+3*r)*(a+b*ln(c*
x^n))/(1+3*r)
```

Rubi [A]
time = 0.07, antiderivative size = 169, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {250, 2350}

$$d^3x(a+b\log(cx^n))+\frac{3d^2ex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{3de^2x^{2r+1}(a+b\log(cx^n))}{2r+1}+\frac{e^3x^{3r+1}(a+b\log(cx^n))}{3r+1}-bd^3nx-\frac{3bd^2enx^{r+1}}{(r+1)^2}-\frac{3bde^2nx^{2r+1}}{(2r+1)^2}-\frac{be^3nx^{3r+1}}{(3r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] -(b*d^3*n*x) - (3*b*d^2*e*n*x^(1 + r))/(1 + r)^2 - (3*b*d*e^2*n*x^(1 + 2*r)
)/(1 + 2*r)^2 - (b*e^3*n*x^(1 + 3*r))/(1 + 3*r)^2 + d^3*x*(a + b*Log[c*x^n]
) + (3*d^2*e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 + r) + (3*d*e^2*x^(1 + 2*r)*(
a + b*Log[c*x^n]))/(1 + 2*r) + (e^3*x^(1 + 3*r)*(a + b*Log[c*x^n]))/(1 + 3*
r)
```

Rule 250

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Int[ExpandIntegrand[(a + b*
x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && IGtQ[p, 0]
```

Rule 2350

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Dist[a + b*Log[c*x^n], u
, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IGtQ[q, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex^r)^3 (a+b\log(cx^n))\,dx &= \left(d^3x+\frac{3d^2ex^{1+r}}{1+r}+\frac{3de^2x^{1+2r}}{1+2r}+\frac{e^3x^{1+3r}}{1+3r}\right)(a+b\log(cx^n))-(bn)\int \Big(\\ &= -bd^3nx-\frac{3bd^2enx^{1+r}}{(1+r)^2}-\frac{3bde^2nx^{1+2r}}{(1+2r)^2}-\frac{be^3nx^{1+3r}}{(1+3r)^2}+\Big(d^3x+\frac{3d^2ex^{1+r}}{1+r}\end{aligned}$$

Mathematica [A]
time = 0.14, size = 149, normalized size = 0.88

$$x\left(bd^3n\log(x)+d^3(a-bn-bn\log(x)+b\log(cx^n))+\frac{3d^2ex^r(a-bn+ar+b(1+r)\log(cx^n))}{(1+r)^2}+\frac{3de^2x^{2r}(a-bn+2ar+(b+2br)\log(cx^n))}{(1+2r)^2}+\frac{e^3x^{3r}(a-bn+3ar+(b+3br)\log(cx^n))}{(1+3r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(b*d^3*n*Log[x] + d^3*(a - b*n - b*n*Log[x] + b*Log[c*x^n]) + (3*d^2*e*x^
r*(a - b*n + a*r + b*(1 + r)*Log[c*x^n]))/(1 + r)^2 + (3*d*e^2*x^(2*r)*(a -
 b*n + 2*a*r + (b + 2*b*r)*Log[c*x^n]))/(1 + 2*r)^2 + (e^3*x^(3*r)*(a - b*n
 + 3*a*r + (b + 3*b*r)*Log[c*x^n]))/(1 + 3*r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.27, size = 4023, normalized size = 23.80

method	result	size
risch	Expression too large to display	4023

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(2*e^3*r^2*(x^r)^3+9*d*e^2*r^2*(x^r)^2+3*e^3*r*(x^r)^3+6*d^3*r^3+18*d^2
*e*r^2*x^r+12*d*e^2*r*(x^r)^2+e^3*(x^r)^3+11*d^3*r^2+15*d^2*e*r*x^r+3*d*e^2
*(x^r)^2+6*d^3*r+3*d^2*e*x^r+d^3)/(1+3*r)/(1+2*r)/(1+r)*ln(x^n)-1/2*x*(-2*e
^3*(x^r)^3*a-6*d^2*e*x^r*a-6*d*e^2*(x^r)^2*a+132*I*Pi*b*d^3*r^5*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+360*b*d^2*e*n*r^3*x^r-228*ln(c)*b*d*e^2*r^2*(x^r)^
2-60*ln(c)*b*d*e^2*r*(x^r)^2-72*a*d^3*r^6-264*a*d^3*r^5-386*a*d^3*r^4-12*I*
Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+I*Pi*b*d^3*csgn(I*c*x^n)^3
-2*a*d^3-408*a*d*e^2*r^3*(x^r)^2-228*a*d*e^2*r^2*(x^r)^2-60*a*d*e^2*r*(x^r)
^2-582*a*d^2*e*r^3*x^r-282*a*d^2*e*r^2*x^r-66*a*d^2*e*r*x^r-291*I*Pi*b*d^2*
e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r+31*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)*(x^r)^3-12*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+
54*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*(x^r)^2+72*b*d^3*n*r^6+264*b*d^3*n*r^5+
386*b*d^3*n*r^4+222*b*d^2*e*n*r^2*x^r+48*b*d*e^2*n*r*(x^r)^2+60*b*d^2*e*n*r
*x^r+54*b*d*e^2*n*r^4*(x^r)^2+144*b*d*e^2*n*r^3*(x^r)^2+216*b*d^2*e*n*r^4*x
^r-288*a*d^3*r^3-116*a*d^3*r^2-24*a*d^3*r-33*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(
I*c*x^n)^2*x^r-72*ln(c)*b*d^3*r^6-264*ln(c)*b*d^3*r^5-386*ln(c)*b*d^3*r^4-2
88*ln(c)*b*d^3*r^3-116*ln(c)*b*d^3*r^2-24*ln(c)*b*d^3*r+2*b*d^3*n-24*a*e^3*
r^5*(x^r)^3-80*a*e^3*r^4*(x^r)^3-2*ln(c)*b*e^3*(x^r)^3+2*b*e^3*n*(x^r)^3-10
2*a*e^3*r^3*(x^r)^3-2*d^3*b*ln(c)-114*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c
*x^n)^2*(x^r)^2+288*b*d^3*n*r^3+116*b*d^3*n*r^2+24*b*d^3*n*r+26*b*e^3*n*r^2
*(x^r)^3+12*b*e^3*n*r*(x^r)^3+6*b*d*e^2*n*(x^r)^2+6*b*d^2*e*n*x^r-6*ln(c)*b
*d^2*e*x^r+288*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-204
*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+9*I*Pi*b*e^3*r*csgn(I
```

```
*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-141*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I
*c*x^n)^2*x^r-62*a*e^3*r^2*(x^r)^3-18*a*e^3*r*(x^r)^3+108*I*Pi*b*d^2*e*r^5*
csgn(I*c*x^n)^3*x^r-6*ln(c)*b*d*e^2*(x^r)^2-102*ln(c)*b*e^3*r^3*(x^r)^3-62*
ln(c)*b*e^3*r^2*(x^r)^3-18*ln(c)*b*e^3*r*(x^r)^3-24*ln(c)*b*e^3*r^5*(x^r)^3
-80*ln(c)*b*e^3*r^4*(x^r)^3+8*b*e^3*n*r^4*(x^r)^3+24*b*e^3*n*r^3*(x^r)^3-10
8*a*d*e^2*r^5*(x^r)^2-342*a*d*e^2*r^4*(x^r)^2-216*a*d^2*e*r^5*x^r-576*a*d^2
*e*r^4*x^r+204*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2
-291*I*Pi*b*d^2*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-33*I*Pi*b*d^2*e*r*csg
n(I*x^n)*csgn(I*c*x^n)^2*x^r+3*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*x^r-204*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-36*I*Pi*b*d
^3*r^6*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)*(x^r)^3+132*b*d*e^2*n*r^2*(x^r)^2-216*ln(c)*b*d^2*e*r^5*x^r+132
*I*Pi*b*d^3*r^5*csgn(I*c*x^n)^3+171*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)*(x^r)^2+9*I*Pi*b*e^3*r*csgn(I*c*x^n)^3*(x^r)^3+3*I*Pi*b*d*e^2
*csgn(I*c*x^n)^3*(x^r)^2+3*I*Pi*b*d^2*e*csgn(I*c*x^n)^3*x^r+12*I*Pi*b*e^3*r
^5*csgn(I*c*x^n)^3*(x^r)^3+108*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)*x^r+I*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-3*I*Pi*
b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-141*I*Pi*b*d^2*e*r^2*csgn(I*x^n
)*csgn(I*c*x^n)^2*x^r+51*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*(x^r)^3-30*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-12*I*Pi*b*d^3*
r*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2+288
*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r-9*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*c*x^n
)^2*(x^r)^3-9*I*Pi*b*e^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-I*Pi*b*e^3*c
sgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^
r)^3+40*I*Pi*b*e^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-171*I*Pi
*b*d*e^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-171*I*Pi*b*d*e^2*r^4*csgn(I*
x^n)*csgn(I*c*x^n)^2*(x^r)^2+144*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+58*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*I*Pi*b*d^2
*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+291*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r-3
42*ln(c)*b*d*e^2*r^4*(x^r)^2-582*ln(c)*b*d^2*e*r^3*x^r-282*ln(c)*b*d^2*e*r^
2*x^r-66*ln(c)*b*d^2*e*r*x^r-408*ln(c)*b*d*e^2*r^3*(x^r)^2+I*Pi*b*e^3*csgn(
I*c*x^n)^3*(x^r)^3+30*I*Pi*b*d*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-51*I*Pi*b*e^3*
r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-51*I*Pi*b*e^3*r^3*csgn(I*x^n)*csgn(I*
c*x^n)^2*(x^r)^3+33*I*Pi*b*d^2*e*r*csgn(I*c*x^n)^3*x^r+141*I*Pi*b*d^2*e*r^2
*csgn(I*c*x^n)^3*x^r-288*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^2*x^r-288
*I*Pi*b*d^2*e*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-193*I*Pi*b*d^3*r^4*csgn(I
*x^n)*csgn(I*c*x^n)^2+40*I*Pi*b*e^3*r^4*csgn(I*c*x^n)^3*(x^r)^3+12*I*Pi*b*d
^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+12*I*Pi*b*d^3*r*csgn(I*c*x^n)^3+20
4*I*Pi*b*d*e^2*r^3*csgn(I*c*x^n)^3*(x^r)^2-31*I*Pi*b*e^3*r^2*csgn(I*x^n)*cs
gn(I*c*x^n)^2*(x^r)^3+114*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2+193*I*Pi
*b*d^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-40*I*Pi*b*e^3*r^4*csgn(I*c)*
csgn(I*c*x^n)^2*(x^r)^3-40*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)
^3-58*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2-58*I*Pi*b*d^3*r^2*csgn(I*x^n
)*csgn(I*c*x^n)^2-36*I*Pi*b*d^3*r^6*csgn(I*x^n)...
```

Maxima [A]
time = 0.29, size = 220, normalized size = 1.30

$$-bd^3nx + bd^3x\log(cx^n) + ad^3x + \frac{be^3x^{3r+1}\log(cx^n)}{3r+1} + \frac{3bde^2x^{2r+1}\log(cx^n)}{2r+1} + \frac{3bd^2ex^{r+1}\log(cx^n)}{r+1} - \frac{be^3nx^{3r+1}}{(3r+1)^2} + \frac{ae^3x^{3r+1}}{3r+1} - \frac{3bde^2nx^{2r+1}}{(2r+1)^2} + \frac{3ade^2x^{2r+1}}{2r+1} - \frac{3bd^2enx^{r+1}}{(r+1)^2} + \frac{3ad^2ex^{r+1}}{r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] -b*d^3*n*x + b*d^3*x*log(c*x^n) + a*d^3*x + b*e^3*x^(3*r + 1)*log(c*x^n)/(3
*r + 1) + 3*b*d*e^2*x^(2*r + 1)*log(c*x^n)/(2*r + 1) + 3*b*d^2*e*x^(r + 1)*
log(c*x^n)/(r + 1) - b*e^3*n*x^(3*r + 1)/(3*r + 1)^2 + a*e^3*x^(3*r + 1)/(3
*r + 1) - 3*b*d*e^2*n*x^(2*r + 1)/(2*r + 1)^2 + 3*a*d*e^2*x^(2*r + 1)/(2*r
+ 1) - 3*b*d^2*e*n*x^(r + 1)/(r + 1)^2 + 3*a*d^2*e*x^(r + 1)/(r + 1)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 838 vs. 2(167) = 334.
time = 0.35, size = 838, normalized size = 4.96

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] ((36*b*d^3*r^6 + 132*b*d^3*r^5 + 193*b*d^3*r^4 + 144*b*d^3*r^3 + 58*b*d^3*r
^2 + 12*b*d^3*r + b*d^3)*x*log(c) + (36*b*d^3*n*r^6 + 132*b*d^3*n*r^5 + 193
*b*d^3*n*r^4 + 144*b*d^3*n*r^3 + 58*b*d^3*n*r^2 + 12*b*d^3*n*r + b*d^3*n)*x
*log(x) - (36*(b*d^3*n - a*d^3)*r^6 + 132*(b*d^3*n - a*d^3)*r^5 + b*d^3*n +
 193*(b*d^3*n - a*d^3)*r^4 - a*d^3 + 144*(b*d^3*n - a*d^3)*r^3 + 58*(b*d^3*
n - a*d^3)*r^2 + 12*(b*d^3*n - a*d^3)*r)*x + ((12*b*r^5 + 40*b*r^4 + 51*b*r
^3 + 31*b*r^2 + 9*b*r + b)*x*e^3*log(c) + (12*b*n*r^5 + 40*b*n*r^4 + 51*b*n
*r^3 + 31*b*n*r^2 + 9*b*n*r + b*n)*x*e^3*log(x) + (12*a*r^5 - 4*(b*n - 10*a
)*r^4 - 3*(4*b*n - 17*a)*r^3 - (13*b*n - 31*a)*r^2 - b*n - 3*(2*b*n - 3*a)*
r + a)*x*e^3)*x^(3*r) + 3*((18*b*d*r^5 + 57*b*d*r^4 + 68*b*d*r^3 + 38*b*d*r
^2 + 10*b*d*r + b*d)*x*e^2*log(c) + (18*b*d*n*r^5 + 57*b*d*n*r^4 + 68*b*d*n
*r^3 + 38*b*d*n*r^2 + 10*b*d*n*r + b*d*n)*x*e^2*log(x) + (18*a*d*r^5 - 3*(3
*b*d*n - 19*a*d)*r^4 - 4*(6*b*d*n - 17*a*d)*r^3 - b*d*n - 2*(11*b*d*n - 19*
a*d)*r^2 + a*d - 2*(4*b*d*n - 5*a*d)*r)*x*e^2)*x^(2*r) + 3*((36*b*d^2*r^5 +
 96*b*d^2*r^4 + 97*b*d^2*r^3 + 47*b*d^2*r^2 + 11*b*d^2*r + b*d^2)*x*e*log(c
) + (36*b*d^2*n*r^5 + 96*b*d^2*n*r^4 + 97*b*d^2*n*r^3 + 47*b*d^2*n*r^2 + 11
*b*d^2*n*r + b*d^2*n)*x*e*log(x) + (36*a*d^2*r^5 - 12*(3*b*d^2*n - 8*a*d^2)
*r^4 - b*d^2*n - (60*b*d^2*n - 97*a*d^2)*r^3 + a*d^2 - (37*b*d^2*n - 47*a*d
^2)*r^2 - (10*b*d^2*n - 11*a*d^2)*r)*x*e)*x^r)/(36*r^6 + 132*r^5 + 193*r^4
+ 144*r^3 + 58*r^2 + 12*r + 1)
```

Sympy [A]
time = 9.52, size = 325, normalized size = 1.92

$$ad^3x + 3ad^2e\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r \neq -1\\ \log(x) & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r \neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right) + ae^3\left(\begin{cases}\frac{x^{3r+1}}{3r+1} & \text{for } r \neq -\frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}\right) - bd^3nx + bd^3x\log(cx^n) - 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{xx^r}{r+1} & \text{for } r \neq -1\\ \log(x) & \text{otherwise}\end{cases}}{r+1} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq -1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 3bd^2e\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r \neq -1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{xx^{2r}}{2r+1} & \text{for } r \neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r+1} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq -\frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 3bde^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r \neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - be^3n\left(\begin{cases}\frac{\begin{cases}\frac{xx^{3r}}{3r+1} & \text{for } r \neq -\frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}}{3r+1} & \text{for } r > -\infty \wedge r < \infty \wedge r \neq -\frac{1}{3}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + be^3\left(\begin{cases}\frac{x^{3r+1}}{3r+1} & \text{for } r \neq -\frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] a*d**3*x + 3*a*d**2*e*Piecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), T
rue)) + 3*a*d*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x)
, True)) + a*e**3*Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r, -1/3)), (log(x),
 True)) - b*d**3*n*x + b*d**3*x*log(c*x**n) - 3*b*d**2*e*n*Piecewise((Piece
wise((x*x**r/(r + 1), Ne(r, -1)), (log(x), True))/(r + 1), (r > -oo) & (r <
 oo) & Ne(r, -1)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r + 1)/
(r + 1), Ne(r, -1)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecewise((
Piecewise((x*x**(2*r)/(2*r + 1), Ne(r, -1/2)), (log(x), True))/(2*r + 1), (
r > -oo) & (r < oo) & Ne(r, -1/2)), (log(x)**2/2, True)) + 3*b*d*e**2*Piece
wise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))*log(c*x**n) - b
*e**3*n*Piecewise((Piecewise((x*x**(3*r)/(3*r + 1), Ne(r, -1/3)), (log(x),
True))/(3*r + 1), (r > -oo) & (r < oo) & Ne(r, -1/3)), (log(x)**2/2, True))
 + b*e**3*Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r, -1/3)), (log(x), True))*
log(c*x**n)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 374 vs. $2(167) = 334$.

time = 3.31, size = 374, normalized size = 2.21

$$\frac{3\,bd^{2}nrxx^{r}e\log\left(x\right)}{r^{2}+2\,r+1}+bd^{3}nx\log\left(x\right)+\frac{6\,bdnrxx^{2\,r}e^{2}\log\left(x\right)}{4\,r^{2}+4\,r+1}+\frac{3\,bd^{2}nxx^{r}e\log\left(x\right)}{r^{2}+2\,r+1}-bd^{3}nx-\frac{3\,bd^{2}nxx^{r}e}{r^{2}+2\,r+1}+bd^{3}x\log\left(c\right)+\frac{3\,bd^{2}xx^{r}e\log\left(c\right)}{r+1}+\frac{3\,bnrxx^{3\,r}e^{3}\log\left(x\right)}{9\,r^{2}+6\,r+1}+\frac{3\,bdnxx^{2\,r}e^{2}\log\left(x\right)}{4\,r^{2}+4\,r+1}+ad^{3}x-\frac{3\,bdnxx^{2\,r}e^{2}}{4\,r^{2}+4\,r+1}+\frac{3\,ad^{2}xx^{r}e}{r+1}+\frac{3\,bdxx^{2\,r}e^{2}\log\left(c\right)}{2\,r+1}+\frac{bnxx^{3\,r}e^{3}\log\left(x\right)}{9\,r^{2}+6\,r+1}-\frac{bnxx^{3\,r}e^{3}}{9\,r^{2}+6\,r+1}+\frac{3\,adxx^{2\,r}e^{2}}{2\,r+1}+\frac{bxx^{3\,r}e^{3}\log\left(c\right)}{3\,r+1}+\frac{axx^{3\,r}e^{3}}{3\,r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 3*b*d^2*n*r*x*x^r*e*log(x)/(r^2 + 2*r + 1) + b*d^3*n*x*log(x) + 6*b*d*n*r*x
*x^(2*r)*e^2*log(x)/(4*r^2 + 4*r + 1) + 3*b*d^2*n*x*x^r*e*log(x)/(r^2 + 2*r
 + 1) - b*d^3*n*x - 3*b*d^2*n*x*x^r*e/(r^2 + 2*r + 1) + b*d^3*x*log(c) + 3*
b*d^2*x*x^r*e*log(c)/(r + 1) + 3*b*n*r*x*x^(3*r)*e^3*log(x)/(9*r^2 + 6*r +
1) + 3*b*d*n*x*x^(2*r)*e^2*log(x)/(4*r^2 + 4*r + 1) + a*d^3*x - 3*b*d*n*x*x
^(2*r)*e^2/(4*r^2 + 4*r + 1) + 3*a*d^2*x*x^r*e/(r + 1) + 3*b*d*x*x^(2*r)*e^
2*log(c)/(2*r + 1) + b*n*x*x^(3*r)*e^3*log(x)/(9*r^2 + 6*r + 1) - b*n*x*x^(
3*r)*e^3/(9*r^2 + 6*r + 1) + 3*a*d*x*x^(2*r)*e^2/(2*r + 1) + b*x*x^(3*r)*e^
3*log(c)/(3*r + 1) + a*x*x^(3*r)*e^3/(3*r + 1)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

```
[Out] int((d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.401 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=179

$$-\frac{bd^3n}{x}-\frac{3bd^2enx^{-1+r}}{(1-r)^2}-\frac{3bde^2nx^{-1+2r}}{(1-2r)^2}-\frac{be^3nx^{-1+3r}}{(1-3r)^2}-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{-1+r}(a+b\log(cx^n))}{1-r}-\frac{3de^2\cdots}{\cdots}$$

```
[Out] -b*d^3*n/x-3*b*d^2*e*n*x^(-1+r)/(1-r)^2-3*b*d*e^2*n*x^(-1+2*r)/(1-2*r)^2-b*
e^3*n*x^(-1+3*r)/(1-3*r)^2-d^3*(a+b*ln(c*x^n))/x-3*d^2*e*x^(-1+r)*(a+b*ln(c
*x^n))/(1-r)-3*d*e^2*x^(-1+2*r)*(a+b*ln(c*x^n))/(1-2*r)-e^3*x^(-1+3*r)*(a+b
*ln(c*x^n))/(1-3*r)
```

Rubi [A]

time = 0.27, antiderivative size = 179, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {276, 2372, 14}

$$-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}-\frac{bd^3n}{x}-\frac{3bd^2enx^{r-1}}{(1-r)^2}-\frac{3bde^2nx^{2r-1}}{(1-2r)^2}-\frac{be^3nx^{3r-1}}{(1-3r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] -((b*d^3*n)/x) - (3*b*d^2*e*n*x^(-1 + r))/(1 - r)^2 - (3*b*d*e^2*n*x^(-1 +
2*r))/(1 - 2*r)^2 - (b*e^3*n*x^(-1 + 3*r))/(1 - 3*r)^2 - (d^3*(a + b*Log[c*
x^n]))/x - (3*d^2*e*x^(-1 + r)*(a + b*Log[c*x^n]))/(1 - r) - (3*d*e^2*x^(-1
 + 2*r)*(a + b*Log[c*x^n]))/(1 - 2*r) - (e^3*x^(-1 + 3*r)*(a + b*Log[c*x^n]
))/(1 - 3*r)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
```

```
&& EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2}\,dx = -\left(\frac{d^3}{x}+\frac{3d^2ex^{-1+r}}{1-r}+\frac{3de^2x^{-1+2r}}{1-2r}+\frac{e^3x^{-1+3r}}{1-3r}\right)(a+b\log(cx^n)) - (bn)$$
$$= -\left(\frac{d^3}{x}+\frac{3d^2ex^{-1+r}}{1-r}+\frac{3de^2x^{-1+2r}}{1-2r}+\frac{e^3x^{-1+3r}}{1-3r}\right)(a+b\log(cx^n)) - (bn)$$
$$= -\frac{bd^3n}{x}-\frac{3bd^2enx^{-1+r}}{(1-r)^2}-\frac{3bde^2nx^{-1+2r}}{(1-2r)^2}-\frac{be^3nx^{-1+3r}}{(1-3r)^2}-\left(\frac{d^3}{x}+\frac{3d^2ex^{-1}}{1-r}\right.$$

Mathematica [A]
time = 0.16, size = 157, normalized size = 0.88

$$\frac{-bd^3n\log(x)-d^3(a+bn-bn\log(x)+b\log(cx^n))+\frac{3d^2ex^r(-bn+a(-1+r)+b(-1+r)\log(cx^n))}{(-1+r)^2}+\frac{3de^2x^{2r}(-bn+a(-1+2r)+b(-1+2r)\log(cx^n))}{(1-2r)^2}+\frac{e^3x^{3r}(-bn+a(-1+3r)+b(-1+3r)\log(cx^n))}{(1-3r)^2}}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^2,x]
```

```
[Out] (-(b*d^3*n*Log[x]) - d^3*(a + b*n - b*n*Log[x] + b*Log[c*x^n]) + (3*d^2*e*x
^r*(-(b*n) + a*(-1 + r) + b*(-1 + r)*Log[c*x^n]))/(-1 + r)^2 + (3*d*e^2*x^(
2*r)*(-(b*n) + a*(-1 + 2*r) + b*(-1 + 2*r)*Log[c*x^n]))/(1 - 2*r)^2 + (e^3*
x^(3*r)*(-(b*n) + a*(-1 + 3*r) + b*(-1 + 3*r)*Log[c*x^n]))/(1 - 3*r)^2)/x
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.31, size = 4031, normalized size = 22.52

method	result	size
risch	Expression too large to display	4031

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b*(-2*e^3*r^2*(x^r)^3-9*d*e^2*r^2*(x^r)^2+3*e^3*r*(x^r)^3+6*d^3*r^3-18*d^2
*e*r^2*x^r+12*d*e^2*r*(x^r)^2-e^3*(x^r)^3-11*d^3*r^2+15*d^2*e*r*x^r-3*d*e^2
*(x^r)^2+6*d^3*r-3*d^2*e*x^r-d^3)/x/(-1+3*r)/(-1+2*r)/(-1+r)*ln(x^n)-1/2*(2
*e^3*(x^r)^3*a+6*d^2*e*x^r*a+6*d*e^2*(x^r)^2*a+132*I*Pi*b*d^3*r^5*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)-360*b*d^2*e*n*r^3*x^r+228*ln(c)*b*d*e^2*r^2*(x^r
)^2-60*ln(c)*b*d*e^2*r*(x^r)^2+72*a*d^3*r^6-264*a*d^3*r^5+386*a*d^3*r^4-12*
I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-171*I*Pi*b*d*e^2*r^4*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-288*I*Pi*b*d^2*e*r^4*csgn(I*c)*csg
```

n(I*x^n)*csgn(I*c*x^n)*x^r+2*a*d^3-408*a*d*e^2*r^3*(x^r)^2+228*a*d*e^2*r^2*
(x^r)^2-60*a*d*e^2*r*(x^r)^2-582*a*d^2*e*r^3*x^r+282*a*d^2*e*r^2*x^r-66*a*d
^2*e*r*x^r-291*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r-12*I*Pi*b*e^3
*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+54*I*Pi*b*d*e^2*r^5*csgn(I*c*x^n)^3*
(x^r)^2+72*b*d^3*n*r^6-264*b*d^3*n*r^5+386*b*d^3*n*r^4+222*b*d^2*e*n*r^2*x^
r-48*b*d*e^2*n*r*(x^r)^2-60*b*d^2*e*n*r*x^r+54*b*d*e^2*n*r^4*(x^r)^2-144*b*
d*e^2*n*r^3*(x^r)^2+216*b*d^2*e*n*r^4*x^r-288*a*d^3*r^3+116*a*d^3*r^2-24*a*
d^3*r-33*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+72*ln(c)*b*d^3*r^6-26
4*ln(c)*b*d^3*r^5+386*ln(c)*b*d^3*r^4-288*ln(c)*b*d^3*r^3+116*ln(c)*b*d^3*r
^2-24*ln(c)*b*d^3*r+2*b*d^3*n-24*a*e^3*r^5*(x^r)^3+80*a*e^3*r^4*(x^r)^3+2*l
n(c)*b*e^3*(x^r)^3+2*b*e^3*n*(x^r)^3-102*a*e^3*r^3*(x^r)^3+2*d^3*b*ln(c)-36
*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi*b*d^2*e*csgn(I*x
^n)*csgn(I*c*x^n)^2*x^r+31*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3
+40*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-193*I*Pi*b*d^3*r^4*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-288*b*d^3*n*r^3+116*b*d^3*n*r^2-24*b*d^3
*n*r+26*b*e^3*n*r^2*(x^r)^3-12*b*e^3*n*r*(x^r)^3+6*b*d*e^2*n*(x^r)^2+6*b*d^
2*e*n*x^r+6*ln(c)*b*d^2*e*x^r+114*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n
)^2*(x^r)^2-204*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+9*I*Pi
*b*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+62*a*e^3*r^2*(x^r)^3-1
8*a*e^3*r*(x^r)^3-31*I*Pi*b*e^3*r^2*csgn(I*c*x^n)^3*(x^r)^3+108*I*Pi*b*d^2*
e*r^5*csgn(I*c*x^n)^3*x^r+6*ln(c)*b*d*e^2*(x^r)^2-102*ln(c)*b*e^3*r^3*(x^r)
^3+62*ln(c)*b*e^3*r^2*(x^r)^3-18*ln(c)*b*e^3*r*(x^r)^3-24*ln(c)*b*e^3*r^5*(
x^r)^3+80*ln(c)*b*e^3*r^4*(x^r)^3+8*b*e^3*n*r^4*(x^r)^3-24*b*e^3*n*r^3*(x^r
)^3-108*a*d*e^2*r^5*(x^r)^2+342*a*d*e^2*r^4*(x^r)^2-216*a*d^2*e*r^5*x^r+576
*a*d^2*e*r^4*x^r+204*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(
x^r)^2+171*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-291*I*Pi*b*d^
2*e*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-33*I*Pi*b*d^2*e*r*csgn(I*x^n)*csgn(
I*c*x^n)^2*x^r-204*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+12*I*
Pi*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+132*b*d*e^2*n*r^2*
(x^r)^2-216*ln(c)*b*d^2*e*r^5*x^r-114*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r
)^2-3*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2-3*I*Pi*b*d^2*e*csgn(I*c*x^n)^3*x
^r-40*I*Pi*b*e^3*r^4*csgn(I*c*x^n)^3*(x^r)^3+193*I*Pi*b*d^3*r^4*csgn(I*c)*c
sgn(I*c*x^n)^2+132*I*Pi*b*d^3*r^5*csgn(I*c*x^n)^3-40*I*Pi*b*e^3*r^4*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+9*I*Pi*b*e^3*r*csgn(I*c*x^n)^3*(x^r)^3
+12*I*Pi*b*e^3*r^5*csgn(I*c*x^n)^3*(x^r)^3+108*I*Pi*b*d^2*e*r^5*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)*x^r-I*Pi*b*d^3*csgn(I*c*x^n)^3-114*I*Pi*b*d*e^2*r^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-141*I*Pi*b*d^2*e*r^2*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-171*I*Pi*b*d*e^2*r^4*csgn(I*c*x^n)^3*(x^r)^
2-31*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+141*I*Pi*b*
d^2*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-3*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)*(x^r)^2+51*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*(x^r)^3-30*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-12*I*Pi*b*
d^3*r*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2
-9*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-9*I*Pi*b*e^3*r*csgn(I*x^n
)*csgn(I*c*x^n)^2*(x^r)^3+288*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^2*x^

```
r+288*I*Pi*b*d^2*e*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+144*I*Pi*b*d^3*r^3*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+291*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r
+342*ln(c)*b*d*e^2*r^4*(x^r)^2-582*ln(c)*b*d^2*e*r^3*x^r+282*ln(c)*b*d^2*e*
r^2*x^r-66*ln(c)*b*d^2*e*r*x^r-408*ln(c)*b*d*e^2*r^3*(x^r)^2-I*Pi*b*d^3*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+30*I*Pi*b*d*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-
51*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-51*I*Pi*b*e^3*r^3*csgn(
I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+33*I*Pi*b*d^2*e*r*csgn(I*c*x^n)^3*x^r+12*I*P
i*b*d^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+141*I*Pi*b*d^2*e*r^2*csgn(I*c
)*csgn(I*c*x^n)^2*x^r+12*I*Pi*b*d^3*r*csgn(I*c*x^n)^3+I*Pi*b*e^3*csgn(I*c)*
csgn(I*c*x^n)^2*(x^r)^3+I*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+36*I
*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*c*x^n)^2+58*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*
c*x^n)^2+58*I*Pi*b*d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*b*d^3*r^6*cs
gn(I*x^n)*csgn(I*c*x^n)^2+3*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+
3*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r...
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-2>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 830 vs. 2(172) = 344.
time = 0.37, size = 830, normalized size = 4.64

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] -(36*(b*d^3*n + a*d^3)*r^6 - 132*(b*d^3*n + a*d^3)*r^5 + b*d^3*n + 193*(b*d
^3*n + a*d^3)*r^4 + a*d^3 - 144*(b*d^3*n + a*d^3)*r^3 + 58*(b*d^3*n + a*d^3
)*r^2 - 12*(b*d^3*n + a*d^3)*r - ((12*b*r^5 - 40*b*r^4 + 51*b*r^3 - 31*b*r^
2 + 9*b*r - b)*e^3*log(c) + (12*b*n*r^5 - 40*b*n*r^4 + 51*b*n*r^3 - 31*b*n*
r^2 + 9*b*n*r - b*n)*e^3*log(x) + (12*a*r^5 - 4*(b*n + 10*a)*r^4 + 3*(4*b*n
 + 17*a)*r^3 - (13*b*n + 31*a)*r^2 - b*n + 3*(2*b*n + 3*a)*r - a)*e^3)*x^(3
*r) - 3*((18*b*d*r^5 - 57*b*d*r^4 + 68*b*d*r^3 - 38*b*d*r^2 + 10*b*d*r - b*
d)*e^2*log(c) + (18*b*d*n*r^5 - 57*b*d*n*r^4 + 68*b*d*n*r^3 - 38*b*d*n*r^2
+ 10*b*d*n*r - b*d*n)*e^2*log(x) + (18*a*d*r^5 - 3*(3*b*d*n + 19*a*d)*r^4 +
```

```
 4*(6*b*d*n + 17*a*d)*r^3 - b*d*n - 2*(11*b*d*n + 19*a*d)*r^2 - a*d + 2*(4*
b*d*n + 5*a*d)*r)*e^2)*x^(2*r) - 3*((36*b*d^2*r^5 - 96*b*d^2*r^4 + 97*b*d^2
*r^3 - 47*b*d^2*r^2 + 11*b*d^2*r - b*d^2)*e*log(c) + (36*b*d^2*n*r^5 - 96*b
*d^2*n*r^4 + 97*b*d^2*n*r^3 - 47*b*d^2*n*r^2 + 11*b*d^2*n*r - b*d^2*n)*e*lo
g(x) + (36*a*d^2*r^5 - 12*(3*b*d^2*n + 8*a*d^2)*r^4 - b*d^2*n + (60*b*d^2*n
 + 97*a*d^2)*r^3 - a*d^2 - (37*b*d^2*n + 47*a*d^2)*r^2 + (10*b*d^2*n + 11*a
*d^2)*r)*e)*x^r + (36*b*d^3*r^6 - 132*b*d^3*r^5 + 193*b*d^3*r^4 - 144*b*d^3
*r^3 + 58*b*d^3*r^2 - 12*b*d^3*r + b*d^3)*log(c) + (36*b*d^3*n*r^6 - 132*b*
d^3*n*r^5 + 193*b*d^3*n*r^4 - 144*b*d^3*n*r^3 + 58*b*d^3*n*r^2 - 12*b*d^3*n
*r + b*d^3*n)*log(x))/((36*r^6 - 132*r^5 + 193*r^4 - 144*r^3 + 58*r^2 - 12*
r + 1)*x)
```

Sympy [A]
time = 27.80, size = 304, normalized size = 1.70

$$-\frac{ad^3}{x} + 3ad^2e\left(\begin{cases}\frac{x^r}{rx-x} & \text{for}\: r \neq 1 \\ \log(x) & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r}}{2rx-x} & \text{for}\: r \neq \frac{1}{2} \\ \log(x) & \text{otherwise}\end{cases}\right) + ae^3\left(\begin{cases}\frac{x^{3r}}{3rx-x} & \text{for}\: r \neq \frac{1}{3} \\ \log(x) & \text{otherwise}\end{cases}\right) - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{rx-x} & \text{for}\: r \neq 1 \\ \log(x) & \text{otherwise}\end{cases}}{r-1} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq 1 \\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 3bd^2e\left(\begin{cases}\frac{x^{r-1}}{r-1} & \text{for}\: r \neq 1 \\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r}}{2rx-x} & \text{for}\: r \neq \frac{1}{2} \\ \log(x) & \text{otherwise}\end{cases}}{2r-1} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq \frac{1}{2} \\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + 3bde^2\left(\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for}\: r \neq \frac{1}{2} \\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) - be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r}}{3rx-x} & \text{for}\: r \neq \frac{1}{3} \\ \log(x) & \text{otherwise}\end{cases}}{3r-1} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq \frac{1}{3} \\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) + be^3\left(\begin{cases}\frac{x^{3r-1}}{3r-1} & \text{for}\: r \neq \frac{1}{3} \\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] -a*d**3/x + 3*a*d**2*e*Piecewise((x**r/(r*x - x), Ne(r, 1)), (log(x), True)
) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x - x), Ne(r, 1/2)), (log(x), True)
) + a*e**3*Piecewise((x**(3*r)/(3*r*x - x), Ne(r, 1/3)), (log(x), True)) -
b*d**3*n/x - b*d**3*log(c*x**n)/x - 3*b*d**2*e*n*Piecewise((Piecewise((x**r
/(r*x - x), Ne(r, 1)), (log(x), True))/(r - 1), (r > -oo) & (r < oo) & Ne(r
, 1)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r - 1)/(r - 1), Ne(
r, 1)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecewise((Piecewise((x*
*(2*r)/(2*r*x - x), Ne(r, 1/2)), (log(x), True))/(2*r - 1), (r > -oo) & (r
< oo) & Ne(r, 1/2)), (log(x)**2/2, True)) + 3*b*d*e**2*Piecewise((x**(2*r -
 1)/(2*r - 1), Ne(r, 1/2)), (log(x), True))*log(c*x**n) - b*e**3*n*Piecewis
e((Piecewise((x**(3*r)/(3*r*x - x), Ne(r, 1/3)), (log(x), True))/(3*r - 1),
 (r > -oo) & (r < oo) & Ne(r, 1/3)), (log(x)**2/2, True)) + b*e**3*Piecewis
e((x**(3*r - 1)/(3*r - 1), Ne(r, 1/3)), (log(x), True))*log(c*x**n)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^2,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^2, x)
```

3.402 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\,dx$

Optimal. Leaf size=191

$$-\frac{bd^3n}{9x^3}-\frac{be^3nx^{-3(1-r)}}{9(1-r)^2}-\frac{3bd^2enx^{-3+r}}{(3-r)^2}-\frac{3bde^2nx^{-3+2r}}{(3-2r)^2}-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}-3d^2$$

```
[Out] -1/9*b*d^3*n/x^3-1/9*b*e^3*n/(1-r)^2/(x^(3-3*r))-3*b*d^2*e*n*x^(-3+r)/(3-r)
^2-3*b*d*e^2*n*x^(-3+2*r)/(3-2*r)^2-1/3*d^3*(a+b*ln(c*x^n))/x^3-1/3*e^3*(a+
b*ln(c*x^n))/(1-r)/(x^(3-3*r))-3*d^2*e*x^(-3+r)*(a+b*ln(c*x^n))/(3-r)-3*d*e
^2*x^(-3+2*r)*(a+b*ln(c*x^n))/(3-2*r)
```

Rubi [A]
time = 0.27, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}-\frac{bd^3n}{9x^3}-\frac{3bd^2enx^{r-3}}{(3-r)^2}-\frac{3bde^2nx^{2r-3}}{(3-2r)^2}-\frac{be^3nx^{-3(1-r)}}{9(1-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] -1/9*(b*d^3*n)/x^3 - (b*e^3*n)/(9*(1 - r)^2*x^(3*(1 - r))) - (3*b*d^2*e*n*x
^(-3 + r))/(3 - r)^2 - (3*b*d*e^2*n*x^(-3 + 2*r))/(3 - 2*r)^2 - (d^3*(a + b
*Log[c*x^n]))/(3*x^3) - (e^3*(a + b*Log[c*x^n]))/(3*(1 - r)*x^(3*(1 - r)))
- (3*d^2*e*x^(-3 + r)*(a + b*Log[c*x^n]))/(3 - r) - (3*d*e^2*x^(-3 + 2*r)*(
a + b*Log[c*x^n]))/(3 - 2*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^4}\,dx &= -\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{e^3x^{-3(1-r)}}{1-r}+\frac{9d^2ex^{-3+r}}{3-r}+\frac{9de^2x^{-3+2r}}{3-2r}\right)(a+b\log(cx^n))-(b\\ &= -\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{e^3x^{-3(1-r)}}{1-r}+\frac{9d^2ex^{-3+r}}{3-r}+\frac{9de^2x^{-3+2r}}{3-2r}\right)(a+b\log(cx^n))-\frac{1}{3}\\ &= -\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{e^3x^{-3(1-r)}}{1-r}+\frac{9d^2ex^{-3+r}}{3-r}+\frac{9de^2x^{-3+2r}}{3-2r}\right)(a+b\log(cx^n))-\frac{1}{3}\\ &= -\frac{bd^3n}{9x^3}-\frac{be^3nx^{-3(1-r)}}{9(1-r)^2}-\frac{3bd^2enx^{-3+r}}{(3-r)^2}-\frac{3bde^2nx^{-3+2r}}{(3-2r)^2}-\frac{1}{3}\left(\frac{d^3}{x^3}+\frac{e^3x^{-}}{1\cdot}\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 159, normalized size = 0.83

$$\frac{-3bd^3n\log(x)-d^3(3a+bn-3bn\log(x)+3b\log(cx^n))+\frac{27d^2ex^r(-bn+a(-3+r)+b(-3+r)\log(cx^n))}{(-3+r)^2}+\frac{e^3x^{3r}(-bn+3a(-1+r)+3b(-1+r)\log(cx^n))}{(-1+r)^2}+\frac{27de^2x^{2r}(-bn+a(-3+2r)+b(-3+2r)\log(cx^n))}{(3-2r)^2}}{9x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^4,x]
```

```
[Out] (-3*b*d^3*n*Log[x] - d^3*(3*a + b*n - 3*b*n*Log[x] + 3*b*Log[c*x^n]) + (27*
d^2*e*x^r*(-(b*n) + a*(-3 + r) + b*(-3 + r)*Log[c*x^n]))/(-3 + r)^2 + (e^3*
x^(3*r)*(-(b*n) + 3*a*(-1 + r) + 3*b*(-1 + r)*Log[c*x^n]))/(-1 + r)^2 + (27
*d*e^2*x^(2*r)*(-(b*n) + a*(-3 + 2*r) + b*(-3 + 2*r)*Log[c*x^n]))/(3 - 2*r)
^2)/(9*x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 4027, normalized size = 21.08

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b*(-2*e^3*r^2*(x^r)^3-9*d*e^2*r^2*(x^r)^2+9*e^3*r*(x^r)^3+2*d^3*r^3-18
*d^2*e*r^2*x^r+36*d*e^2*r*(x^r)^2-9*e^3*(x^r)^3-11*d^3*r^2+45*d^2*e*r*x^r-2
7*d*e^2*(x^r)^2+18*d^3*r-27*d^2*e*x^r-9*d^3)/x^3/(-1+r)/(-3+2*r)/(-3+r)*ln(
x^n)-1/18*(486*e^3*(x^r)^3*a+2430*I*Pi*b*d*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-45
9*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-120*I*Pi*b*e^3*r^4*csgn(
I*c*x^n)^3*(x^r)^3-243*I*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1458*
d^2*e*x^r*a+1458*d*e^2*(x^r)^2*a+132*I*Pi*b*d^3*r^5*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-864*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r+729*I*Pi*b*d*e^2*csgn
(I*c)*csgn(I*c*x^n)^2*(x^r)^2+729*I*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*
(x^r)^2-513*I*Pi*b*d*e^2*r^4*csgn(I*c*x^n)^3*(x^r)^2-1080*b*d^2*e*n*r^3*x^r
+6156*ln(c)*b*d*e^2*r^2*(x^r)^2-4860*ln(c)*b*d*e^2*r*(x^r)^2+579*I*Pi*b*d^3
*r^4*csgn(I*c)*csgn(I*c*x^n)^2+24*a*d^3*r^6-264*a*d^3*r^5+1158*a*d^3*r^4-12
*I*Pi*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-864*I*Pi*b*d^2*e*r^4*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-1836*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csg
n(I*c*x^n)^2*(x^r)^2-2430*I*Pi*b*d*e^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^
2+486*a*d^3-3672*a*d*e^2*r^3*(x^r)^2+6156*a*d*e^2*r^2*(x^r)^2-4860*a*d*e^2*
r*(x^r)^2-5238*a*d^2*e*r^3*x^r+7614*a*d^2*e*r^2*x^r-5346*a*d^2*e*r*x^r-12*I
*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+54*I*Pi*b*d*e^2*r^5*csgn(I*
c*x^n)^3*(x^r)^2+8*b*d^3*n*r^6-88*b*d^3*n*r^5+386*b*d^3*n*r^4+513*I*Pi*b*d*
e^2*r^4*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+3807*I*Pi*b*d^2*e*r^2*csgn(I*c)*c
sgn(I*c*x^n)^2*x^r-3078*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*(x^r)^2-3807*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+199
8*b*d^2*e*n*r^2*x^r-1296*b*d*e^2*n*r*(x^r)^2-1620*b*d^2*e*n*r*x^r+54*b*d*e^
2*n*r^4*(x^r)^2-432*b*d*e^2*n*r^3*(x^r)^2+216*b*d^2*e*n*r^4*x^r-2592*a*d^3*
r^3+3132*a*d^3*r^2-1944*a*d^3*r-12*I*Pi*b*d^3*r^6*csgn(I*c*x^n)^3-243*I*Pi*
b*e^3*csgn(I*c*x^n)^3*(x^r)^3+243*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+243*
I*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2+24*ln(c)*b*d^3*r^6-264*ln(c)*b*d^3*r
^5+1158*ln(c)*b*d^3*r^4-2592*ln(c)*b*d^3*r^3+3132*ln(c)*b*d^3*r^2-1944*ln(c
)*b*d^3*r+162*b*d^3*n-24*a*e^3*r^5*(x^r)^3+240*a*e^3*r^4*(x^r)^3+486*ln(c)*
b*e^3*(x^r)^3+162*b*e^3*n*(x^r)^3-918*a*e^3*r^3*(x^r)^3+486*d^3*b*ln(c)+261
9*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r-729*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*c*
x^n)^2*(x^r)^3-729*I*Pi*b*e^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-243*I*P
i*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-1566*I*Pi*b*d^3*r^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-864*b*d^3*n*r^3+1044*b*d^3*n*r^2-648*b*d^3
*n*r+234*b*e^3*n*r^2*(x^r)^3-324*b*e^3*n*r*(x^r)^3+486*b*d*e^2*n*(x^r)^2+48
6*b*d^2*e*n*x^r+1458*ln(c)*b*d^2*e*x^r+1674*a*e^3*r^2*(x^r)^3-1458*a*e^3*r*
(x^r)^3+837*I*Pi*b*e^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-3078*I*Pi*b*
d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-3807*I*Pi*b*d^2*e*r^2*csgn(I*c*x^n)^3*x^r
+108*I*Pi*b*d^2*e*r^5*csgn(I*c*x^n)^3*x^r+1458*ln(c)*b*d*e^2*(x^r)^2-918*ln
(c)*b*e^3*r^3*(x^r)^3+1674*ln(c)*b*e^3*r^2*(x^r)^3-1458*ln(c)*b*e^3*r*(x^r)
^3-24*ln(c)*b*e^3*r^5*(x^r)^3+240*ln(c)*b*e^3*r^4*(x^r)^3+8*b*e^3*n*r^4*(x^
r)^3-72*b*e^3*n*r^3*(x^r)^3-108*a*d*e^2*r^5*(x^r)^2+1026*a*d*e^2*r^4*(x^r)^
2-216*a*d^2*e*r^5*x^r+1728*a*d^2*e*r^4*x^r+1566*I*Pi*b*d^3*r^2*csgn(I*c)*cs
gn(I*c*x^n)^2+1566*I*Pi*b*d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+12*I*Pi*b*d^3
*r^6*csgn(I*x^n)*csgn(I*c*x^n)^2-579*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*x^n)*c
```

```
sgn(I*c*x^n)+729*I*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+837*I*Pi*b*e^
3*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+12*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*(x^r)^3-2673*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^
r+1188*b*d*e^2*n*r^2*(x^r)^2-216*ln(c)*b*d^2*e*r^5*x^r+1836*I*Pi*b*d*e^2*r^
3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+132*I*Pi*b*d^3*r^5*csgn(I*c*x
^n)^3+864*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^2*x^r+12*I*Pi*b*e^3*r^5*
csgn(I*c*x^n)^3*(x^r)^3+2673*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*x^r+108*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+2619*
I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-459*I*Pi*b*e^3*r^3
*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+459*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)*(x^r)^3-243*I*Pi*b*d^3*csgn(I*c*x^n)^3-729*I*Pi*b*d*e^2*cs
gn(I*c*x^n)^3*(x^r)^2-729*I*Pi*b*d^2*e*csgn(I*c*x^n)^3*x^r-837*I*Pi*b*e^3*r
^2*csgn(I*c*x^n)^3*(x^r)^3+579*I*Pi*b*d^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+3
078*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+1026*ln(c)*b*d*e^2
*r^4*(x^r)^2-5238*ln(c)*b*d^2*e*r^3*x^r+7614*ln(c)*b*d^2*e*r^2*x^r-5346*ln(
c)*b*d^2*e*r*x^r-3672*ln(c)*b*d*e^2*r^3*(x^r)^2-1296*I*Pi*b*d^3*r^3*csgn(I*
x^n)*csgn(I*c*x^n)^2-972*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*c*x^n)^2-972*I*Pi*b*
d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2+3807*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I*
c*x^n)^2*x^r+972*I*Pi*b*d^3*r*csgn(I*c*x^n)^3-2430*I*Pi*b*d*e^2*r*csgn(I*c)
*csgn(I*c*x^n)^2*(x^r)^2-729*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)*(x^r)^2-2673*I*Pi*b*d^2*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-729*I*Pi*b*d
^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-26...
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-4>0)', see `assume?` for more det
ails)Is
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 843 vs. 2(173) = 346.
time = 0.35, size = 843, normalized size = 4.41

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

```
[Out] -1/9*(4*(b*d^3*n + 3*a*d^3)*r^6 - 44*(b*d^3*n + 3*a*d^3)*r^5 + 81*b*d^3*n +
 193*(b*d^3*n + 3*a*d^3)*r^4 + 243*a*d^3 - 432*(b*d^3*n + 3*a*d^3)*r^3 + 52
2*(b*d^3*n + 3*a*d^3)*r^2 - 324*(b*d^3*n + 3*a*d^3)*r - (3*(4*b*r^5 - 40*b*
r^4 + 153*b*r^3 - 279*b*r^2 + 243*b*r - 81*b)*e^3*log(c) + 3*(4*b*n*r^5 - 4
0*b*n*r^4 + 153*b*n*r^3 - 279*b*n*r^2 + 243*b*n*r - 81*b*n)*e^3*log(x) + (1
2*a*r^5 - 4*(b*n + 30*a)*r^4 + 9*(4*b*n + 51*a)*r^3 - 9*(13*b*n + 93*a)*r^2
 - 81*b*n + 81*(2*b*n + 9*a)*r - 243*a)*e^3)*x^(3*r) - 27*((2*b*d*r^5 - 19*
b*d*r^4 + 68*b*d*r^3 - 114*b*d*r^2 + 90*b*d*r - 27*b*d)*e^2*log(c) + (2*b*d
*n*r^5 - 19*b*d*n*r^4 + 68*b*d*n*r^3 - 114*b*d*n*r^2 + 90*b*d*n*r - 27*b*d*
n)*e^2*log(x) + (2*a*d*r^5 - (b*d*n + 19*a*d)*r^4 + 4*(2*b*d*n + 17*a*d)*r^
3 - 9*b*d*n - 2*(11*b*d*n + 57*a*d)*r^2 - 27*a*d + 6*(4*b*d*n + 15*a*d)*r)*
e^2)*x^(2*r) - 27*((4*b*d^2*r^5 - 32*b*d^2*r^4 + 97*b*d^2*r^3 - 141*b*d^2*r
^2 + 99*b*d^2*r - 27*b*d^2)*e*log(c) + (4*b*d^2*n*r^5 - 32*b*d^2*n*r^4 + 97
*b*d^2*n*r^3 - 141*b*d^2*n*r^2 + 99*b*d^2*n*r - 27*b*d^2*n)*e*log(x) + (4*a
*d^2*r^5 - 4*(b*d^2*n + 8*a*d^2)*r^4 - 9*b*d^2*n + (20*b*d^2*n + 97*a*d^2)*
r^3 - 27*a*d^2 - (37*b*d^2*n + 141*a*d^2)*r^2 + 3*(10*b*d^2*n + 33*a*d^2)*r
)*e)*x^r + 3*(4*b*d^3*r^6 - 44*b*d^3*r^5 + 193*b*d^3*r^4 - 432*b*d^3*r^3 +
522*b*d^3*r^2 - 324*b*d^3*r + 81*b*d^3)*log(c) + 3*(4*b*d^3*n*r^6 - 44*b*d^
3*n*r^5 + 193*b*d^3*n*r^4 - 432*b*d^3*n*r^3 + 522*b*d^3*n*r^2 - 324*b*d^3*n
*r + 81*b*d^3*n)*log(x))/((4*r^6 - 44*r^5 + 193*r^4 - 432*r^3 + 522*r^2 - 3
24*r + 81)*x^3)
```

Sympy [**A**]
time = 88.39, size = 338, normalized size = 1.77

$$- \frac{a d^{3}}{3 x^{3}} + 3 a d^{2} e \left(\begin{cases} \frac{x^{r}}{r x^{3} - 3 x^{3}} & \text{for}\: r \neq 3 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) + 3 a d e^{2} \left(\begin{cases} \frac{x^{2 r}}{2 r x^{3} - 3 x^{3}} & \text{for}\: r \neq \frac{3}{2} \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) + a e^{3} \left(\begin{cases} \frac{x^{3 r}}{3 r x^{3} - 3 x^{3}} & \text{for}\: r \neq 1 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) - \frac{b d^{3} n}{9 x^{3}} - \frac{b d^{3} \log{\left(c x^{n} \right)}}{3 x^{3}} - 3 b d^{2} e n \left(\begin{cases} \frac{\begin{cases} \frac{x^{r}}{r x^{3} - 3 x^{3}} & \text{for}\: r \neq 3 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}}{r - 3} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq 3 \\ \frac{\log{\left(x \right)}^{2}}{2} & \text{otherwise} \end{cases}\right) + 3 b d^{2} e \left(\begin{cases} \frac{x^{r - 3}}{r - 3} & \text{for}\: r \neq 3 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)} - 3 b d e^{2} n \left(\begin{cases} \frac{\begin{cases} \frac{x^{2 r}}{2 r x^{3} - 3 x^{3}} & \text{for}\: r \neq \frac{3}{2} \\ \log{\left(x \right)} & \text{otherwise} \end{cases}}{2 r - 3} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq \frac{3}{2} \\ \frac{\log{\left(x \right)}^{2}}{2} & \text{otherwise} \end{cases}\right) + 3 b d e^{2} \left(\begin{cases} \frac{x^{2 r - 3}}{2 r - 3} & \text{for}\: r \neq \frac{3}{2} \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)} - b e^{3} n \left(\begin{cases} \frac{\begin{cases} \frac{x^{3 r}}{3 r x^{3} - 3 x^{3}} & \text{for}\: r \neq 1 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}}{3 r - 3} & \text{for}\: r > -\infty \wedge r < \infty \wedge r \neq 1 \\ \frac{\log{\left(x \right)}^{2}}{2} & \text{otherwise} \end{cases}\right) + b e^{3} \left(\begin{cases} \frac{x^{3 r - 3}}{3 r - 3} & \text{for}\: r \neq 1 \\ \log{\left(x \right)} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**4,x)
```

```
[Out] -a*d**3/(3*x**3) + 3*a*d**2*e*Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3)),
 (log(x), True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x**3 - 3*x**3), Ne(r
, 3/2)), (log(x), True)) + a*e**3*Piecewise((x**(3*r)/(3*r*x**3 - 3*x**3),
Ne(r, 1)), (log(x), True)) - b*d**3*n/(9*x**3) - b*d**3*log(c*x**n)/(3*x**3
) - 3*b*d**2*e*n*Piecewise((Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3)), (
log(x), True))/(r - 3), (r > -oo) & (r < oo) & Ne(r, 3)), (log(x)**2/2, Tru
e)) + 3*b*d**2*e*Piecewise((x**(r - 3)/(r - 3), Ne(r, 3)), (log(x), True))*
log(c*x**n) - 3*b*d*e**2*n*Piecewise((Piecewise((x**(2*r)/(2*r*x**3 - 3*x**
3), Ne(r, 3/2)), (log(x), True))/(2*r - 3), (r > -oo) & (r < oo) & Ne(r, 3/
2)), (log(x)**2/2, True)) + 3*b*d*e**2*Piecewise((x**(2*r - 3)/(2*r - 3), N
e(r, 3/2)), (log(x), True))*log(c*x**n) - b*e**3*n*Piecewise((Piecewise((x*
*(3*r)/(3*r*x**3 - 3*x**3), Ne(r, 1)), (log(x), True))/(3*r - 3), (r > -oo)
 & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + b*e**3*Piecewise((x**(3*r -
 3)/(3*r - 3), Ne(r, 1)), (log(x), True))*log(c*x**n)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^4, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^3\,(a+b\,\ln\left(c\,x^n\right))}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^4,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^4, x)
```

3.403 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx$

Optimal. Leaf size=183

$$-\frac{bd^3n}{25x^5}-\frac{3bd^2enx^{-5+r}}{(5-r)^2}-\frac{3bde^2nx^{-5+2r}}{(5-2r)^2}-\frac{be^3nx^{-5+3r}}{(5-3r)^2}-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{-5+r}(a+b\log(cx^n))}{5-r}-\frac{3de^2}{}$$

```
[Out] -1/25*b*d^3*n/x^5-3*b*d^2*e*n*x^(-5+r)/(5-r)^2-3*b*d*e^2*n*x^(-5+2*r)/(5-2*
r)^2-b*e^3*n*x^(-5+3*r)/(5-3*r)^2-1/5*d^3*(a+b*ln(c*x^n))/x^5-3*d^2*e*x^(-5
+r)*(a+b*ln(c*x^n))/(5-r)-3*d*e^2*x^(-5+2*r)*(a+b*ln(c*x^n))/(5-2*r)-e^3*x^
(-5+3*r)*(a+b*ln(c*x^n))/(5-3*r)
```

Rubi [A]
time = 0.28, antiderivative size = 183, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}-\frac{bd^3n}{25x^5}-\frac{3bd^2enx^{r-5}}{(5-r)^2}-\frac{3bde^2nx^{2r-5}}{(5-2r)^2}-\frac{be^3nx^{3r-5}}{(5-3r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] -1/25*(b*d^3*n)/x^5 - (3*b*d^2*e*n*x^(-5 + r))/(5 - r)^2 - (3*b*d*e^2*n*x^(
-5 + 2*r))/(5 - 2*r)^2 - (b*e^3*n*x^(-5 + 3*r))/(5 - 3*r)^2 - (d^3*(a + b*L
og[c*x^n]))/(5*x^5) - (3*d^2*e*x^(-5 + r)*(a + b*Log[c*x^n]))/(5 - r) - (3*
d*e^2*x^(-5 + 2*r)*(a + b*Log[c*x^n]))/(5 - 2*r) - (e^3*x^(-5 + 3*r)*(a + b
*Log[c*x^n]))/(5 - 3*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^6}\,dx &= -\frac{1}{5}\left(\frac{d^3}{x^5}+\frac{15d^2ex^{-5+r}}{5-r}+\frac{15de^2x^{-5+2r}}{5-2r}+\frac{5e^3x^{-5+3r}}{5-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{1}{5}\left(\frac{d^3}{x^5}+\frac{15d^2ex^{-5+r}}{5-r}+\frac{15de^2x^{-5+2r}}{5-2r}+\frac{5e^3x^{-5+3r}}{5-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{1}{5}\left(\frac{d^3}{x^5}+\frac{15d^2ex^{-5+r}}{5-r}+\frac{15de^2x^{-5+2r}}{5-2r}+\frac{5e^3x^{-5+3r}}{5-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{bd^3n}{25x^5}-\frac{3bd^2enx^{-5+r}}{(5-r)^2}-\frac{3bde^2nx^{-5+2r}}{(5-2r)^2}-\frac{be^3nx^{-5+3r}}{(5-3r)^2}-\frac{1}{5}\left(\frac{d^3}{x^5}+\frac{15d^2e}{5-}\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 164, normalized size = 0.90

$$\frac{-5bd^3n\log(x)-d^3(5a+bn-5bn\log(x)+5b\log(cx^n))+\frac{75d^2ex^r(-bn+a(-5+r)+b(-5+r)\log(cx^n))}{(-5+r)^2}+\frac{75de^2x^{2r}(-bn+a(-5+2r)+b(-5+2r)\log(cx^n))}{(5-2r)^2}+\frac{25e^3x^{3r}(-bn+a(-5+3r)+b(-5+3r)\log(cx^n))}{(5-3r)^2}}{25x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^6,x]
```

```
[Out] (-5*b*d^3*n*Log[x] - d^3*(5*a + b*n - 5*b*n*Log[x] + 5*b*Log[c*x^n]) + (75*
d^2*e*x^r*(-(b*n) + a*(-5 + r) + b*(-5 + r)*Log[c*x^n]))/(-5 + r)^2 + (75*d
*e^2*x^(2*r)*(-(b*n) + a*(-5 + 2*r) + b*(-5 + 2*r)*Log[c*x^n]))/(5 - 2*r)^2
 + (25*e^3*x^(3*r)*(-(b*n) + a*(-5 + 3*r) + b*(-5 + 3*r)*Log[c*x^n]))/(5 -
3*r)^2)/(25*x^5)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.34, size = 4031, normalized size = 22.03

method	result	size
risch	Expression too large to display	4031

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

```
[Out] -1/5*b*(-10*e^3*r^2*(x^r)^3-45*d*e^2*r^2*(x^r)^2+75*e^3*r*(x^r)^3+6*d^3*r^3
-90*d^2*e*r^2*x^r+300*d*e^2*r*(x^r)^2-125*e^3*(x^r)^3-55*d^3*r^2+375*d^2*e*
r*x^r-375*d*e^2*(x^r)^2+150*d^3*r-375*d^2*e*x^r-125*d^3)/x^5/(-5+3*r)/(-5+2
*r)/(-5+r)*ln(x^n)-1/50*(156250*e^3*(x^r)^3*a+468750*d^2*e*x^r*a+468750*d*e
^2*(x^r)^2*a+181250*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*c*x^n)^2+181250*I*Pi*b*
d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+180*I*Pi*b*d^3*r^6*csgn(I*x^n)*csgn(I*c
*x^n)^2-45000*b*d^2*e*n*r^3*x^r+712500*ln(c)*b*d*e^2*r^2*(x^r)^2-937500*ln(
c)*b*d*e^2*r*(x^r)^2+31875*I*Pi*b*e^3*r^3*csgn(I*c*x^n)^3*(x^r)^3+360*a*d^3
*r^6-6600*a*d^3*r^5+48250*a*d^3*r^4+5000*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I*
c*x^n)^2*(x^r)^3+468750*I*Pi*b*d*e^2*r*csgn(I*c*x^n)^3*(x^r)^2+156250*a*d^3
-255000*a*d*e^2*r^3*(x^r)^2+712500*a*d*e^2*r^2*(x^r)^2-937500*a*d*e^2*r*(x^
r)^2-363750*a*d^2*e*r^3*x^r+881250*a*d^2*e*r^2*x^r-1031250*a*d^2*e*r*x^r+72
*b*d^3*n*r^6-1320*b*d^3*n*r^5+9650*b*d^3*n*r^4+78125*I*Pi*b*d^3*csgn(I*x^n)
*csgn(I*c*x^n)^2-356250*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*(x^r)^2+138750*b*d^2*e*n*r^2*x^r-150000*b*d*e^2*n*r*(x^r)^2-187500*b*d^2*
e*n*r*x^r+1350*b*d*e^2*n*r^4*(x^r)^2-18000*b*d*e^2*n*r^3*(x^r)^2+5400*b*d^2
*e*n*r^4*x^r-180000*a*d^3*r^3+362500*a*d^3*r^2-375000*a*d^3*r+3300*I*Pi*b*d
^3*r^5*csgn(I*c*x^n)^3+24125*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*c*x^n)^2+24125
*I*Pi*b*d^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2-96875*I*Pi*b*e^3*r^2*csgn(I*c*x
^n)^3*(x^r)^3+360*ln(c)*b*d^3*r^6-6600*ln(c)*b*d^3*r^5+48250*ln(c)*b*d^3*r^
4-180000*ln(c)*b*d^3*r^3+362500*ln(c)*b*d^3*r^2-375000*ln(c)*b*d^3*r+31250*
b*d^3*n-600*a*e^3*r^5*(x^r)^3+10000*a*e^3*r^4*(x^r)^3+156250*ln(c)*b*e^3*(x
^r)^3+31250*b*e^3*n*(x^r)^3-63750*a*e^3*r^3*(x^r)^3+156250*d^3*b*ln(c)-7812
5*I*Pi*b*d^3*csgn(I*c*x^n)^3-36000*b*d^3*n*r^3+72500*b*d^3*n*r^2-75000*b*d^
3*n*r+16250*b*e^3*n*r^2*(x^r)^3-37500*b*e^3*n*r*(x^r)^3+93750*b*d*e^2*n*(x^
r)^2+93750*b*d^2*e*n*x^r+468750*ln(c)*b*d^2*e*x^r-234375*I*Pi*b*d*e^2*csgn(
I*c*x^n)^3*(x^r)^2-234375*I*Pi*b*d^2*e*csgn(I*c*x^n)^3*x^r-5000*I*Pi*b*e^3*
r^4*csgn(I*c*x^n)^3*(x^r)^3+36000*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^
2*x^r+36000*I*Pi*b*d^2*e*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+356250*I*Pi*b*
d*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+193750*a*e^3*r^2*(x^r)^3-281250
*a*e^3*r*(x^r)^3+181875*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)*x^r+1350*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+127
500*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+2700*I*Pi*
b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+468750*ln(c)*b*d*e^2*(x
^r)^2-63750*ln(c)*b*e^3*r^3*(x^r)^3+193750*ln(c)*b*e^3*r^2*(x^r)^3-281250*l
n(c)*b*e^3*r*(x^r)^3-600*ln(c)*b*e^3*r^5*(x^r)^3+10000*ln(c)*b*e^3*r^4*(x^r
)^3+200*b*e^3*n*r^4*(x^r)^3-3000*b*e^3*n*r^3*(x^r)^3-2700*a*d*e^2*r^5*(x^r)
^2+42750*a*d*e^2*r^4*(x^r)^2-5400*a*d^2*e*r^5*x^r+72000*a*d^2*e*r^4*x^r+356
250*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+440625*I*Pi*b*d^2*
e*r^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r+440625*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csg
n(I*c*x^n)^2*x^r-21375*I*Pi*b*d*e^2*r^4*csgn(I*c*x^n)^3*(x^r)^2+96875*I*Pi*
b*e^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-356250*I*Pi*b*d*e^2*r^2*csgn(
I*c*x^n)^3*(x^r)^2+31875*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
*(x^r)^3-468750*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-187500*I*P
i*b*d^3*r*csgn(I*c)*csgn(I*c*x^n)^2-187500*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*
```

```
c*x^n)^2+234375*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+234375*I*Pi*
b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+82500*b*d*e^2*n*r^2*(x^r)^2-540
0*ln(c)*b*d^2*e*r^5*x^r+187500*I*Pi*b*d^3*r*csgn(I*c*x^n)^3+468750*I*Pi*b*d
*e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+515625*I*Pi*b*d^2*e*r*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-78125*I*Pi*b*e^3*csgn(I*c*x^n)^3*(x^r
)^3+78125*I*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+90000*I*Pi*b*d^3*r^3*csgn(I*
c*x^n)^3-181875*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r-1350*I*Pi*b*
d*e^2*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-2700*I*Pi*b*d^2*e*r^5*csgn(I*
c)*csgn(I*c*x^n)^2*x^r-96875*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*(x^r)^3-5000*I*Pi*b*e^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^
3-234375*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-1350*I*Pi
*b*d*e^2*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-3300*I*Pi*b*d^3*r^5*csgn(I*c
)*csgn(I*c*x^n)^2-3300*I*Pi*b*d^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2-440625*I*
Pi*b*d^2*e*r^2*csgn(I*c*x^n)^3*x^r+5000*I*Pi*b*e^3*r^4*csgn(I*c)*csgn(I*c*x
^n)^2*(x^r)^3+234375*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-300*I*Pi*b*
e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+127500*I*Pi*b*d*e^2*r^3*csgn(I*
c*x^n)^3*(x^r)^2+140625*I*Pi*b*e^3*r*csgn(I*c*x^n)^3*(x^r)^3+300*I*Pi*b*e^3
*r^5*csgn(I*c*x^n)^3*(x^r)^3+42750*ln(c)*b*d*e^2*r^4*(x^r)^2-363750*ln(c)*b
*d^2*e*r^3*x^r+881250*ln(c)*b*d^2*e*r^2*x^r-1031250*ln(c)*b*d^2*e*r*x^r-255
000*ln(c)*b*d*e^2*r^3*(x^r)^2-468750*I*Pi*b*d*e^2*r*csgn(I*x^n)*csgn(I*c*x^
n)^2*(x^r)^2-515625*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-127500*I*P
i*b*d*e^2*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2...
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-6>0)', see `assume?` for more det
ails)Is
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 844 vs. $2(172) = 344$.
time = 0.37, size = 844, normalized size = 4.61

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

```
[Out] -1/25*(36*(b*d^3*n + 5*a*d^3)*r^6 - 660*(b*d^3*n + 5*a*d^3)*r^5 + 15625*b*d
^3*n + 4825*(b*d^3*n + 5*a*d^3)*r^4 + 78125*a*d^3 - 18000*(b*d^3*n + 5*a*d^
3)*r^3 + 36250*(b*d^3*n + 5*a*d^3)*r^2 - 37500*(b*d^3*n + 5*a*d^3)*r - 25*(
(12*b*r^5 - 200*b*r^4 + 1275*b*r^3 - 3875*b*r^2 + 5625*b*r - 3125*b)*e^3*lo
g(c) + (12*b*n*r^5 - 200*b*n*r^4 + 1275*b*n*r^3 - 3875*b*n*r^2 + 5625*b*n*r
 - 3125*b*n)*e^3*log(x) + (12*a*r^5 - 4*(b*n + 50*a)*r^4 + 15*(4*b*n + 85*a
)*r^3 - 25*(13*b*n + 155*a)*r^2 - 625*b*n + 375*(2*b*n + 15*a)*r - 3125*a)*
e^3)*x^(3*r) - 75*((18*b*d*r^5 - 285*b*d*r^4 + 1700*b*d*r^3 - 4750*b*d*r^2
+ 6250*b*d*r - 3125*b*d)*e^2*log(c) + (18*b*d*n*r^5 - 285*b*d*n*r^4 + 1700*
b*d*n*r^3 - 4750*b*d*n*r^2 + 6250*b*d*n*r - 3125*b*d*n)*e^2*log(x) + (18*a*
d*r^5 - 3*(3*b*d*n + 95*a*d)*r^4 + 20*(6*b*d*n + 85*a*d)*r^3 - 625*b*d*n -
50*(11*b*d*n + 95*a*d)*r^2 - 3125*a*d + 250*(4*b*d*n + 25*a*d)*r)*e^2)*x^(2
*r) - 75*((36*b*d^2*r^5 - 480*b*d^2*r^4 + 2425*b*d^2*r^3 - 5875*b*d^2*r^2 +
 6875*b*d^2*r - 3125*b*d^2)*e*log(c) + (36*b*d^2*n*r^5 - 480*b*d^2*n*r^4 +
2425*b*d^2*n*r^3 - 5875*b*d^2*n*r^2 + 6875*b*d^2*n*r - 3125*b*d^2*n)*e*log(
x) + (36*a*d^2*r^5 - 12*(3*b*d^2*n + 40*a*d^2)*r^4 - 625*b*d^2*n + 25*(12*b
*d^2*n + 97*a*d^2)*r^3 - 3125*a*d^2 - 25*(37*b*d^2*n + 235*a*d^2)*r^2 + 625
*(2*b*d^2*n + 11*a*d^2)*r)*e)*x^r + 5*(36*b*d^3*r^6 - 660*b*d^3*r^5 + 4825*
b*d^3*r^4 - 18000*b*d^3*r^3 + 36250*b*d^3*r^2 - 37500*b*d^3*r + 15625*b*d^3
)*log(c) + 5*(36*b*d^3*n*r^6 - 660*b*d^3*n*r^5 + 4825*b*d^3*n*r^4 - 18000*b
*d^3*n*r^3 + 36250*b*d^3*n*r^2 - 37500*b*d^3*n*r + 15625*b*d^3*n)*log(x))/(
(36*r^6 - 660*r^5 + 4825*r^4 - 18000*r^3 + 36250*r^2 - 37500*r + 15625)*x^5
)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**6,x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^6, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(d+e\,x^r\right)^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^6,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^6, x)
```

3.404 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^8}\,dx$

Optimal. Leaf size=183

$$-\frac{bd^3n}{49x^7}-\frac{3bd^2enx^{-7+r}}{(7-r)^2}-\frac{3bde^2nx^{-7+2r}}{(7-2r)^2}-\frac{be^3nx^{-7+3r}}{(7-3r)^2}-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{-7+r}(a+b\log(cx^n))}{7-r}-\frac{3de^2\ldots}{}$$

```
[Out] -1/49*b*d^3*n/x^7-3*b*d^2*e*n*x^(-7+r)/(7-r)^2-3*b*d*e^2*n*x^(-7+2*r)/(7-2*
r)^2-b*e^3*n*x^(-7+3*r)/(7-3*r)^2-1/7*d^3*(a+b*ln(c*x^n))/x^7-3*d^2*e*x^(-7
+r)*(a+b*ln(c*x^n))/(7-r)-3*d*e^2*x^(-7+2*r)*(a+b*ln(c*x^n))/(7-2*r)-e^3*x^
(-7+3*r)*(a+b*ln(c*x^n))/(7-3*r)
```

Rubi [A]
time = 0.28, antiderivative size = 183, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}-\frac{bd^3n}{49x^7}-\frac{3bd^2enx^{r-7}}{(7-r)^2}-\frac{3bde^2nx^{2r-7}}{(7-2r)^2}-\frac{be^3nx^{3r-7}}{(7-3r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] -1/49*(b*d^3*n)/x^7 - (3*b*d^2*e*n*x^(-7 + r))/(7 - r)^2 - (3*b*d*e^2*n*x^(
-7 + 2*r))/(7 - 2*r)^2 - (b*e^3*n*x^(-7 + 3*r))/(7 - 3*r)^2 - (d^3*(a + b*L
og[c*x^n]))/(7*x^7) - (3*d^2*e*x^(-7 + r)*(a + b*Log[c*x^n]))/(7 - r) - (3*
d*e^2*x^(-7 + 2*r)*(a + b*Log[c*x^n]))/(7 - 2*r) - (e^3*x^(-7 + 3*r)*(a + b
*Log[c*x^n]))/(7 - 3*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8}\,dx &= -\frac{1}{7}\left(\frac{d^3}{x^7}+\frac{21d^2ex^{-7+r}}{7-r}+\frac{21de^2x^{-7+2r}}{7-2r}+\frac{7e^3x^{-7+3r}}{7-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{1}{7}\left(\frac{d^3}{x^7}+\frac{21d^2ex^{-7+r}}{7-r}+\frac{21de^2x^{-7+2r}}{7-2r}+\frac{7e^3x^{-7+3r}}{7-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{1}{7}\left(\frac{d^3}{x^7}+\frac{21d^2ex^{-7+r}}{7-r}+\frac{21de^2x^{-7+2r}}{7-2r}+\frac{7e^3x^{-7+3r}}{7-3r}\right)(a+b\log(cx^n)) -\\ &= -\frac{bd^3n}{49x^7}-\frac{3bd^2enx^{-7+r}}{(7-r)^2}-\frac{3bde^2nx^{-7+2r}}{(7-2r)^2}-\frac{be^3nx^{-7+3r}}{(7-3r)^2}-\frac{1}{7}\left(\frac{d^3}{x^7}+\frac{21d^2e}{7-}\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 164, normalized size = 0.90

$$\frac{-7bd^3n\log(x)-d^3(7a+bn-7bn\log(x)+7b\log(cx^n))+\frac{147d^2ex^r(-bn+a(-7+r)+b(-7+r)\log(cx^n))}{(-7+r)^2}+\frac{147de^2x^{2r}(-bn+a(-7+2r)+b(-7+2r)\log(cx^n))}{(7-2r)^2}+\frac{49e^3x^{3r}(-bn+a(-7+3r)+b(-7+3r)\log(cx^n))}{(7-3r)^2}}{49x^7}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^8,x]
```

```
[Out] (-7*b*d^3*n*Log[x] - d^3*(7*a + b*n - 7*b*n*Log[x] + 7*b*Log[c*x^n]) + (147
*d^2*e*x^r*(-(b*n) + a*(-7 + r) + b*(-7 + r)*Log[c*x^n]))/(-7 + r)^2 + (147
*d*e^2*x^(2*r)*(-(b*n) + a*(-7 + 2*r) + b*(-7 + 2*r)*Log[c*x^n]))/(7 - 2*r)
^2 + (49*e^3*x^(3*r)*(-(b*n) + a*(-7 + 3*r) + b*(-7 + 3*r)*Log[c*x^n]))/(7
- 3*r)^2)/(49*x^7)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.32, size = 4031, normalized size = 22.03

method	result	size
risch	Expression too large to display	4031

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

```
[Out] -1/7*b*(-14*e^3*r^2*(x^r)^3-63*d*e^2*r^2*(x^r)^2+147*e^3*r*(x^r)^3+6*d^3*r^
3-126*d^2*e*r^2*x^r+588*d*e^2*r*(x^r)^2-343*e^3*(x^r)^3-77*d^3*r^2+735*d^2*
e*r*x^r-1029*d*e^2*(x^r)^2+294*d^3*r-1029*d^2*e*x^r-343*d^3)/x^7/(-7+3*r)/(
-7+2*r)/(-7+r)*ln(x^n)-1/98*(1647086*e^3*(x^r)^3*a-974806*I*Pi*b*d^3*r^2*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2470629*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x
^n)^2*x^r+4941258*d^2*e*x^r*a+4941258*d*e^2*(x^r)^2*a-2369787*I*Pi*b*d^2*e*
r^2*csgn(I*c*x^n)^3*x^r-588*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^
3+2369787*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+122451*I*Pi*b*e^
3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-123480*b*d^2*e*n*r^3*x^r+
3831996*ln(c)*b*d*e^2*r^2*(x^r)^2-7058940*ln(c)*b*d*e^2*r*(x^r)^2+504*a*d^3
*r^6-12936*a*d^3*r^5+132398*a*d^3*r^4-3529470*I*Pi*b*d*e^2*r*csgn(I*c)*csgn
(I*c*x^n)^2*(x^r)^2-5292*I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*c*x^n)^2*x^r-191
5998*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-2646*I*Pi*b*d*e^2*r^5*csgn(I*
c)*csgn(I*c*x^n)^2*(x^r)^2+1647086*a*d^3-979608*a*d*e^2*r^3*(x^r)^2+3831996
*a*d*e^2*r^2*(x^r)^2-7058940*a*d*e^2*r*(x^r)^2-1397382*a*d^2*e*r^3*x^r+4739
574*a*d^2*e*r^2*x^r-7764834*a*d^2*e*r*x^r-252*I*Pi*b*d^3*r^6*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+2470629*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^
2+72*b*d^3*n*r^6-1848*b*d^3*n*r^5+18914*b*d^3*n*r^4-6468*I*Pi*b*d^3*r^5*csg
n(I*x^n)*csgn(I*c*x^n)^2+66199*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*c*x^n)^2+661
99*I*Pi*b*d^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2+698691*I*Pi*b*d^2*e*r^3*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+2646*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)*(x^r)^2+533022*b*d^2*e*n*r^2*x^r-806736*b*d*e^2*n*r*(x^r)
^2-1008420*b*d^2*e*n*r*x^r+2646*b*d*e^2*n*r^4*(x^r)^2-49392*b*d*e^2*n*r^3*(
x^r)^2+10584*b*d^2*e*n*r^4*x^r-691488*a*d^3*r^3+1949612*a*d^3*r^2-2823576*a
*d^3*r-345744*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2-345744*I*Pi*b*d^3*r^
3*csgn(I*x^n)*csgn(I*c*x^n)^2+504*ln(c)*b*d^3*r^6-12936*ln(c)*b*d^3*r^5+132
398*ln(c)*b*d^3*r^4-691488*ln(c)*b*d^3*r^3+1949612*ln(c)*b*d^3*r^2-2823576*
ln(c)*b*d^3*r+235298*b*d^3*n-1176*a*e^3*r^5*(x^r)^3+27440*a*e^3*r^4*(x^r)^3
+1647086*ln(c)*b*e^3*(x^r)^3+235298*b*e^3*n*(x^r)^3-244902*a*e^3*r^3*(x^r)^
3+1647086*d^3*b*ln(c)-122451*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)
^3-98784*I*Pi*b*d^2*e*r^4*csgn(I*c*x^n)^3*x^r-122451*I*Pi*b*e^3*r^3*csgn(I*
x^n)*csgn(I*c*x^n)^2*(x^r)^3-98784*b*d^3*n*r^3+278516*b*d^3*n*r^2-403368*b*
d^3*n*r+62426*b*e^3*n*r^2*(x^r)^3-201684*b*e^3*n*r*(x^r)^3+705894*b*d*e^2*n
*(x^r)^2+705894*b*d^2*e*n*x^r+4941258*ln(c)*b*d^2*e*x^r-3882417*I*Pi*b*d^2*
e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-1411788*I*Pi*b*d^3*r*csgn(I*c)*csgn(I*c*x
^n)^2-1411788*I*Pi*b*d^3*r*csgn(I*x^n)*csgn(I*c*x^n)^2-823543*I*Pi*b*d^3*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1042034*a*e^3*r^2*(x^r)^3-2117682*a*e^3*r
*(x^r)^3+6468*I*Pi*b*d^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4941258*ln
(c)*b*d*e^2*(x^r)^2-244902*ln(c)*b*e^3*r^3*(x^r)^3+1042034*ln(c)*b*e^3*r^2*
(x^r)^3-2117682*ln(c)*b*e^3*r*(x^r)^3-1176*ln(c)*b*e^3*r^5*(x^r)^3+27440*ln
(c)*b*e^3*r^4*(x^r)^3+392*b*e^3*n*r^4*(x^r)^3-8232*b*e^3*n*r^3*(x^r)^3-5292
*a*d*e^2*r^5*(x^r)^2+117306*a*d*e^2*r^4*(x^r)^2-10584*a*d^2*e*r^5*x^r+19756
8*a*d^2*e*r^4*x^r+98784*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*c*x^n)^2*x^r+9878
4*I*Pi*b*d^2*e*r^4*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-5292*I*Pi*b*d^2*e*r^5*cs
gn(I*x^n)*csgn(I*c*x^n)^2*x^r-698691*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*c*x^
```

```
n)^2*x^r-521017*I*Pi*b*e^3*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-
489804*I*Pi*b*d*e^2*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+316932*b*d*e^2*
n*r^2*(x^r)^2-10584*ln(c)*b*d^2*e*r^5*x^r+122451*I*Pi*b*e^3*r^3*csgn(I*c*x^
n)^3*(x^r)^3-521017*I*Pi*b*e^3*r^2*csgn(I*c*x^n)^3*(x^r)^3+1058841*I*Pi*b*e
^3*r*csgn(I*c*x^n)^3*(x^r)^3-2470629*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2-6
6199*I*Pi*b*d^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+823543*I*Pi*b*d^3*c
sgn(I*x^n)*csgn(I*c*x^n)^2+6468*I*Pi*b*d^3*r^5*csgn(I*c*x^n)^3-66199*I*Pi*b
*d^3*r^4*csgn(I*c*x^n)^3+698691*I*Pi*b*d^2*e*r^3*csgn(I*c*x^n)^3*x^r-191599
8*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-2369787*I*Pi
*b*d^2*e*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+3882417*I*Pi*b*d^2*e*r
*csgn(I*c*x^n)^3*x^r-58653*I*Pi*b*d*e^2*r^4*csgn(I*c*x^n)^3*(x^r)^2+1915998
*I*Pi*b*d*e^2*r^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-823543*I*Pi*b*d^3*csgn(
I*c*x^n)^3+588*I*Pi*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+1
058841*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-2646*I*Pi*b
*d*e^2*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+117306*ln(c)*b*d*e^2*r^4*(x^
r)^2-1397382*ln(c)*b*d^2*e*r^3*x^r+4739574*ln(c)*b*d^2*e*r^2*x^r-7764834*ln
(c)*b*d^2*e*r*x^r-979608*ln(c)*b*d*e^2*r^3*(x^r)^2+3529470*I*Pi*b*d*e^2*r*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+3882417*I*Pi*b*d^2*e*r*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*x^r-58653*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)*(x^r)^2-98784*I*Pi*b*d^2*e*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)*x^r-13720*I*Pi*b*e^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3
+2369787*I*Pi*b*d^2*e*r^2*csgn(I*c)*csgn(I*c*x^...
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-8>0)', see `assume?` for more det
ails)Is
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 844 vs. $2(172) = 344$.
time = 0.37, size = 844, normalized size = 4.61

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

```
[Out] -1/49*(36*(b*d^3*n + 7*a*d^3)*r^6 - 924*(b*d^3*n + 7*a*d^3)*r^5 + 117649*b*
d^3*n + 9457*(b*d^3*n + 7*a*d^3)*r^4 + 823543*a*d^3 - 49392*(b*d^3*n + 7*a*
d^3)*r^3 + 139258*(b*d^3*n + 7*a*d^3)*r^2 - 201684*(b*d^3*n + 7*a*d^3)*r -
49*((12*b*r^5 - 280*b*r^4 + 2499*b*r^3 - 10633*b*r^2 + 21609*b*r - 16807*b)
*e^3*log(c) + (12*b*n*r^5 - 280*b*n*r^4 + 2499*b*n*r^3 - 10633*b*n*r^2 + 21
609*b*n*r - 16807*b*n)*e^3*log(x) + (12*a*r^5 - 4*(b*n + 70*a)*r^4 + 21*(4*
b*n + 119*a)*r^3 - 49*(13*b*n + 217*a)*r^2 - 2401*b*n + 1029*(2*b*n + 21*a)
*r - 16807*a)*e^3)*x^(3*r) - 147*((18*b*d*r^5 - 399*b*d*r^4 + 3332*b*d*r^3
- 13034*b*d*r^2 + 24010*b*d*r - 16807*b*d)*e^2*log(c) + (18*b*d*n*r^5 - 399
*b*d*n*r^4 + 3332*b*d*n*r^3 - 13034*b*d*n*r^2 + 24010*b*d*n*r - 16807*b*d*n
)*e^2*log(x) + (18*a*d*r^5 - 3*(3*b*d*n + 133*a*d)*r^4 + 28*(6*b*d*n + 119*
a*d)*r^3 - 2401*b*d*n - 98*(11*b*d*n + 133*a*d)*r^2 - 16807*a*d + 686*(4*b*
d*n + 35*a*d)*r)*e^2)*x^(2*r) - 147*((36*b*d^2*r^5 - 672*b*d^2*r^4 + 4753*b
*d^2*r^3 - 16121*b*d^2*r^2 + 26411*b*d^2*r - 16807*b*d^2)*e*log(c) + (36*b*
d^2*n*r^5 - 672*b*d^2*n*r^4 + 4753*b*d^2*n*r^3 - 16121*b*d^2*n*r^2 + 26411*
b*d^2*n*r - 16807*b*d^2*n)*e*log(x) + (36*a*d^2*r^5 - 12*(3*b*d^2*n + 56*a*
d^2)*r^4 - 2401*b*d^2*n + 7*(60*b*d^2*n + 679*a*d^2)*r^3 - 16807*a*d^2 - 49
*(37*b*d^2*n + 329*a*d^2)*r^2 + 343*(10*b*d^2*n + 77*a*d^2)*r)*e)*x^r + 7*(
36*b*d^3*r^6 - 924*b*d^3*r^5 + 9457*b*d^3*r^4 - 49392*b*d^3*r^3 + 139258*b*
d^3*r^2 - 201684*b*d^3*r + 117649*b*d^3)*log(c) + 7*(36*b*d^3*n*r^6 - 924*b
*d^3*n*r^5 + 9457*b*d^3*n*r^4 - 49392*b*d^3*n*r^3 + 139258*b*d^3*n*r^2 - 20
1684*b*d^3*n*r + 117649*b*d^3*n)*log(x))/((36*r^6 - 924*r^5 + 9457*r^4 - 49
392*r^3 + 139258*r^2 - 201684*r + 117649)*x^7)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**8,x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^8, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^8} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^8,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^8, x)
```

3.405 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx$

Optimal. Leaf size=191

$$-\frac{bd^3n}{81x^9}-\frac{be^3nx^{-3(3-r)}}{9(3-r)^2}-\frac{3bd^2enx^{-9+r}}{(9-r)^2}-\frac{3bde^2nx^{-9+2r}}{(9-2r)^2}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}-3d^2$$

```
[Out] -1/81*b*d^3*n/x^9-1/9*b*e^3*n/(3-r)^2/(x^(9-3*r))-3*b*d^2*e*n*x^(-9+r)/(9-r
)^2-3*b*d*e^2*n*x^(-9+2*r)/(9-2*r)^2-1/9*d^3*(a+b*ln(c*x^n))/x^9-1/3*e^3*(a
+b*ln(c*x^n))/(3-r)/(x^(9-3*r))-3*d^2*e*x^(-9+r)*(a+b*ln(c*x^n))/(9-r)-3*d*
e^2*x^(-9+2*r)*(a+b*ln(c*x^n))/(9-2*r)
```

Rubi [A]
time = 0.28, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {276, 2372, 12, 14}

$$-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}-\frac{bd^3n}{81x^9}-\frac{3bd^2enx^{r-9}}{(9-r)^2}-\frac{3bde^2nx^{2r-9}}{(9-2r)^2}-\frac{be^3nx^{-3(3-r)}}{9(3-r)^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^10,x]
```

```
[Out] -1/81*(b*d^3*n)/x^9 - (b*e^3*n)/(9*(3 - r)^2*x^(3*(3 - r))) - (3*b*d^2*e*n*
x^(-9 + r))/(9 - r)^2 - (3*b*d*e^2*n*x^(-9 + 2*r))/(9 - 2*r)^2 - (d^3*(a +
b*Log[c*x^n]))/(9*x^9) - (e^3*(a + b*Log[c*x^n]))/(3*(3 - r)*x^(3*(3 - r)))
 - (3*d^2*e*x^(-9 + r)*(a + b*Log[c*x^n]))/(9 - r) - (3*d*e^2*x^(-9 + 2*r)*
(a + b*Log[c*x^n]))/(9 - 2*r)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^{10}}\,dx &= -\frac{1}{9}\left(\frac{d^3}{x^9}+\frac{3e^3x^{-3(3-r)}}{3-r}+\frac{27d^2ex^{-9+r}}{9-r}+\frac{27de^2x^{-9+2r}}{9-2r}\right)(a+b\log(cx^n)) \\ &= -\frac{1}{9}\left(\frac{d^3}{x^9}+\frac{3e^3x^{-3(3-r)}}{3-r}+\frac{27d^2ex^{-9+r}}{9-r}+\frac{27de^2x^{-9+2r}}{9-2r}\right)(a+b\log(cx^n)) \\ &= -\frac{1}{9}\left(\frac{d^3}{x^9}+\frac{3e^3x^{-3(3-r)}}{3-r}+\frac{27d^2ex^{-9+r}}{9-r}+\frac{27de^2x^{-9+2r}}{9-2r}\right)(a+b\log(cx^n)) \\ &= -\frac{bd^3n}{81x^9}-\frac{be^3nx^{-3(3-r)}}{9(3-r)^2}-\frac{3bd^2enx^{-9+r}}{(9-r)^2}-\frac{3bde^2nx^{-9+2r}}{(9-2r)^2}-\frac{1}{9}\left(\frac{d^3}{x^9}+\frac{3e^3x}{3}\right.\end{aligned}$$

Mathematica [A]
time = 0.16, size = 160, normalized size = 0.84

$$\frac{-9bd^3n\log(x)-d^3(9a+bn-9bn\log(x)+9b\log(cx^n))+\frac{243d^2ex^r(-bn+a(-9+r)+b(-9+r)\log(cx^n))}{(-9+r)^2}+\frac{9e^3x^{3r}(-bn+3a(-3+r)+3b(-3+r)\log(cx^n))}{(-3+r)^2}+\frac{243de^2x^{2r}(-bn+a(-9+2r)+b(-9+2r)\log(cx^n))}{(9-2r)^2}}{81x^9}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^10,x]
```

```
[Out] (-9*b*d^3*n*Log[x] - d^3*(9*a + b*n - 9*b*n*Log[x] + 9*b*Log[c*x^n]) + (243
*d^2*e*x^r*(-(b*n) + a*(-9 + r) + b*(-9 + r)*Log[c*x^n]))/(-9 + r)^2 + (9*e
^3*x^(3*r)*(-(b*n) + 3*a*(-3 + r) + 3*b*(-3 + r)*Log[c*x^n]))/(-3 + r)^2 +
(243*d*e^2*x^(2*r)*(-(b*n) + a*(-9 + 2*r) + b*(-9 + 2*r)*Log[c*x^n]))/(9 -
2*r)^2)/(81*x^9)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.33, size = 4027, normalized size = 21.08

method	result	size
risch	Expression too large to display	4027

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^10,x,method=_RETURNVERBOSE)
```

```
[Out] -1/9*b*(-6*e^3*r^2*(x^r)^3-27*d*e^2*r^2*(x^r)^2+81*e^3*r*(x^r)^3+2*d^3*r^3-
54*d^2*e*r^2*x^r+324*d*e^2*r*(x^r)^2-243*e^3*(x^r)^3-33*d^3*r^2+405*d^2*e*r
*x^r-729*d*e^2*(x^r)^2+162*d^3*r-729*d^2*e*x^r-243*d^3)/x^9/(-3+r)/(-9+2*r)
/(-9+r)*ln(x^n)-1/162*(1062882*e^3*(x^r)^3*a+3188646*d^2*e*x^r*a+3188646*d*
e^2*(x^r)^2*a-104976*I*Pi*b*d^3*r^3*csgn(I*c)*csgn(I*c*x^n)^2-104976*I*Pi*b
*d^3*r^3*csgn(I*x^n)*csgn(I*c*x^n)^2+3240*I*Pi*b*e^3*r^4*csgn(I*x^n)*csgn(I
*c*x^n)^2*(x^r)^3-925101*I*Pi*b*d^2*e*r^2*csgn(I*c*x^n)^3*x^r-531441*I*Pi*b
*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+708588*I*Pi*b*d^3*r*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-29160*b*d^2*e*n*r^3*x^r+1495908*ln(c)*b*d*e^2
*r^2*(x^r)^2-3542940*ln(c)*b*d*e^2*r*(x^r)^2-1594323*I*Pi*b*d^2*e*csgn(I*c*
x^n)^3*x^r+72*a*d^3*r^6-2376*a*d^3*r^5+31266*a*d^3*r^4-23328*I*Pi*b*d^2*e*r
^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+972*I*Pi*b*d^2*e*r^5*csgn(I*c*x^
n)^3*x^r+1062882*a*d^3-297432*a*d*e^2*r^3*(x^r)^2+1495908*a*d*e^2*r^2*(x^r)
^2-3542940*a*d*e^2*r*(x^r)^2-424278*a*d^2*e*r^3*x^r+1850202*a*d^2*e*r^2*x^r
-3897234*a*d^2*e*r*x^r+8*b*d^3*n*r^6-264*b*d^3*n*r^5+3474*b*d^3*n*r^4+16183
8*b*d^2*e*n*r^2*x^r-314928*b*d*e^2*n*r*(x^r)^2-393660*b*d^2*e*n*r*x^r+486*b
*d*e^2*n*r^4*(x^r)^2-11664*b*d*e^2*n*r^3*(x^r)^2+1944*b*d^2*e*n*r^4*x^r-209
952*a*d^3*r^3+761076*a*d^3*r^2-1417176*a*d^3*r-708588*I*Pi*b*d^3*r*csgn(I*c
)*csgn(I*c*x^n)^2+72*ln(c)*b*d^3*r^6-2376*ln(c)*b*d^3*r^5+31266*ln(c)*b*d^3
*r^4-209952*ln(c)*b*d^3*r^3+761076*ln(c)*b*d^3*r^2-1417176*ln(c)*b*d^3*r+11
8098*b*d^3*n-216*a*e^3*r^5*(x^r)^3+6480*a*e^3*r^4*(x^r)^3+1062882*ln(c)*b*e
^3*(x^r)^3+118098*b*e^3*n*(x^r)^3-74358*a*e^3*r^3*(x^r)^3+1062882*d^3*b*ln(
c)-23328*b*d^3*n*r^3+84564*b*d^3*n*r^2-157464*b*d^3*n*r+18954*b*e^3*n*r^2*(
x^r)^3-78732*b*e^3*n*r*(x^r)^3+354294*b*d*e^2*n*(x^r)^2+354294*b*d^2*e*n*x^
r+3188646*ln(c)*b*d^2*e*x^r-1948617*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^
2*x^r-1594323*I*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+4067
82*a*e^3*r^2*(x^r)^3-1062882*a*e^3*r*(x^r)^3+104976*I*Pi*b*d^3*r^3*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)-380538*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+1594323*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+212139*I*Pi*b
*d^2*e*r^3*csgn(I*c*x^n)^3*x^r+3188646*ln(c)*b*d*e^2*(x^r)^2-74358*ln(c)*b*
e^3*r^3*(x^r)^3+406782*ln(c)*b*e^3*r^2*(x^r)^3-1062882*ln(c)*b*e^3*r*(x^r)^
3-216*ln(c)*b*e^3*r^5*(x^r)^3+6480*ln(c)*b*e^3*r^4*(x^r)^3+72*b*e^3*n*r^4*(
x^r)^3-1944*b*e^3*n*r^3*(x^r)^3-972*a*d*e^2*r^5*(x^r)^2+27702*a*d*e^2*r^4*(
x^r)^2-1944*a*d^2*e*r^5*x^r+46656*a*d^2*e*r^4*x^r+1594323*I*Pi*b*d^2*e*csgn
(I*x^n)*csgn(I*c*x^n)^2*x^r+15633*I*Pi*b*d^3*r^4*csgn(I*x^n)*csgn(I*c*x^n)^
2+37179*I*Pi*b*e^3*r^3*csgn(I*c*x^n)^3*(x^r)^3-203391*I*Pi*b*e^3*r^2*csgn(I
*c*x^n)^3*(x^r)^3-747954*I*Pi*b*d*e^2*r^2*csgn(I*c*x^n)^3*(x^r)^2-531441*I*
Pi*b*e^3*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3-531441*I*Pi*b*e^3*r*csgn(I*x^n
)*csgn(I*c*x^n)^2*(x^r)^3+96228*b*d*e^2*n*r^2*(x^r)^2+925101*I*Pi*b*d^2*e*r
^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r+925101*I*Pi*b*d^2*e*r^2*csgn(I*x^n)*csgn(I
*c*x^n)^2*x^r+37179*I*Pi*b*e^3*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r
)^3-1944*ln(c)*b*d^2*e*r^5*x^r+36*I*Pi*b*d^3*r^6*csgn(I*c)*csgn(I*c*x^n)^2-
13851*I*Pi*b*d*e^2*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+108*I*Pi
*b*e^3*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-148716*I*Pi*b*d*e^2*
r^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+531441*I*Pi*b*e^3*r*csgn(I*c)*csgn(
```

```
I*x^n)*csgn(I*c*x^n)*(x^r)^3+1771470*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*(x^r)^2+1948617*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*x^r+104976*I*Pi*b*d^3*r^3*csgn(I*c*x^n)^3-380538*I*Pi*b*d^3*r^2*csgn(I
*c*x^n)^3-1594323*I*Pi*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+2121
39*I*Pi*b*d^2*e*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+486*I*Pi*b*d*e^
2*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-203391*I*Pi*b*e^3*r^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+747954*I*Pi*b*d*e^2*r^2*csgn(I*c)*
csgn(I*c*x^n)^2*(x^r)^2+747954*I*Pi*b*d*e^2*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2
*(x^r)^2-486*I*Pi*b*d*e^2*r^5*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-3240*I*Pi*b
*e^3*r^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+531441*I*Pi*b*e^3*r*cs
gn(I*c*x^n)^3*(x^r)^3-1594323*I*Pi*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2-108*I*Pi
*b*e^3*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+203391*I*Pi*b*e^3*r^2*csgn(I
*c)*csgn(I*c*x^n)^2*(x^r)^3+108*I*Pi*b*e^3*r^5*csgn(I*c*x^n)^3*(x^r)^3-3240
*I*Pi*b*e^3*r^4*csgn(I*c*x^n)^3*(x^r)^3-148716*I*Pi*b*d*e^2*r^3*csgn(I*c)*c
sgn(I*c*x^n)^2*(x^r)^2-972*I*Pi*b*d^2*e*r^5*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r
+27702*ln(c)*b*d*e^2*r^4*(x^r)^2-424278*ln(c)*b*d^2*e*r^3*x^r+1850202*ln(c)
*b*d^2*e*r^2*x^r-3897234*ln(c)*b*d^2*e*r*x^r-297432*ln(c)*b*d*e^2*r^3*(x^r)
^2+148716*I*Pi*b*d*e^2*r^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+972*
I*Pi*b*d^2*e*r^5*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+531441*I*Pi*b*e^3*
csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+380538*I*Pi*b*d^3*r^2*csgn(I*c)*csgn(I*
c*x^n)^2+380538*I*Pi*b*d^3*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2-212139*I*Pi*b*d^
2*e*r^3*csgn(I*c)*csgn(I*c*x^n)^2*x^r-486*I*Pi*...
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError >> Computation failed since Maxima requested a
dditional constraints; using the 'assume' command before evaluation *may* h
elp (example of legal syntax is 'assume(r-10>0)', see `assume?` for more de
tails)I
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 844 vs. 2(173) = 346.
time = 0.37, size = 844, normalized size = 4.42

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

```
[Out] -1/81*(4*(b*d^3*n + 9*a*d^3)*r^6 - 132*(b*d^3*n + 9*a*d^3)*r^5 + 59049*b*d^
3*n + 1737*(b*d^3*n + 9*a*d^3)*r^4 + 531441*a*d^3 - 11664*(b*d^3*n + 9*a*d^
3)*r^3 + 42282*(b*d^3*n + 9*a*d^3)*r^2 - 78732*(b*d^3*n + 9*a*d^3)*r - 9*(3
*(4*b*r^5 - 120*b*r^4 + 1377*b*r^3 - 7533*b*r^2 + 19683*b*r - 19683*b)*e^3*
log(c) + 3*(4*b*n*r^5 - 120*b*n*r^4 + 1377*b*n*r^3 - 7533*b*n*r^2 + 19683*b
*n*r - 19683*b*n)*e^3*log(x) + (12*a*r^5 - 4*(b*n + 90*a)*r^4 + 27*(4*b*n +
 153*a)*r^3 - 81*(13*b*n + 279*a)*r^2 - 6561*b*n + 2187*(2*b*n + 27*a)*r -
59049*a)*e^3)*x^(3*r) - 243*((2*b*d*r^5 - 57*b*d*r^4 + 612*b*d*r^3 - 3078*b
*d*r^2 + 7290*b*d*r - 6561*b*d)*e^2*log(c) + (2*b*d*n*r^5 - 57*b*d*n*r^4 +
612*b*d*n*r^3 - 3078*b*d*n*r^2 + 7290*b*d*n*r - 6561*b*d*n)*e^2*log(x) + (2
*a*d*r^5 - (b*d*n + 57*a*d)*r^4 + 12*(2*b*d*n + 51*a*d)*r^3 - 729*b*d*n - 1
8*(11*b*d*n + 171*a*d)*r^2 - 6561*a*d + 162*(4*b*d*n + 45*a*d)*r)*e^2)*x^(2
*r) - 243*((4*b*d^2*r^5 - 96*b*d^2*r^4 + 873*b*d^2*r^3 - 3807*b*d^2*r^2 + 8
019*b*d^2*r - 6561*b*d^2)*e*log(c) + (4*b*d^2*n*r^5 - 96*b*d^2*n*r^4 + 873*
b*d^2*n*r^3 - 3807*b*d^2*n*r^2 + 8019*b*d^2*n*r - 6561*b*d^2*n)*e*log(x) +
(4*a*d^2*r^5 - 4*(b*d^2*n + 24*a*d^2)*r^4 - 729*b*d^2*n + 3*(20*b*d^2*n + 2
91*a*d^2)*r^3 - 6561*a*d^2 - 9*(37*b*d^2*n + 423*a*d^2)*r^2 + 81*(10*b*d^2*
n + 99*a*d^2)*r)*e)*x^r + 9*(4*b*d^3*r^6 - 132*b*d^3*r^5 + 1737*b*d^3*r^4 -
 11664*b*d^3*r^3 + 42282*b*d^3*r^2 - 78732*b*d^3*r + 59049*b*d^3)*log(c) +
9*(4*b*d^3*n*r^6 - 132*b*d^3*n*r^5 + 1737*b*d^3*n*r^4 - 11664*b*d^3*n*r^3 +
 42282*b*d^3*n*r^2 - 78732*b*d^3*n*r + 59049*b*d^3*n)*log(x))/((4*r^6 - 132
*r^5 + 1737*r^4 - 11664*r^3 + 42282*r^2 - 78732*r + 59049)*x^9)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**10,x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^3*(b*log(c*x^n) + a)/x^10, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^{10}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^10,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^10, x)
```

3.406 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{x^3(a+b\log(cx^n))}{d+ex^r},x\right)$$

```
[Out] Unintegrable(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r),x]
[Out] Defer[Int][(x^3*(a + b*Log[c*x^n]))/(d + e*x^r), x]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(26) = 52.
time = 0.07, size = 87, normalized size = 3.35

$$\frac{x^4\left(-bn\,{}_3F_2\left(1,\frac{4}{r},\frac{4}{r};1+\frac{4}{r},1+\frac{4}{r};-\frac{ex^r}{d}\right)+4\,{}_2F_1\left(1,\frac{4}{r};\frac{4+r}{r};-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{16d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r),x]
[Out] (x^4*(-(b*n*HypergeometricPFQ[{1, 4/r, 4/r}, {1 + 4/r, 1 + 4/r}, -((e*x^r)/
d)]) + 4*Hypergeometric2F1[1, 4/r, (4 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^
n])))/(16*d)
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(x^r*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a + b\log(cx^n))}{d + ex^r} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x^r*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x^3 \left(a + b \ln \left(c\, x^n\right)\right)}{d + e\, x^r}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^r),x)
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.407 $\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal. Leaf size=24

$$\text{Int}\left(\frac{x(a+b\log(cx^n))}{d+ex^r},x\right)$$

```
[Out] Unintegrable(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Rubi [A]
time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

```
[Out] Defer[Int][(x*(a + b*Log[c*x^n]))/(d + e*x^r), x]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(24) = 48.
time = 0.07, size = 87, normalized size = 3.62

$$\frac{x^2\left(-bn\,{}_3F_2\left(1,\frac{2}{r},\frac{2}{r};1+\frac{2}{r},1+\frac{2}{r};-\frac{ex^r}{d}\right)+2\,{}_2F_1\left(1,\frac{2}{r};\frac{2+r}{r};-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{4d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

```
[Out] (x^2*(-(b*n*HypergeometricPFQ[{1, 2/r, 2/r}, {1 + 2/r, 1 + 2/r}, -((e*x^r)/
d)]) + 2*Hypergeometric2F1[1, 2/r, (2 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^
n])))/(4*d)
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^n))}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(e*x^r + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((b*x*log(c*x^n) + a*x)/(x^r*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a + b\log(cx^n))}{d + ex^r}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(x^r*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x\,(a+b\,\ln\left(c\,x^n\right))}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^r),x)
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.408 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$

Optimal. Leaf size=54

$$-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}$$

```
[Out] -(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d/r+b*n*polylog(2,-d/e/(x^r))/d/r^2
```

Rubi [A]
time = 0.05, antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2379, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

```
[Out] -(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*x
^r))])/(d*r^2)
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx&=-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{(bn)\int\frac{\log\left(1+\frac{dx^{-r}}{e}\right)}{x}\,dx}{dr}\\&=-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 108, normalized size = 2.00

$$\frac{bnr^2\log^2(x)-2r(a+b\log(cx^n))\log(d-dx^r)+2bnr\log(x)(\log(d-dx^r)-\log(d+ex^r))+2bn\log\left(-\frac{ex^r}{d}\right)\log(d+ex^r)+2bn\text{Li}_2\left(1+\frac{ex^r}{d}\right)}{2dr^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

```
[Out] (b*n*r^2*Log[x]^2 - 2*r*(a + b*Log[c*x^n])*Log[d - d*x^r] + 2*b*n*r*Log[x]*
(Log[d - d*x^r] - Log[d + e*x^r]) + 2*b*n*Log[-((e*x^r)/d)]*Log[d + e*x^r]
+ 2*b*n*PolyLog[2, 1 + (e*x^r)/d])/(2*d*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.15, size = 451, normalized size = 8.35

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{rd}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{rd}-\frac{b\ln(x^r)n\ln(x)}{rd}+\frac{b\ln(x^r)\ln(x^n)}{rd}+\frac{bn\ln(x)^2}{2d}-\frac{bn\ln(x)\ln\left(1+\frac{e\,x^r}{d}\right)}{rd}-\frac{bn\,\text{polylo}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

```
[Out] b/r/d*ln(d+e*x^r)*n*ln(x)-b/r/d*ln(d+e*x^r)*ln(x^n)-b/r/d*ln(x^r)*n*ln(x)+b
/r/d*ln(x^r)*ln(x^n)+1/2*b*n/d*ln(x)^2-b/r*n/d*ln(x)*ln(1+e*x^r/d)-b/r^2*n/
d*polylog(2,-e*x^r/d)+1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*ln(x^r)-1/
2*I/r*b*Pi*csgn(I*c*x^n)^3/d*ln(x^r)+1/2*I/r*b*Pi*csgn(I*c*x^n)^3/d*ln(d+e*
x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*ln(d+e*x^r)-1/2*I/r*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2/d*ln(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^
2/d*ln(x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(d+e*x^r)-
1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(x^r)-1/r*b*ln(c)/d*ln
(d+e*x^r)+1/r*b*ln(c)/d*ln(x^r)-a/r/d*ln(d+e*x^r)+a/r/d*ln(x^r)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] a*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + b*integrate((log(c) + log(x^n))/(
e*x*x^r + d*x), x)
```

Fricas [A]
time = 0.36, size = 96, normalized size = 1.78

$$\frac{bnr^2\log(x)^2-2\,bnr\log(x)\log\left(\frac{x^re+d}{d}\right)-2\,bn\text{Li}_2\left(-\frac{x^re+d}{d}+1\right)-2\,(br\log(c)+ar)\log(x^re+d)+2\,(br^2\log(c)+ar^2)\log(x)}{2\,dr^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] 1/2*(b*n*r^2*log(x)^2 - 2*b*n*r*log(x)*log((x^r*e + d)/d) - 2*b*n*dilog(-(x
^r*e + d)/d + 1) - 2*(b*r*log(c) + a*r)*log(x^r*e + d) + 2*(b*r^2*log(c) +
a*r^2)*log(x))/(d*r^2)
```

Sympy [A]
time = 194.90, size = 452, normalized size = 8.37

$$-\frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x^r}{d} & \text{for}\: e=0\\ -\frac{\log(-2ex^r)}{2e} & \text{otherwise}\end{cases}\right)}{dr}-\frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x^r}{d} & \text{for}\: e=0\\ \frac{\log(2d+2ex^r)}{2e} & \text{otherwise}\end{cases}\right)}{dr}+\frac{2ben\left(\begin{cases}\begin{cases}\frac{\log(x)}{2e}+\frac{x^r}{dr} & \text{for}\: r\neq 0\\ \frac{\log(x)}{2e}+\frac{\log(x)}{d} & \text{otherwise}\end{cases} & \text{for}\: e=0\\ -\frac{\begin{cases}0 & \text{for}\: \frac{1}{|ex^r|}<1\wedge |ex^r|<1\\ \frac{\log(ex^r)^2}{2r}+\frac{i\pi\log(ex^r)}{r} & \text{for}\: |ex^r|<1\\ \frac{\log\left(\frac{x^{-r}}{e}\right)^2}{2r}-\frac{i\pi\log\left(\frac{x^{-r}}{e}\right)}{r} & \text{for}\: \frac{1}{|ex^r|}<1\\ \frac{G^{3,0}_{3,3}\left(\begin{matrix} & 1,1,1\\ 0,0,0 & \end{matrix}\middle| ex^re^{i\pi}\right)}{r}+\frac{G^{0,3}_{3,3}\left(\begin{matrix}1,1,1 & \\ & 0,0,0\end{matrix}\middle| ex^re^{i\pi}\right)}{r} & \text{otherwise}\end{cases}}{2e}-\frac{\log(2)\log(x)}{2e} & \text{otherwise}\end{cases}\right)}{dr}+\frac{2ben\left(\begin{cases}\begin{cases}\frac{\log(x)}{2e}+\frac{x^r}{dr} & \text{for}\: r\neq 0\\ \frac{\log(x)}{2e}+\frac{\log(x)}{d} & \text{otherwise}\end{cases} & \text{for}\: e=0\\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for}\: \frac{1}{|x|}<1\wedge |x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for}\: |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for}\: \frac{1}{|x|}<1\\ -G^{2,0}_{2,2}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G^{0,2}_{2,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{otherwise}\end{cases}}{2e}+\frac{\log(2)\log(x)}{2e} & \text{otherwise}\end{cases}\right)}{dr}-\frac{2be\left(\begin{cases}\frac{1}{2e}+\frac{x^r}{d} & \text{for}\: e=0\\ -\frac{\log(-2ex^r)}{2e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{dr}-\frac{2be\left(\begin{cases}\frac{1}{2e}+\frac{x^r}{d} & \text{for}\: e=0\\ \frac{\log(2d+2ex^r)}{2e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{dr}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r),x)
```

```
[Out] -2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), True
))/(d*r) - 2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log(2*d + 2*e*x**
r)/(2*e), True))/(d*r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/
(d*r), Ne(r, 0)), (log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (-Piecewise(
(0, (Abs(e*x**r) < 1) & (1/Abs(e*x**r) < 1)), (log(e*x**r)**2/(2*r) + I*pi*
log(e*x**r)/r, Abs(e*x**r) < 1), (log(1/(e*x**r))**2/(2*r) - I*pi*log(1/(e*
x**r))/r, 1/Abs(e*x**r) < 1), (meijerg(((), (1, 1, 1)), ((0, 0, 0), ()), e*
x**r*exp_polar(I*pi))/r + meijerg(((1, 1, 1), ()), ((), (0, 0, 0)), e*x**r*
exp_polar(I*pi))/r, True))/(2*e) - log(2)*log(x)/(2*e), True))/(d*r) + 2*b*
e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/(d*r), Ne(r, 0)), (log(x)/(2*
e) + log(x)/d, True)), Eq(e, 0)), (Piecewise((-polylog(2, e*x**r*exp_polar(
I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x
**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**
r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ())
, x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*
x**r*exp_polar(I*pi)/d)/r, True))/(2*e) + log(2)*log(x)/(2*e), True))/(d*r)
 - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), Tr
ue))*log(c*x**n)/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log
(2*d + 2*e*x**r)/(2*e), True))*log(c*x**n)/(d*r)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x^r\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)), x)
```

3.409 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)},x\right)$$

[Out] Unintegrable((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx$$

Verification is not applicable to the result.

[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)),x]

[Out] Defer[Int][(a + b*Log[c*x^n])/(x^3*(d + e*x^r)), x]

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx=\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 86 vs. 2(26) = 52.
time = 0.07, size = 86, normalized size = 3.31

$$-\frac{bn\,{}_3F_2\left(1,-\frac{2}{r},-\frac{2}{r};1-\frac{2}{r},1-\frac{2}{r};-\frac{ex^r}{d}\right)+2\,{}_2F_1\left(1,-\frac{2}{r};\frac{-2+r}{r};-\frac{ex^r}{d}\right)\left(a+b\log\left(cx^n\right)\right)}{4dx^2}$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)),x]

[Out] -1/4*(b*n*HypergeometricPFQ[{1, -2/r, -2/r}, {1 - 2/r, 1 - 2/r}, -((e*x^r)/d)] + 2*Hypergeometric2F1[1, -2/r, (-2 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^n]))/(d*x^2)

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\left(d+e\,x^r\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^3), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^3*x^r*e + d*x^3), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log{(cx^n)}}{x^3\,(d+ex^r)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(d+e*x**r),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**3*(d + e*x**r)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)*x^3), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\,\left(d+e\,x^r\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^r)),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^r)), x)
```

3.410 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^r} dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{x^2(a+b\log(cx^n))}{d+ex^r},x\right)$$

```
[Out] Unintegrable(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r} dx$$

Verification is not applicable to the result.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

```
[Out] Defer[Int][(x^2*(a + b*Log[c*x^n]))/(d + e*x^r), x]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r} dx = \int \frac{x^2(a+b\log(cx^n))}{d+ex^r} dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(26) = 52.
time = 0.07, size = 87, normalized size = 3.35

$$\frac{x^3\left(-bn\,{}_3F_2\left(1,\frac{3}{r},\frac{3}{r};1+\frac{3}{r},1+\frac{3}{r};-\frac{ex^r}{d}\right)+3\,{}_2F_1\left(1,\frac{3}{r};\frac{3+r}{r};-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{9d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

```
[Out] (x^3*(-(b*n*HypergeometricPFQ[{1, 3/r, 3/r}, {1 + 3/r, 1 + 3/r}, -((e*x^r)/
d)]) + 3*Hypergeometric2F1[1, 3/r, (3 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^
n])))/(9*d)
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{d+e\,x^r} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(x^r*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log{(cx^n)})}{d + ex^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^r*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x^2\,(a+b\,\ln(c\,x^n))}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^r),x)
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.411 $\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$

Optimal. Leaf size=23

$$\mathrm{Int}\left(\frac{a+b\log\left(cx^n\right)}{d+ex^r},x\right)$$

```
[Out] Unintegrable((a+b*ln(c*x^n))/(d+e*x^r),x)
```

Rubi [A]
time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex^r}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^r),x]
```

```
[Out] Defer[Int][(a + b*Log[c*x^n])/(d + e*x^r), x]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{d+ex^r}\,dx = \int \frac{a+b\log\left(cx^n\right)}{d+ex^r}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 69 vs. 2(23) = 46.
time = 0.05, size = 69, normalized size = 3.00

$$\frac{x\left(-bn\,{}_3F_2\left(1,\frac{1}{r},\frac{1}{r};1+\frac{1}{r},1+\frac{1}{r};-\frac{ex^r}{d}\right)+{}_2F_1\left(1,\frac{1}{r};1+\frac{1}{r};-\frac{ex^r}{d}\right)\left(a+b\log\left(cx^n\right)\right)\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^r),x]
```

```
[Out] (x*(-(b*n*HypergeometricPFQ[{1, r^(-1), r^(-1)}, {1 + r^(-1), 1 + r^(-1)},
-((e*x^r)/d)]) + Hypergeometric2F1[1, r^(-1), 1 + r^(-1), -((e*x^r)/d)]*(a
+ b*Log[c*x^n])))/d
```

Maple [A]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d+e*x^r),x)
```

```
[Out] int((a+b*ln(c*x^n))/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)/(e*x^r + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^r*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(c x^{n} \right)}}{d + e x^{r}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d+e*x**r),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**r), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^r*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{a + b\,\ln\left(c\,x^n\right)}{d + e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^r),x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^r), x)
```

3.412 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{a+b\log(cx^n)}{x^2(d+ex^r)},x\right)$$

```
[Out] Unintegrable((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)),x]
```

```
[Out] Defer[Int][(a + b*Log[c*x^n])/(x^2*(d + e*x^r)), x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 83 vs. 2(26) = 52.
time = 0.06, size = 83, normalized size = 3.19

$$-\frac{bn\,{}_3F_2\left(1,-\frac{1}{r},-\frac{1}{r};1-\frac{1}{r},1-\frac{1}{r};-\frac{ex^r}{d}\right)+{}_2F_1\left(1,-\frac{1}{r};\frac{-1+r}{r};-\frac{ex^r}{d}\right)(a+b\log(cx^n))}{dx}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)),x]
```

```
[Out] -((b*n*HypergeometricPFQ[{1, -r^(-1), -r^(-1)}, {1 - r^(-1), 1 - r^(-1)}, -
((e*x^r)/d)] + Hypergeometric2F1[1, -r^(-1), (-1 + r)/r, -((e*x^r)/d)]*(a +
 b*Log[c*x^n]))/(d*x))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{x^2(d+e\,x^r)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^2), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(x^2*x^r*e + d*x^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(c x^{n} \right)}}{x^{2} \left(d + e x^{r}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(d+e*x**r),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x**r)), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)*x^2), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{a + b \ln(c x^n)}{x^2 \left(d + e x^r\right)} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^r)),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^r)), x)
```

3.413 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2} \, dx$

Optimal. Leaf size=26

$$\mathrm{Int}\left(\frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

```
[Out] Unintegrable(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2} \, dx$$

Verification is not applicable to the result.

```
[In] Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

```
[Out] Defer[Int][(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2, x]
```

Rubi steps

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2} \, dx = \int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2} \, dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(26) = 52.
time = 0.16, size = 140, normalized size = 5.38

$$\frac{x^4\left(-bn(-4+r)(d+ex^r)\,{}_3F_2\left(1,\frac{4}{r},\frac{4}{r};1+\frac{4}{r},1+\frac{4}{r};-\frac{ex^r}{d}\right)+16d(a+b\log(cx^n))+4(d+ex^r)\,{}_2F_1\left(1,\frac{4}{r};\frac{4+r}{r};-\frac{ex^r}{d}\right)(-bn+a(-4+r)+b(-4+r)\log(cx^n))\right)}{16d^2r(d+ex^r)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

```
[Out] (x^4*(-(b*n*(-4 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 4/r, 4/r}, {1 + 4/r,
 1 + 4/r}, -((e*x^r)/d)]) + 16*d*(a + b*Log[c*x^n]) + 4*(d + e*x^r)*Hyperge
ometric2F1[1, 4/r, (4 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-4 + r) + b*(-4 +
r)*Log[c*x^n])))/(16*d^2*r*(d + e*x^r))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(d+e\,x^r)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

```
[Out] int(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^3*log(c*x^n) + a*x^3)/(2*d*x^r*e + d^2 + x^(2*r)*e^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex^r)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

```
[Out] Integral(x**3*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^3/(x^r*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

```
[Out] int((x^3*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.414 $\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal. Leaf size=24

$$\text{Int}\left(\frac{x(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

```
[Out] Unintegrable(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

```
[Out] Defer[Int][(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2, x]
```

Rubi steps

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(24) = 48.
time = 0.15, size = 140, normalized size = 5.83

$$\frac{x^2\left(-bn(-2+r)(d+ex^r)\,{}_3F_2\left(1,\frac{2}{r},\frac{2}{r};1+\frac{2}{r},1+\frac{2}{r};-\frac{ex^r}{d}\right)+4d(a+b\log(cx^n))+2(d+ex^r)\,{}_2F_1\left(1,\frac{2}{r};\frac{2+r}{r};-\frac{ex^r}{d}\right)(-bn+a(-2+r)+b(-2+r)\log(cx^n))\right)}{4d^2r(d+ex^r)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

```
[Out] (x^2*(-(b*n*(-2 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 2/r, 2/r}, {1 + 2/r,
 1 + 2/r}, -((e*x^r)/d)]) + 4*d*(a + b*Log[c*x^n]) + 2*(d + e*x^r)*Hypergeo
metric2F1[1, 2/r, (2 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-2 + r) + b*(-2 + r
)*Log[c*x^n])))/(4*d^2*r*(d + e*x^r))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{x(a+b\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

```
[Out] int(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(e*x^r + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x*log(c*x^n) + a*x)/(2*d*x^r*e + d^2 + x^(2*r)*e^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x(a + b\log(cx^n))}{(d + ex^r)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

```
[Out] Integral(x*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x/(x^r*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
[Out] int((x*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.415 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

Optimal. Leaf size=102

$$-\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)}-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r}+\frac{bn\log(d+ex^r)}{d^2r^2}+\frac{bn\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{d^2r^2}$$

```
[Out] -e*x^r*(a+b*ln(c*x^n))/d^2/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2/
r+b*n*ln(d+e*x^r)/d^2/r^2+b*n*polylog(2,-d/e/(x^r))/d^2/r^2
```

Rubi [A]
time = 0.16, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2391, 2379, 2438, 2373, 266}

$$\frac{bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{d^2r}-\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)}+\frac{bn\log(d+ex^r)}{d^2r^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

```
[Out] -((e*x^r*(a + b*Log[c*x^n]))/(d^2*r*(d + e*x^r))) - ((a + b*Log[c*x^n])*Log
[1 + d/(e*x^r)])/(d^2*r) + (b*n*Log[d + e*x^r])/(d^2*r^2) + (b*n*PolyLog[2,
 -(d/(e*x^r))])/(d^2*r^2)
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \frac{\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx}{d} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))}{(d+ex^r)^2}\,dx}{d}$$

$$= -\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{(bn)\int \frac{\log\left(1+\frac{dx^{-r}}{e}\right)}{x}\,dx}{d^2r} + \frac{(b}{}$$

$$= -\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{bn\log(d+ex^r)}{d^2r^2} + \frac{bn\mathrm{Li}_2(}{d}$$

Mathematica [A]
time = 0.21, size = 132, normalized size = 1.29

$$\frac{\frac{dr(a+b\log(cx^n))}{d+ex^r} + bn\log(d-dx^r) - ar\log(d-dx^r) + br(n\log(x)-\log(cx^n))\log(d-dx^r) + bn\left(\frac{1}{2}r^2\log^2(x) + \left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r) + \mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right)}{d^2r^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

```
[Out] ((d*r*(a + b*Log[c*x^n]))/(d + e*x^r) + b*n*Log[d - d*x^r] - a*r*Log[d - d*
x^r] + b*r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + b*n*((r^2*Log[x]^2)/2 +
 (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/
d]))/(d^2*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.16, size = 715, normalized size = 7.01

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^2} - \frac{bn\ln(x)}{rd(d+e\,x^r)} - \frac{b\ln(x^r)n\ln(x)}{r\,d^2} - \frac{bn\,\mathrm{dilog}\left(\frac{d+e\,x^r}{d}\right)}{r^2d^2} - \frac{bn\ln(x)\ln\left(\frac{d+e\,x^r}{d}\right)}{r\,d^2} + \frac{bn\ln(x)^2}{2d^2} + \frac{b\ln(c)}{rd(d+e\,x^r)} +$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I/r*b*Pi*csgn(I*c*x^n)^3/d^2*ln(d+e*x^r)+b/r/d^2*ln(d+e*x^r)*n*ln(x)-b/
r/d/(d+e*x^r)*n*ln(x)-b/r/d^2*ln(x^r)*n*ln(x)-1/2*I/r*b*Pi*csgn(I*c*x^n)^3/
d^2*ln(x^r)+1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(d+e*x^r)+1/2*I/r*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*ln(x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2/d^2*ln(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(d+e*x^r)+1
/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2*ln(d+e*x^r)-b/r*n/d^2*l
n(x)*ln((d+e*x^r)/d)+1/2*b*n/d^2*ln(x)^2-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)/d/(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
/d^2*ln(x^r)+1/r*b*ln(c)/d/(d+e*x^r)+1/r*b*ln(c)/d^2*ln(x^r)-1/r*b*ln(c)/d^
2*ln(d+e*x^r)-b/r/d^2*ln(d+e*x^r)*ln(x^n)+b/r/d/(d+e*x^r)*ln(x^n)+b/r/d^2*l
n(x^r)*ln(x^n)-b/r^2*n/d^2*dilog((d+e*x^r)/d)-1/2*I/r*b*Pi*csgn(I*c*x^n)^3/
d/(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*ln(d+e*x^r)-b/r*n*
e/d^2*ln(x)*x^r/(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*ln(x^r
)+a/r/d^2*ln(x^r)-a/r/d^2*ln(d+e*x^r)+a/r/d/(d+e*x^r)+b*n*ln(d+e*x^r)/d^2/r
^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] a*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + b*int
egrate((log(c) + log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 229 vs. $2(102) = 204$.
time = 0.33, size = 229, normalized size = 2.25

$$\frac{bdnr^2\log(x)^2 + 2\,bdr\log(c) + 2\,adr + \left(bnr^2e\log(x)^2 + 2\,(br^2e\log(c) - (bnr - ar^2)e)\log(x)\right)x^r - 2\,(bnx^re + bdn)\mathrm{Li}_2\left(-\frac{x^re+d}{d} + 1\right) - 2\,(bdr\log(c) - bdn + adr + (bre\log(c) - (bn - ar)e)x^r)\log(x^re + d) + 2\,(bdr^2\log(c) + adr^2)\log(x) - 2\,(bnrx^re\log(x) + bdnr\log(x))\log\left(\frac{x^re+d}{d}\right)}{2\,(d^2r^2x^re + d^3r^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(b*d*n*r^2*log(x)^2 + 2*b*d*r*log(c) + 2*a*d*r + (b*n*r^2*e*log(x)^2 +
2*(b*r^2*e*log(c) - (b*n*r - a*r^2)*e)*log(x))*x^r - 2*(b*n*x^r*e + b*d*n)*
dilog(-(x^r*e + d)/d + 1) - 2*(b*d*r*log(c) - b*d*n + a*d*r + (b*r*e*log(c)
 - (b*n - a*r)*e)*x^r)*log(x^r*e + d) + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x)
```

```
 - 2*(b*n*r*x^r*e*log(x) + b*d*n*r*log(x))*log((x^r*e + d)/d))/(d^2*r^2*x^r
*e + d^3*r^2)
```

Sympy [A]
time = 206.76, size = 360, normalized size = 3.53

$$-\frac{ae\left(\begin{cases}\frac{x^r}{d^2} & \text{for}\: e=0\\-\frac{1}{de+e^2x^r} & \text{otherwise}\end{cases}\right)}{dr}-\frac{ae\left(\begin{cases}\frac{x^r}{d} & \text{for}\: e=0\\\frac{\log\left(d+ex^r\right)}{e} & \text{otherwise}\end{cases}\right)}{d^2r}+\frac{a\log\left(x^r\right)}{d^2r}+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{r} & \text{for}\: r\neq 0\\\log\left(x\right) & \text{otherwise}\end{cases}}{d^2} & \text{for}\: e=0\\-\begin{cases}\frac{\log\left(x\right)}{e^2} & \text{for}\: d=0\wedge r=0\\-\frac{x^{-r}}{e^2r} & \text{for}\: d=0\\\frac{\log\left(x\right)}{de+e^2} & \text{for}\: r=0\\\frac{\log\left(x\right)}{de}-\frac{\log\left(\frac{d}{e}+x^r\right)}{der} & \text{otherwise}\end{cases} & \text{otherwise}\end{cases}\right)}{dr}-\frac{be\left(\begin{cases}\frac{x^r}{d^2} & \text{for}\: e=0\\-\frac{1}{de+e^2x^r} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)}{dr}+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{r} & \text{for}\: r\neq 0\\\log\left(x\right) & \text{otherwise}\end{cases}}{d} & \text{for}\: e=0\\\frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for}\: \frac{1}{|x|}<1\wedge |x|<1\\\log\left(d\right)\log\left(x\right)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for}\: |x|<1\\-\log\left(d\right)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for}\: \frac{1}{|x|}<1\\-G^{2,0}_{2,2}\left(\begin{matrix} & 1,1\\0,0 & \end{matrix}\middle|x\right)\log\left(d\right)+G^{0,2}_{2,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log\left(d\right)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^2r}-\frac{be\left(\begin{cases}\frac{x^r}{d} & \text{for}\: e=0\\\frac{\log\left(d+ex^r\right)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)}{d^2r}+\frac{bn\left(\begin{cases}0 & \text{for}\: r=0\\-\frac{\log\left(x^r\right)^2}{2r} & \text{otherwise}\end{cases}\right)}{d^2r}+\frac{b\log\left(x^r\right)\log\left(cx^n\right)}{d^2r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**2,x)
```

```
[Out] -a*e*Piecewise((x**r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))/(d*r) -
 a*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))/(d**2*r) + a*
log(x**r)/(d**2*r) + b*e*n*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log(x)
, True))/d**2, Eq(e, 0)), (-Piecewise((log(x)/e**2, Eq(d, 0) & Eq(r, 0)), (
-1/(e**2*r*x**r), Eq(d, 0)), (log(x)/(d*e + e**2), Eq(r, 0)), (log(x)/(d*e)
 - log(d/e + x**r)/(d*e*r), True)), True))/(d*r) - b*e*Piecewise((x**r/d**2
, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))*log(c*x**n)/(d*r) + b*e*n*Piecew
ise((Piecewise((x**r/r, Ne(r, 0)), (log(x), True))/d, Eq(e, 0)), (Piecewise
((-polylog(2, e*x**r*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)),
(log(d)*log(x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log
(d)*log(1/x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-mei
jerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0,
 0)), x)*log(d) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True))/e, True))/
(d**2*r) - b*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))*log
(c*x**n)/(d**2*r) + b*n*Piecewise((0, Eq(r, 0)), (-log(x**r)**2/(2*r), True
))/(d**2*r) + b*log(x**r)*log(c*x**n)/(d**2*r)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^2*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x^r\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^2),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^2), x)
```

3.416 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)^2},x\right)$$

```
[Out] Unintegrable((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2),x]
```

```
[Out] Defer[Int][(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2), x]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)^2}\,dx=\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 139 vs. 2(26) = 52.
time = 0.15, size = 139, normalized size = 5.35

$$-\frac{bn(2+r)\left(d+ex^r\right)\,{}_3F_2\left(1,-\frac{2}{r},-\frac{2}{r};1-\frac{2}{r},1-\frac{2}{r};-\frac{ex^r}{d}\right)-4d\left(a+b\log\left(cx^n\right)\right)+2\left(d+ex^r\right)\,{}_2F_1\left(1,-\frac{2}{r};\frac{-2+r}{r};-\frac{ex^r}{d}\right)\left(-bn+a(2+r)+b(2+r)\log\left(cx^n\right)\right)}{4d^2rx^2\left(d+ex^r\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2),x]
```

```
[Out] -1/4*(b*n*(2 + r)*(d + e*x^r)*HypergeometricPFQ[{1, -2/r, -2/r}, {1 - 2/r,
1 - 2/r}, -((e*x^r)/d)] - 4*d*(a + b*Log[c*x^n]) + 2*(d + e*x^r)*Hypergeome
tric2F1[1, -2/r, (-2 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(2 + r) + b*(2 + r)*
Log[c*x^n]))/(d^2*r*x^2*(d + e*x^r))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^3\left(d+e\,x^r\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^3), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(2*d*x^3*x^r*e + d^2*x^3 + x^3*x^(2*r)*e^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**3/(d+e*x**r)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**3*(d + e*x**r)**2), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^2*x^3), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{a + b\ln\left(c\,x^n\right)}{x^3\,{\left(d + e\,x^r\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^3*(d + e*x^r)^2),x)
[Out] int((a + b*log(c*x^n))/(x^3*(d + e*x^r)^2), x)
```

3.417 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

```
[Out] Unintegrable(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
[Out] Defer[Int][(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2, x]
```

Rubi steps

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(26) = 52.
time = 0.15, size = 140, normalized size = 5.38

$$\frac{x^3\left(-bn(-3+r)\left(d+ex^r\right)\,{}_3F_2\left(1,\frac{3}{r},\frac{3}{r};1+\frac{3}{r},1+\frac{3}{r};-\frac{ex^r}{d}\right)+9d(a+b\log(cx^n))+3\left(d+ex^r\right)\,{}_2F_1\left(1,\frac{3}{r};\frac{3+r}{r};-\frac{ex^r}{d}\right)(-bn+a(-3+r)+b(-3+r)\log(cx^n))\right)}{9d^2r\left(d+ex^r\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
[Out] (x^3*(-(b*n*(-3 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 3/r, 3/r}, {1 + 3/r,
 1 + 3/r}, -((e*x^r)/d)]) + 9*d*(a + b*Log[c*x^n]) + 3*(d + e*x^r)*Hypergeo
metric2F1[1, 3/r, (3 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-3 + r) + b*(-3 + r
)*Log[c*x^n])))/(9*d^2*r*(d + e*x^r))
```

Maple [A]
time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x^2*log(c*x^n) + a*x^2)/(2*d*x^r*e + d^2 + x^(2*r)*e^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2(a + b\log{(cx^n)})}{(d + ex^r)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

```
[Out] Integral(x**2*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*x^2/(x^r*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x^2 (a + b \ln(c x^n))}{(d + e x^r)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
[Out] int((x^2*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.418 $\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$

Optimal. Leaf size=23

$$\text{Int}\left(\frac{a+b\log(cx^n)}{(d+ex^r)^2},x\right)$$

```
[Out] Unintegrable((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(a + b*Log[c*x^n])/(d + e*x^r)^2,x]
[Out] Defer[Int][(a + b*Log[c*x^n])/(d + e*x^r)^2, x]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx = \int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 161 vs. 2(23) = 46.
time = 1.97, size = 161, normalized size = 7.00

$$\frac{x\left(adr\,{}_2F_1\left(2,\frac{1}{r};1+\frac{1}{r};-\frac{ex^r}{d}\right)+aerx^r\,{}_2F_1\left(2,\frac{1}{r};1+\frac{1}{r};-\frac{ex^r}{d}\right)-bn(-1+r)(d+ex^r)\,{}_3F_2\left(1,\frac{1}{r},\frac{1}{r};1+\frac{1}{r},1+\frac{1}{r};-\frac{ex^r}{d}\right)+bd\log(cx^n)-b(d+ex^r)\,{}_2F_1\left(1,\frac{1}{r};1+\frac{1}{r};-\frac{ex^r}{d}\right)(n-(-1+r)\log(cx^n))\right)}{d^2r(d+ex^r)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d + e*x^r)^2,x]
[Out] (x*(a*d*r*Hypergeometric2F1[2, r^(-1), 1 + r^(-1), -((e*x^r)/d)] + a*e*r*x^
r*Hypergeometric2F1[2, r^(-1), 1 + r^(-1), -((e*x^r)/d)] - b*n*(-1 + r)*(d
+ e*x^r)*HypergeometricPFQ[{1, r^(-1), r^(-1)}, {1 + r^(-1), 1 + r^(-1)}, -
((e*x^r)/d)] + b*d*Log[c*x^n] - b*(d + e*x^r)*Hypergeometric2F1[1, r^(-1),
1 + r^(-1), -((e*x^r)/d)]*(n - (-1 + r)*Log[c*x^n])))/(d^2*r*(d + e*x^r))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln(c\,x^n)}{(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)/(e*x^r + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(2*d*x^r*e + d^2 + x^(2*r)*e^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log\left(cx^{n}\right)}{\left(d + ex^{r}\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(x^r*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{a+b\ln\left(c\,x^n\right)}{{\left(d+e\,x^r\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d + e*x^r)^2,x)
```

```
[Out] int((a + b*log(c*x^n))/(d + e*x^r)^2, x)
```

3.419 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx$

Optimal. Leaf size=26

$$\text{Int}\left(\frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^r\right)^2},x\right)$$

```
[Out] Unintegrable((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^r\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2),x]
```

```
[Out] Defer[Int][(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2), x]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^r\right)^2}\,dx = \int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^r\right)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 135 vs. 2(26) = 52.
time = 0.13, size = 135, normalized size = 5.19

$$\frac{-bn(1+r)\left(d+ex^r\right)\,{}_3F_2\left(1,-\frac{1}{r},-\frac{1}{r};1-\frac{1}{r},1-\frac{1}{r};-\frac{ex^r}{d}\right)+d(a+b\log\left(cx^n\right))-\left(d+ex^r\right)\,{}_2F_1\left(1,-\frac{1}{r};\frac{-1+r}{r};-\frac{ex^r}{d}\right)\left(a-bn+ar+b(1+r)\log\left(cx^n\right)\right)}{d^2rx\left(d+ex^r\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2),x]
```

```
[Out] (-(b*n*(1 + r)*(d + e*x^r)*HypergeometricPFQ[{1, -r^(-1), -r^(-1)}, {1 - r^
(-1), 1 - r^(-1)}, -((e*x^r)/d)]) + d*(a + b*Log[c*x^n]) - (d + e*x^r)*Hype
rgeometric2F1[1, -r^(-1), (-1 + r)/r, -((e*x^r)/d)]*(a - b*n + a*r + b*(1 +
 r)*Log[c*x^n]))/(d^2*r*x*(d + e*x^r))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^2\left(d+e\,x^r\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^2), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)/(2*d*x^2*x^r*e + d^2*x^2 + x^2*x^(2*r)*e^2), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b \log{\left(cx^{n} \right)}}{x^{2} \left(d + ex^{r}\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x**2/(d+e*x**r)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x**2*(d + e*x**r)**2), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^2*x^2), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x^2\,{\left(d+e\,x^r\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x^2*(d + e*x^r)^2),x)
[Out] int((a + b*log(c*x^n))/(x^2*(d + e*x^r)^2), x)
```

3.420 $\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx$

Optimal. Leaf size=37

$$\frac{a\log(1-cx^n)}{cn}-\frac{b\mathrm{Li}_2(1-cx^n)}{cn}$$

```
[Out] a*ln(1-c*x^n)/c/n-b*polylog(2,1-c*x^n)/c/n
```

Rubi [A]
time = 0.10, antiderivative size = 37, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}=0.160$, Rules used = {2378, 2370, 2353, 2352}

$$\frac{a\log(1-cx^n)}{cn}-\frac{b\mathrm{PolyLog}(2,1-cx^n)}{cn}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(c - x^(-n))),x]
```

```
[Out] (a*Log[1 - c*x^n])/(c*n) - (b*PolyLog[2, 1 - c*x^n])/(c*n)
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2353

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[
(a + b*Log[(-c)*(d/e)])*(Log[d + e*x]/e), x] + Dist[b, Int[Log[(-e)*(x/d)]/
(d + e*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && GtQ[(-c)*(d/e), 0]
```

Rule 2370

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)/(x_))^(q_.)*(
x_)^(m_.), x_Symbol] :> Int[(e + d*x)^q*(a + b*Log[c*x^n])^p, x] /; FreeQ[{
a, b, c, d, e, m, n, p}, x] && EqQ[m, q] && IntegerQ[q]
```

Rule 2378

```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Dist[1/n, Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \frac{\text{Subst}\left(\int \frac{a+b\log(cx)}{\left(c-\frac{1}{x}\right)x}\,dx, x, x^n\right)}{n}$$
$$= \frac{\text{Subst}\left(\int \frac{a+b\log(cx)}{-1+cx}\,dx, x, x^n\right)}{n}$$
$$= \frac{a\log(1-cx^n)}{cn} + \frac{b\text{Subst}\left(\int \frac{\log(cx)}{-1+cx}\,dx, x, x^n\right)}{n}$$
$$= \frac{a\log(1-cx^n)}{cn} - \frac{b\text{Li}_2(1-cx^n)}{cn}$$

Mathematica [A]
time = 0.01, size = 37, normalized size = 1.00

$$\frac{(a+b\log(cx^n))\log(1-cx^n)+b\text{Li}_2(cx^n)}{cn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(c - x^(-n))),x]
[Out] ((a + b*Log[c*x^n])*Log[1 - c*x^n] + b*PolyLog[2, c*x^n])/(c*n)
```

Maple [A]
time = 0.18, size = 31, normalized size = 0.84

method	result
derivativedivides	$\frac{\frac{a\ln(c\,x^n-1)}{c}-\frac{b\,\mathrm{dilog}(c\,x^n)}{c}}{n}$
default	$\frac{\frac{a\ln(c\,x^n-1)}{c}-\frac{b\,\mathrm{dilog}(c\,x^n)}{c}}{n}$
risch	$\frac{b\ln(1-c\,x^n)\ln(x^n)}{nc}-\frac{b\ln(1-c\,x^n)\ln(c\,x^n)}{nc}-\frac{b\,\mathrm{dilog}(c\,x^n)}{nc}-\frac{i\ln(c\,x^n-1)b\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{2nc}+$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(c-1/(x^n)),x,method=_RETURNVERBOSE)
[Out] 1/n*(1/c*a*ln(c*x^n-1)-1/c*b*dilog(c*x^n))
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(c-1/(x^n)),x, algorithm="maxima")
```

```
[Out] b*integrate((x^n*log(c) + x^n*log(x^n))/(c*x*x^n - x), x) + a*log((c*x^n -
1)/c)/(c*n)
```

Fricas [A]
time = 0.37, size = 45, normalized size = 1.22

$$\frac{bn\log\left(-cx^n+1\right)\log\left(x\right)+b\text{Li}_2(cx^n)+\left(b\log\left(c\right)+a\right)\log\left(cx^n-1\right)}{cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(c-1/(x^n)),x, algorithm="fricas")
```

```
[Out] (b*n*log(-c*x^n + 1)*log(x) + b*dilog(c*x^n) + (b*log(c) + a)*log(c*x^n - 1
))/(c*n)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(c-1/(x**n)),x)
```

```
[Out] Exception raised: TypeError >> Invalid comparison of non-real zoo
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(c-1/(x^n)),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((c - 1/x^n)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(c-\frac{1}{x^n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(c - 1/x^n)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(c - 1/x^n)), x)
```

3.421 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=152

$$-\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+e^3x^{3r}$$

```
[Out] -3*b*d^2*e*n*x^r/r^2-3/4*b*d*e^2*n*x^(2*r)/r^2-1/9*b*e^3*n*x^(3*r)/r^2-1/2*
b*d^3*n*ln(x)^2+3*d^2*e*x^r*(a+b*ln(c*x^n))/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c*x
^n))/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n))/r+d^3*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.12, antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}-\frac{1}{2}bd^3n\log^2(x)-\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-3*b*d^2*e*n*x^r)/r^2 - (3*b*d*e^2*n*x^(2*r))/(4*r^2) - (b*e^3*n*x^(3*r))/
(9*r^2) - (b*d^3*n*Log[x]^2)/2 + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/r + (3*d*
e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(3
*r) + d^3*Log[x]*(a + b*Log[c*x^n])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] && !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}+6d^3\log(x)\right)(a+b\log(cx^n))-(bn)\int$$

$$= \frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}+6d^3\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int}{}$$

$$= \frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}+6d^3\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int}{}$$

$$= -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}+\frac{1}{6}\left(\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{r}+\frac{2e^3x^{3r}}{r}\right.$$

$$= -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{1}{6}\left(\frac{18d^2ex^r}{r}+\right.$$

Mathematica [A]
time = 0.19, size = 129, normalized size = 0.85

$$-\frac{1}{2}bd^3n\log^2(x)+d^3\log(x)\,(a+b\log(cx^n))+\frac{ex^r(6ar(18d^2+9dex^r+2e^2x^{2r})-bn(108d^2+27dex^r+4e^2x^{2r})+6br(18d^2+9dex^r+2e^2x^{2r})\log(cx^n))}{36r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/2*(b*d^3*n*Log[x]^2) + d^3*Log[x]*(a + b*Log[c*x^n]) + (e*x^r*(6*a*r*(18
*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - b*n*(108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*
r)) + 6*b*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r))*Log[c*x^n]))/(36*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 693, normalized size = 4.56

method	result
risch	$-\frac{b\,e^{3} n\,x^{3 r}}{9 r^{2}}-\frac{3 i \pi b\,d^{2} e\,\mathrm{csgn}(i c)\mathrm{csgn}(i x^{n})\mathrm{csgn}(i c\,x^{n}) x^{r}}{2 r}+a\,d^{3} \ln\left(x\right)+\frac{3 \ln(c) b d\,e^{2} x^{2 r}}{2 r}+\frac{b\left(2 e^{3} x^{3 r}+6 d^{3} \ln(x) r+9 d\,e^{2} x^{2 r}+\right.}{6 r}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] -3/4*I/r*Pi*b*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-3/2*I/r*Pi*
b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-3/4*I/r*Pi*b*d*e^2*csgn(I*c
*x^n)^3*(x^r)^2-3/2*I/r*Pi*b*d^2*e*csgn(I*c*x^n)^3*x^r-1/2*I*ln(x)*Pi*b*d^3
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+a*d^3*ln(x)-1/2*I*ln(x)*Pi*b*d^3*csgn(
I*c*x^n)^3+3*a/r*x^r*d^2*e+3/2*a/r*(x^r)^2*d*e^2+1/6*I/r*Pi*b*e^3*csgn(I*c)
*csgn(I*c*x^n)^2*(x^r)^3+1/6*I/r*Pi*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)
^3+3/2/r*ln(c)*b*d*e^2*(x^r)^2-3/4/r^2*b*d*e^2*n*(x^r)^2+3/r*ln(c)*b*d^2*e*
x^r+1/6*b*(2*e^3*(x^r)^3+6*d^3*ln(x)*r+9*d*e^2*(x^r)^2+18*d^2*e*x^r)/r*ln(x
^n)+1/3*a/r*(x^r)^3*e^3+1/2*I*ln(x)*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+1/2*
I*ln(x)*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2-1/6*I/r*Pi*b*e^3*csgn(I*c*x^n)
^3*(x^r)^3-3*b*d^2*e*n*x^r/r^2+ln(x)*ln(c)*b*d^3+1/3/r*ln(c)*b*e^3*(x^r)^3-
1/9/r^2*b*e^3*n*(x^r)^3+3/4*I/r*Pi*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^
2+3/4*I/r*Pi*b*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+3/2*I/r*Pi*b*d^2*e
*csgn(I*c)*csgn(I*c*x^n)^2*x^r+3/2*I/r*Pi*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)
^2*x^r-1/2*b*d^3*n*ln(x)^2-1/6*I/r*Pi*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*(x^r)^3
```

Maxima [A]
time = 0.28, size = 172, normalized size = 1.13

$$\frac{be^{3}x^{3\,r}\log\left(cx^{n}\right)}{3\,r}+\frac{3\,bde^{2}x^{2\,r}\log\left(cx^{n}\right)}{2\,r}+\frac{3\,bd^{2}ex^{r}\log\left(cx^{n}\right)}{r}+\frac{bd^{3}\log\left(cx^{n}\right)^{2}}{2\,n}+ad^{3}\log\left(x\right)-\frac{be^{3}nx^{3\,r}}{9\,r^{2}}+\frac{ae^{3}x^{3\,r}}{3\,r}-\frac{3\,bde^{2}nx^{2\,r}}{4\,r^{2}}+\frac{3\,ade^{2}x^{2\,r}}{2\,r}-\frac{3\,bd^{2}enx^{r}}{r^{2}}+\frac{3\,ad^{2}ex^{r}}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/3*b*e^3*x^(3*r)*log(c*x^n)/r + 3/2*b*d*e^2*x^(2*r)*log(c*x^n)/r + 3*b*d^2
*e*x^r*log(c*x^n)/r + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x) - 1/9*b*e^3*n
*x^(3*r)/r^2 + 1/3*a*e^3*x^(3*r)/r - 3/4*b*d*e^2*n*x^(2*r)/r^2 + 3/2*a*d*e^
2*x^(2*r)/r - 3*b*d^2*e*n*x^r/r^2 + 3*a*d^2*e*x^r/r
```

Fricas [A]
time = 0.36, size = 166, normalized size = 1.09

$$\frac{18\,bd^{3}nr^{2}\log\left(x\right)^{2}+4\,{\left(3\,bnre^{3}\log\left(x\right)+3\,bre^{3}\log\left(c\right)-{\left(bn-3\,ar\right)}e^{3}\right)}x^{3\,r}+27\,{\left(2\,bdnre^{2}\log\left(x\right)+2\,bdre^{2}\log\left(c\right)-{\left(bdn-2\,adr\right)}e^{2}\right)}x^{2\,r}+108\,{\left(bd^{2}nre\log\left(x\right)+bd^{2}re\log\left(c\right)-{\left(bd^{2}n-ad^{2}r\right)}e\right)}x^{r}+36\,{\left(bd^{3}r^{2}\log\left(c\right)+ad^{3}r^{2}\right)}\log\left(x\right)}{36\,r^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/36*(18*b*d^3*n*r^2*log(x)^2 + 4*(3*b*n*r*e^3*log(x) + 3*b*r*e^3*log(c) -
(b*n - 3*a*r)*e^3)*x^(3*r) + 27*(2*b*d*n*r*e^2*log(x) + 2*b*d*r*e^2*log(c)
- (b*d*n - 2*a*d*r)*e^2)*x^(2*r) + 108*(b*d^2*n*r*e*log(x) + b*d^2*r*e*log(
c) - (b*d^2*n - a*d^2*r)*e)*x^r + 36*(b*d^3*r^2*log(c) + a*d^3*r^2)*log(x))
/r^2
```

Sympy [A]
time = 6.46, size = 299, normalized size = 1.97

$$\begin{cases} (a + b\log{(c)})\,(d+e)^3 \log{(x)} & \text{for}\: n = 0 \wedge r = 0 \\ (d+e)^3 \left(\begin{cases} a\log{(x)} & \text{for}\: b = 0 \\ -(-a - b\log{(c)})\log{(x)} & \text{for}\: n = 0 \\ \frac{(-a-b\log{(cx^n)})^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for}\: r = 0 \\ (a + b\log{(c)})\left(d^3\log{(x)} + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) & \text{for}\: n = 0 \\ \frac{ad^3\log{(cx^n)}}{n} + \frac{3ad^2ex^r}{r} + \frac{3ade^2x^{2r}}{2r} + \frac{ae^3x^{3r}}{3r} + \frac{bd^3\log{(cx^n)}^2}{2n} - \frac{3bd^2enx^r}{r^2} + \frac{3bd^2ex^r\log{(cx^n)}}{r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3bde^2x^{2r}\log{(cx^n)}}{2r} - \frac{be^3nx^{3r}}{9r^2} + \frac{be^3x^{3r}\log{(cx^n)}}{3r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise(((a + b*log(c))*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)
**3*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((
-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), ((a + b*log(c))*(d**3*lo
g(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) + e**3*x**(3*r)/(3*r)), Eq
(n, 0)), (a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**r/r + 3*a*d*e**2*x**(2*r)/(2
*r) + a*e**3*x**(3*r)/(3*r) + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x*
*r/r**2 + 3*b*d**2*e*x**r*log(c*x**n)/r - 3*b*d*e**2*n*x**(2*r)/(4*r**2) +
3*b*d*e**2*x**(2*r)*log(c*x**n)/(2*r) - b*e**3*n*x**(3*r)/(9*r**2) + b*e**3
*x**(3*r)*log(c*x**n)/(3*r), True))
```

Giac [A]
time = 1.93, size = 210, normalized size = 1.38

$$\frac{1}{2}\,bd^3n\log{(x)}^2 + \frac{3\,bd^2nx^re\log{(x)}}{r} + bd^3\log{(c)}\log{(x)} + \frac{3\,bd^2x^re\log{(c)}}{r} + ad^3\log{(x)} + \frac{3\,bdnx^{2\,r}e^2\log{(x)}}{2\,r} - \frac{3\,bd^2nx^re}{r^2} + \frac{3\,ad^2x^re}{r} + \frac{3\,bdx^{2\,r}e^2\log{(c)}}{2\,r} + \frac{bnx^{3\,r}e^3\log{(x)}}{3\,r} - \frac{3\,bdnx^{2\,r}e^2}{4\,r^2} + \frac{3\,adx^{2\,r}e^2}{2\,r} + \frac{bx^{3\,r}e^3\log{(c)}}{3\,r} - \frac{bnx^{3\,r}e^3}{9\,r^2} + \frac{ax^{3\,r}e^3}{3\,r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*d^3*n*log(x)^2 + 3*b*d^2*n*x^r*e*log(x)/r + b*d^3*log(c)*log(x) + 3*b
*d^2*x^r*e*log(c)/r + a*d^3*log(x) + 3/2*b*d*n*x^(2*r)*e^2*log(x)/r - 3*b*d
^2*n*x^r*e/r^2 + 3*a*d^2*x^r*e/r + 3/2*b*d*x^(2*r)*e^2*log(c)/r + 1/3*b*n*x
^(3*r)*e^3*log(x)/r - 3/4*b*d*n*x^(2*r)*e^2/r^2 + 3/2*a*d*x^(2*r)*e^2/r + 1
/3*b*x^(3*r)*e^3*log(c)/r - 1/9*b*n*x^(3*r)*e^3/r^2 + 1/3*a*x^(3*r)*e^3/r
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x,x)
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x, x)
```

3.422 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=104

$$-\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}-\frac{1}{2}bd^2n\log^2(x)+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}+d^2\log(x)\left(a+b\log(cx^n)\right)$$

```
[Out] -2*b*d*e*n*x^r/r^2-1/4*b*e^2*n*x^(2*r)/r^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x^r*(a
+b*ln(c*x^n))/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+d^2*ln(x)*(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.09, antiderivative size = 104, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 6, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {272, 45, 2372, 12, 14, 2338}

$$d^2\log(x)\left(a+b\log(cx^n)\right)+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}-\frac{1}{2}bd^2n\log^2(x)-\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-2*b*d*e*n*x^r)/r^2 - (b*e^2*n*x^(2*r))/(4*r^2) - (b*d^2*n*Log[x]^2)/2 + (
2*d*e*x^r*(a + b*Log[c*x^n]))/r + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) +
d^2*Log[x]*(a + b*Log[c*x^n])
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 45

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
```

```
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2372

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Dist[a +
b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x], x], x]] /; F
reeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] && !(EqQ[q, 1]
 && EqQ[m, -1])
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx &= \frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx^n))-(bn)\int \frac{ex^r(4d+e\\ &= \frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int \frac{ex^r(4d+ex^r)+2}{x}}{2r}\\ &= \frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx^n))-\frac{(bn)\int\left(4dex^{-1+r}\right.}{}\\ &= -\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}+\frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x)\right)(a+b\log(cx\\ &= -\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}-\frac{1}{2}bd^2n\log^2(x)+\frac{1}{2}\left(\frac{4dex^r}{r}+\frac{e^2x^{2r}}{r}+2d^2\log(x\end{aligned}$$

Mathematica [A]
time = 0.14, size = 87, normalized size = 0.84

$$-\frac{1}{2}bd^2n\log^2(x)+d^2\log(x)(a+b\log(cx^n))+\frac{ex^r(2ar(4d+ex^r)-bn(8d+ex^r)+2br(4d+ex^r)\log(cx^n))}{4r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -1/2*(b*d^2*n*Log[x]^2) + d^2*Log[x]*(a + b*Log[c*x^n]) + (e*x^r*(2*a*r*(4*
d + e*x^r) - b*n*(8*d + e*x^r) + 2*b*r*(4*d + e*x^r)*Log[c*x^n]))/(4*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 487, normalized size = 4.68

method	result
risch	$\frac{b(2d^2\ln(x)r+e^2x^{2r}+4de\,x^r)\ln(x^n)}{2r}+\frac{i\ln(x)\pi b\,d^2\text{csgn}(ic)\text{csgn}(ic\,x^n)^2}{2}+\frac{i\pi b\,e^2\text{csgn}(ic)\text{csgn}(ic\,x^n)^2x^{2r}}{4r}-\frac{i\pi b\,e^2\text{csgn}(ic)\text{csgn}(ix}{4r}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*b*(2*d^2*ln(x)*r+e^2*(x^r)^2+4*d*e*x^r)/r*ln(x^n)+1/2*I*ln(x)*Pi*b*d^2*
csgn(I*c)*csgn(I*c*x^n)^2+1/4*I/r*Pi*b*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^
2+I/r*Pi*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-1/4*I/r*Pi*b*e^2*csgn(I*c*x^
n)^3*(x^r)^2-1/4*I/r*Pi*b*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+1
/4*I/r*Pi*b*e^2*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2-I/r*Pi*b*d*e*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)*x^r+I/r*Pi*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+1/
2*I*ln(x)*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I/r*Pi*b*d*e*csgn(I*c*x^n)^3
*x^r-1/2*I*ln(x)*Pi*b*d^2*csgn(I*c*x^n)^3-1/2*I*ln(x)*Pi*b*d^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)-1/2*b*d^2*n*ln(x)^2+ln(x)*ln(c)*b*d^2+1/2/r*ln(c)*b
*e^2*(x^r)^2+a*d^2*ln(x)+1/2*a/r*(x^r)^2*e^2-1/4/r^2*b*e^2*n*(x^r)^2+2/r*ln
(c)*b*d*e*x^r+2*a/r*x^r*d*e-2*b*d*e*n*x^r/r^2
```

Maxima [A]
time = 0.28, size = 114, normalized size = 1.10

$$\frac{be^2x^{2\,r}\log\left(cx^n\right)}{2\,r}+\frac{2\,bdex^r\log\left(cx^n\right)}{r}+\frac{bd^2\log\left(cx^n\right)^2}{2\,n}+ad^2\log\left(x\right)-\frac{be^2nx^{2\,r}}{4\,r^2}+\frac{ae^2x^{2\,r}}{2\,r}-\frac{2\,bdenx^r}{r^2}+\frac{2\,adex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/2*b*e^2*x^(2*r)*log(c*x^n)/r + 2*b*d*e*x^r*log(c*x^n)/r + 1/2*b*d^2*log(c
*x^n)^2/n + a*d^2*log(x) - 1/4*b*e^2*n*x^(2*r)/r^2 + 1/2*a*e^2*x^(2*r)/r -
2*b*d*e*n*x^r/r^2 + 2*a*d*e*x^r/r
```

Fricas [A]
time = 0.35, size = 116, normalized size = 1.12

$$\frac{2\,bd^2nr^2\log\left(x\right)^2+\left(2\,bnre^2\log\left(x\right)+2\,bre^2\log\left(c\right)-\left(bn-2\,ar\right)e^2\right)x^{2\,r}+8\,\left(bdnre\log\left(x\right)+bdre\log\left(c\right)-\left(bdn-adr\right)e\right)x^r+4\,\left(bd^2r^2\log\left(c\right)+ad^2r^2\right)\log\left(x\right)}{4\,r^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/4*(2*b*d^2*n*r^2*log(x)^2 + (2*b*n*r*e^2*log(x) + 2*b*r*e^2*log(c) - (b*n
 - 2*a*r)*e^2)*x^(2*r) + 8*(b*d*n*r*e*log(x) + b*d*r*e*log(c) - (b*d*n - a*
d*r)*e)*x^r + 4*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x))/r^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 216 vs. $2(104) = 208$.

time = 5.31, size = 216, normalized size = 2.08

$$\begin{cases} (a + b\log(c))(d+e)^2\log(x) & \text{for } n = 0 \wedge r = 0 \\ (d+e)^2 \left(\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r = 0 \\ (a + b\log(c))\left(d^2\log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r}\right) & \text{for } n = 0 \\ \frac{ad^2\log(cx^n)}{n} + \frac{2adex^r}{r} + \frac{ae^2x^{2r}}{2r} + \frac{bd^2\log(cx^n)^2}{2n} - \frac{2bdenx^r}{r^2} + \frac{2bdex^r\log(cx^n)}{r} - \frac{be^2nx^{2r}}{4r^2} + \frac{be^2x^{2r}\log(cx^n)}{2r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise(((a + b*log(c))*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)
**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((
-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), ((a + b*log(c))*(d**2*lo
g(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0)), (a*d**2*log(c*x**n)/
n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b*d**2*log(c*x**n)**2/(2*n) -
2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)/r - b*e**2*n*x**(2*r)/(4*r**
2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r), True))
```

Giac [A]

time = 4.45, size = 140, normalized size = 1.35

$$\frac{1}{2}bd^2n\log(x)^2 + \frac{2bdnx^re\log(x)}{r} + bd^2\log(c)\log(x) + \frac{2bdx^re\log(c)}{r} + ad^2\log(x) + \frac{bnx^{2r}e^2\log(x)}{2r} - \frac{2bdnx^re}{r^2} + \frac{2adx^re}{r} + \frac{bx^{2r}e^2\log(c)}{2r} - \frac{bnx^{2r}e^2}{4r^2} + \frac{ax^{2r}e^2}{2r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*d^2*n*log(x)^2 + 2*b*d*n*x^r*e*log(x)/r + b*d^2*log(c)*log(x) + 2*b*d
*x^r*e*log(c)/r + a*d^2*log(x) + 1/2*b*n*x^(2*r)*e^2*log(x)/r - 2*b*d*n*x^r
*e/r^2 + 2*a*d*x^r*e/r + 1/2*b*x^(2*r)*e^2*log(c)/r - 1/4*b*n*x^(2*r)*e^2/r
^2 + 1/2*a*x^(2*r)*e^2/r
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d + e\,x^r)^2\,(a + b\,\ln(c\,x^n))}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x,x)
```

```
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x, x)
```

3.423 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x} dx$

Optimal. Leaf size=53

$$-\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}$$

```
[Out] -b*e*n*x^r/r^2+e*x^r*(a+b*ln(c*x^n))/r+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

Rubi [A]
time = 0.06, antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {14, 2393, 2338, 2341}

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{ex^r(a+b\log(cx^n))}{r}-\frac{benx^r}{r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] -((b*e*n*x^r)/r^2) + (e*x^r*(a + b*Log[c*x^n]))/r + (d*(a + b*Log[c*x^n])^2
)/(2*b*n)
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2393

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
```

```
Q[r]))
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx &= \int\left(\frac{d(a+b\log(cx^n))}{x}+ex^{-1+r}(a+b\log(cx^n))\right)dx\\ &= d\int\frac{a+b\log(cx^n)}{x}\,dx+e\int x^{-1+r}(a+b\log(cx^n))\,dx\\ &= -\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}\end{aligned}$$

Mathematica [A]
time = 0.05, size = 51, normalized size = 0.96

$$-\frac{1}{2}bdn\log^2(x)+d\log(x)(a+b\log(cx^n))+\frac{ex^r(-bn+ar+br\log(cx^n))}{r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
[Out] -1/2*(b*d*n*Log[x]^2) + d*Log[x]*(a + b*Log[c*x^n]) + (e*x^r*(-(b*n) + a*r
+ b*r*Log[c*x^n]))/r^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.03, size = 278, normalized size = 5.25

method	result
risch	$\frac{b(dr\ln(x)+e\,x^r)\ln(x^n)}{r}-\frac{i\operatorname{csgn}(ic\,x^n)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic)db\pi\ln(x)}{2}+\frac{i\ln(x)\pi bd\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{2}+\frac{i\ln(x)\pi bd\operatorname{csgn}(ix^n)\operatorname{csgn}}{2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
[Out] b*(d*r*ln(x)+e*x^r)/r*ln(x^n)-1/2*I*csgn(I*c*x^n)*csgn(I*x^n)*csgn(I*c)*d*b
*Pi*ln(x)+1/2*I*ln(x)*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(x)*Pi*b*d*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*csgn(I*c*x^n)^3*d*b*Pi*ln(x)-1/2*I/r*Pi*b*
e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+1/2*I/r*Pi*b*e*csgn(I*c)*csgn(I*c
*x^n)^2*x^r+1/2*I/r*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-1/2*I/r*Pi*b*e*c
sgn(I*c*x^n)^3*x^r-1/2*b*d*n*ln(x)^2+ln(x)*ln(c)*b*d+ln(x)*a*d+1/r*ln(c)*b*
e*x^r+a/r*x^r*e-b*e*n*x^r/r^2
```

Maxima [A]
time = 0.28, size = 56, normalized size = 1.06

$$\frac{bex^r\log(cx^n)}{r}+\frac{bd\log(cx^n)^2}{2\,n}+ad\log(x)-\frac{benx^r}{r^2}+\frac{aex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] b*e*x^r*log(c*x^n)/r + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x) - b*e*n*x^r/r^2
+ a*e*x^r/r
```

Fricas [A]
time = 0.35, size = 69, normalized size = 1.30

$$\frac{bdnr^2\log(x)^2+2\left(bnre\log(x)+bre\log(c)-(bn-ar)e\right)x^r+2\left(bdr^2\log(c)+adr^2\right)\log(x)}{2r^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*(b*d*n*r^2*log(x)^2 + 2*(b*n*r*e*log(x) + b*r*e*log(c) - (b*n - a*r)*e)
*x^r + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x))/r^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 131 vs. 2(46) = 92.
time = 5.41, size = 131, normalized size = 2.47

$$\begin{cases}(a+b\log(c))(d+e)\log(x) & \text{for } n=0 \wedge r=0\\ (d+e)\left(\begin{cases}a\log(x) & \text{for } b=0\\ -(-a-b\log(c))\log(x) & \text{for } n=0\\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise}\end{cases}\right) & \text{for } r=0\\ (a+b\log(c))\left(d\log(x)+\frac{ex^r}{r}\right) & \text{for } n=0\\ \frac{ad\log(cx^n)}{n}+\frac{aex^r}{r}+\frac{bd\log(cx^n)^2}{2n}-\frac{benx^r}{r^2}+\frac{bex^r\log(cx^n)}{r} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Piecewise(((a + b*log(c))*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)*Pi
ecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b
*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), ((a + b*log(c))*(d*log(x) + e*
x**r/r), Eq(n, 0)), (a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**2/(2
*n) - b*e*n*x**r/r**2 + b*e*x**r*log(c*x**n)/r, True))
```

Giac [A]
time = 2.74, size = 69, normalized size = 1.30

$$\frac{1}{2}bdn\log(x)^2+\frac{bnx^re\log(x)}{r}+bd\log(c)\log(x)+\frac{bx^re\log(c)}{r}+ad\log(x)-\frac{bnx^re}{r^2}+\frac{ax^re}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] 1/2*b*d*n*log(x)^2 + b*n*x^r*e*log(x)/r + b*d*log(c)*log(x) + b*x^r*e*log(c
)/r + a*d*log(x) - b*n*x^r*e/r^2 + a*x^r*e/r
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(d + e\,x^r)\,\left(a + b\,\ln\left(c\,x^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n)))/x,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n)))/x, x)
```

3.424 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$

Optimal. Leaf size=54

$$-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}$$

```
[Out] -(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d/r+b*n*polylog(2,-d/e/(x^r))/d/r^2
```

Rubi [A]
time = 0.05, antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2379, 2438}

$$\frac{bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

```
[Out] -(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*x
^r))])/(d*r^2)
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx &= -\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{(bn)\int\frac{\log\left(1+\frac{dx^{-r}}{e}\right)}{x}\,dx}{dr}\\ &= -\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 108, normalized size = 2.00

$$\frac{bnr^2\log^2(x)-2r(a+b\log(cx^n))\log(d-dx^r)+2bnr\log(x)(\log(d-dx^r)-\log(d+ex^r))+2bn\log\left(-\frac{ex^r}{d}\right)\log(d+ex^r)+2bn\mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)}{2dr^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

```
[Out] (b*n*r^2*Log[x]^2 - 2*r*(a + b*Log[c*x^n])*Log[d - d*x^r] + 2*b*n*r*Log[x]*
(Log[d - d*x^r] - Log[d + e*x^r]) + 2*b*n*Log[-((e*x^r)/d)]*Log[d + e*x^r]
+ 2*b*n*PolyLog[2, 1 + (e*x^r)/d])/(2*d*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.12, size = 451, normalized size = 8.35

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{rd}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{rd}-\frac{b\ln(x^r)n\ln(x)}{rd}+\frac{b\ln(x^r)\ln(x^n)}{rd}+\frac{bn\ln(x)^2}{2d}-\frac{bn\ln(x)\ln\left(1+\frac{e\,x^r}{d}\right)}{rd}-\frac{bn\,\mathrm{poly}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

```
[Out] b/r/d*ln(d+e*x^r)*n*ln(x)-b/r/d*ln(d+e*x^r)*ln(x^n)-b/r/d*ln(x^r)*n*ln(x)+b
/r/d*ln(x^r)*ln(x^n)+1/2*b*n/d*ln(x)^2-b/r*n/d*ln(x)*ln(1+e*x^r/d)-b/r^2*n/
d*polylog(2,-e*x^r/d)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln
(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*ln(d+e*x^r)-1/2*I/r*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d*ln(x^r)+1/2*I/r*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2/d*ln(x^r)+1/2*I/r*b*Pi*csgn(I*c*x^n)^3/d*ln(d+e*x^r)-1/2*I/r*b
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d*ln(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*c*x^n)^3/
d*ln(x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d*ln(x^r)-1/r*b*ln(c)/d*ln
(d+e*x^r)+1/r*b*ln(c)/d*ln(x^r)-a/r/d*ln(d+e*x^r)+a/r/d*ln(x^r)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] a*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + b*integrate((log(c) + log(x^n))/(
e*x*x^r + d*x), x)
```

Fricas [A]
time = 0.35, size = 96, normalized size = 1.78

$$\frac{bnr^2\log(x)^2-2\,bnr\log(x)\log\left(\frac{x^re+d}{d}\right)-2\,bn\mathrm{Li}_2\left(-\frac{x^re+d}{d}+1\right)-2\,(br\log(c)+ar)\log(x^re+d)+2\,(br^2\log(c)+ar^2)\log(x)}{2\,dr^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] 1/2*(b*n*r^2*log(x)^2 - 2*b*n*r*log(x)*log((x^r*e + d)/d) - 2*b*n*dilog(-(x
^r*e + d)/d + 1) - 2*(b*r*log(c) + a*r)*log(x^r*e + d) + 2*(b*r^2*log(c) +
a*r^2)*log(x))/(d*r^2)
```

Sympy [A]
time = 209.78, size = 452, normalized size = 8.37

$$- \frac{2 a e \left(\begin{cases} \frac{1}{2 e} + \frac{x^{r}}{d} & \text{for}\: e = 0 \\ - \frac{\log{\left(- 2 e x^{r} \right)}}{2 e} & \text{otherwise} \end{cases}\right)}{d r} - \frac{2 a e \left(\begin{cases} \frac{1}{2 e} + \frac{x^{r}}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(2 d + 2 e x^{r} \right)}}{2 e} & \text{otherwise} \end{cases}\right)}{d r} + \frac{2 b e n \left(\begin{cases} \begin{cases} \frac{\log{\left(x \right)}}{2 e} + \frac{x^{r}}{d r} & \text{for}\: r \neq 0 \\ \frac{\log{\left(x \right)}}{2 e} + \frac{\log{\left(x \right)}}{d} & \text{otherwise} \end{cases} & \text{for}\: e = 0 \\ - \frac{\begin{cases} 0 & \text{for}\: \frac{1}{\left|{e x^{r}}\right|} < 1 \wedge \left|{e x^{r}}\right| < 1 \\ \frac{\log{\left(e x^{r} \right)}^{2}}{2 r} + \frac{i \pi \log{\left(e x^{r} \right)}}{r} & \text{for}\: \left|{e x^{r}}\right| < 1 \\ \frac{\log{\left(\frac{x^{- r}}{e} \right)}^{2}}{2 r} - \frac{i \pi \log{\left(\frac{x^{- r}}{e} \right)}}{r} & \text{for}\: \frac{1}{\left|{e x^{r}}\right|} < 1 \\ \frac{{G_{3, 3}^{3, 0}\left(\begin{matrix} & 1, 1, 1 \\ 0, 0, 0 & \end{matrix} \middle| {e x^{r} e^{i \pi}} \right)}}{r} + \frac{{G_{3, 3}^{0, 3}\left(\begin{matrix} 1, 1, 1 & \\ & 0, 0, 0 \end{matrix} \middle| {e x^{r} e^{i \pi}} \right)}}{r} & \text{otherwise} \end{cases}}{2 e} - \frac{\log{\left(2 \right)} \log{\left(x \right)}}{2 e} & \text{otherwise} \end{cases}\right)}{d r} + \frac{2 b e n \left(\begin{cases} \begin{cases} \frac{\log{\left(x \right)}}{2 e} + \frac{x^{r}}{d r} & \text{for}\: r \neq 0 \\ \frac{\log{\left(x \right)}}{2 e} + \frac{\log{\left(x \right)}}{d} & \text{otherwise} \end{cases} & \text{for}\: e = 0 \\ \frac{\begin{cases} - \frac{\operatorname{Li}_{2}\left(\frac{e x^{r} e^{i \pi}}{d}\right)}{r} & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \wedge \left|{x}\right| < 1 \\ \log{\left(d \right)} \log{\left(x \right)} - \frac{\operatorname{Li}_{2}\left(\frac{e x^{r} e^{i \pi}}{d}\right)}{r} & \text{for}\: \left|{x}\right| < 1 \\ - \log{\left(d \right)} \log{\left(\frac{1}{x} \right)} - \frac{\operatorname{Li}_{2}\left(\frac{e x^{r} e^{i \pi}}{d}\right)}{r} & \text{for}\: \frac{1}{\left|{x}\right|} < 1 \\ - {G_{2, 2}^{2, 0}\left(\begin{matrix} & 1, 1 \\ 0, 0 & \end{matrix} \middle| {x} \right)} \log{\left(d \right)} + {G_{2, 2}^{0, 2}\left(\begin{matrix} 1, 1 & \\ & 0, 0 \end{matrix} \middle| {x} \right)} \log{\left(d \right)} - \frac{\operatorname{Li}_{2}\left(\frac{e x^{r} e^{i \pi}}{d}\right)}{r} & \text{otherwise} \end{cases}}{2 e} + \frac{\log{\left(2 \right)} \log{\left(x \right)}}{2 e} & \text{otherwise} \end{cases}\right)}{d r} - \frac{2 b e \left(\begin{cases} \frac{1}{2 e} + \frac{x^{r}}{d} & \text{for}\: e = 0 \\ - \frac{\log{\left(- 2 e x^{r} \right)}}{2 e} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{d r} - \frac{2 b e \left(\begin{cases} \frac{1}{2 e} + \frac{x^{r}}{d} & \text{for}\: e = 0 \\ \frac{\log{\left(2 d + 2 e x^{r} \right)}}{2 e} & \text{otherwise} \end{cases}\right) \log{\left(c x^{n} \right)}}{d r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r),x)
```

```
[Out] -2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), True
))/(d*r) - 2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log(2*d + 2*e*x**
r)/(2*e), True))/(d*r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/
(d*r), Ne(r, 0)), (log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (-Piecewise(
(0, (Abs(e*x**r) < 1) & (1/Abs(e*x**r) < 1)), (log(e*x**r)**2/(2*r) + I*pi*
log(e*x**r)/r, Abs(e*x**r) < 1), (log(1/(e*x**r))**2/(2*r) - I*pi*log(1/(e*
x**r))/r, 1/Abs(e*x**r) < 1), (meijerg(((), (1, 1, 1)), ((0, 0, 0), ()), e*
x**r*exp_polar(I*pi))/r + meijerg(((1, 1, 1), ()), ((), (0, 0, 0)), e*x**r*
exp_polar(I*pi))/r, True))/(2*e) - log(2)*log(x)/(2*e), True))/(d*r) + 2*b*
e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/(d*r), Ne(r, 0)), (log(x)/(2*
e) + log(x)/d, True)), Eq(e, 0)), (Piecewise((-polylog(2, e*x**r*exp_polar(
I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x
**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**
r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ())
, x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*
x**r*exp_polar(I*pi)/d)/r, True))/(2*e) + log(2)*log(x)/(2*e), True))/(d*r)
 - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), Tr
ue))*log(c*x**n)/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log
(2*d + 2*e*x**r)/(2*e), True))*log(c*x**n)/(d*r)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x^r\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)), x)
```

3.425 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

Optimal. Leaf size=102

$$-\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)}-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r}+\frac{bn\log(d+ex^r)}{d^2r^2}+\frac{bn\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{d^2r^2}$$

```
[Out] -e*x^r*(a+b*ln(c*x^n))/d^2/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2/
r+b*n*ln(d+e*x^r)/d^2/r^2+b*n*polylog(2,-d/e/(x^r))/d^2/r^2
```

Rubi [A]
time = 0.16, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2391, 2379, 2438, 2373, 266}

$$\frac{bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{d^2r}-\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)}+\frac{bn\log(d+ex^r)}{d^2r^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

```
[Out] -((e*x^r*(a + b*Log[c*x^n]))/(d^2*r*(d + e*x^r))) - ((a + b*Log[c*x^n])*Log
[1 + d/(e*x^r)])/(d^2*r) + (b*n*Log[d + e*x^r])/(d^2*r^2) + (b*n*PolyLog[2,
 -(d/(e*x^r))])/(d^2*r^2)
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \frac{\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx}{d} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))}{(d+ex^r)^2}\,dx}{d}$$
$$= -\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{(bn)\int \frac{\log\left(1+\frac{dx^{-r}}{e}\right)}{x}\,dx}{d^2r} +$$
$$= -\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{bn\log(d+ex^r)}{d^2r^2} + \frac{bn\mathrm{Li}_2}{}$$

Mathematica [A]
time = 0.18, size = 132, normalized size = 1.29

$$\frac{\frac{dr(a+b\log(cx^n))}{d+ex^r} + bn\log(d-dx^r) - ar\log(d-dx^r) + br(n\log(x)-\log(cx^n))\log(d-dx^r) + bn\left(\frac{1}{2}r^2\log^2(x) + \left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r) + \mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right)}{d^2r^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

```
[Out] ((d*r*(a + b*Log[c*x^n]))/(d + e*x^r) + b*n*Log[d - d*x^r] - a*r*Log[d - d*
x^r] + b*r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + b*n*((r^2*Log[x]^2)/2 +
 (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/
d]))/(d^2*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.11, size = 715, normalized size = 7.01

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^2} - \frac{bn\ln(x)}{rd(d+e\,x^r)} - \frac{b\ln(x^r)n\ln(x)}{r\,d^2} - \frac{bn\,\mathrm{dilog}\left(\frac{d+e\,x^r}{d}\right)}{r^2d^2} - \frac{bn\ln(x)\ln\left(\frac{d+e\,x^r}{d}\right)}{r\,d^2} + \frac{bn\ln(x)^2}{2d^2} - \frac{i b\pi\,\mathrm{csgn}(ic)}{2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I/r*b*Pi*csgn(I*c*x^n)^3/d^2*ln(d+e*x^r)+b/r/d^2*ln(d+e*x^r)*n*ln(x)-b/
r/d/(d+e*x^r)*n*ln(x)-b/r/d^2*ln(x^r)*n*ln(x)-1/2*I/r*b*Pi*csgn(I*c*x^n)^3/
d^2*ln(x^r)+1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(d+e*x^r)+1/2*I/r*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*ln(x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2/d^2*ln(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(d+e*x^r)+1
/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2*ln(d+e*x^r)-b/r*n/d^2*l
n(x)*ln((d+e*x^r)/d)+1/2*b*n/d^2*ln(x)^2-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)/d/(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
/d^2*ln(x^r)+1/r*b*ln(c)/d/(d+e*x^r)+1/r*b*ln(c)/d^2*ln(x^r)-1/r*b*ln(c)/d^
2*ln(d+e*x^r)-b/r/d^2*ln(d+e*x^r)*ln(x^n)+b/r/d/(d+e*x^r)*ln(x^n)+b/r/d^2*l
n(x^r)*ln(x^n)-b/r^2*n/d^2*dilog((d+e*x^r)/d)-1/2*I/r*b*Pi*csgn(I*c*x^n)^3/
d/(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2*ln(d+e*x^r)-b/r*n*
e/d^2*ln(x)*x^r/(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2*ln(x^r
)+a/r/d^2*ln(x^r)-a/r/d^2*ln(d+e*x^r)+a/r/d/(d+e*x^r)+b*n*ln(d+e*x^r)/d^2/r
^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] a*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + b*int
egrate((log(c) + log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 229 vs. $2(102) = 204$.
time = 0.36, size = 229, normalized size = 2.25

$$\frac{bdnr^2 \log(x)^2 + 2\,bdr\log(c) + 2\,adr + \left(bnr^2e\log(x)^2 + 2\,(br^2e\log(c) - (bnr - ar^2)e)\log(x)\right)x^r - 2\,(bnx^re + bdn)\mathrm{Li}_2\left(-\frac{x^re+d}{d} + 1\right) - 2\,(bdr\log(c) - bdn + adr + (bre\log(c) - (bn - ar)e)x^r)\log(x^re + d) + 2\,(bdr^2\log(c) + adr^2)\log(x) - 2\,(bnrx^re\log(x) + bdnr\log(x))\log\left(\frac{x^re+d}{d}\right)}{2\,(d^2r^2x^re + d^3r^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(b*d*n*r^2*log(x)^2 + 2*b*d*r*log(c) + 2*a*d*r + (b*n*r^2*e*log(x)^2 +
2*(b*r^2*e*log(c) - (b*n*r - a*r^2)*e)*log(x))*x^r - 2*(b*n*x^r*e + b*d*n)*
dilog(-(x^r*e + d)/d + 1) - 2*(b*d*r*log(c) - b*d*n + a*d*r + (b*r*e*log(c)
 - (b*n - a*r)*e)*x^r)*log(x^r*e + d) + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x)
```

```
- 2*(b*n*r*x^r*e*log(x) + b*d*n*r*log(x))*log((x^r*e + d)/d))/(d^2*r^2*x^r
*e + d^3*r^2)
```

Sympy [A]
time = 216.37, size = 360, normalized size = 3.53

$$-\frac{ae\left(\begin{cases}\frac{x^r}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^r} & \text{otherwise}\end{cases}\right)}{dr}-\frac{ae\left(\begin{cases}\frac{x^r}{d} & \text{for } e=0\\ \frac{\log(d+ex^r)}{e} & \text{otherwise}\end{cases}\right)}{d^2r}+\frac{a\log(x^r)}{d^2r}+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{r} & \text{for } r\neq 0\\ \log(x) & \text{otherwise}\end{cases}}{d^2} & \text{for } e=0\\ -\begin{cases}\frac{\log(x)}{e^2} & \text{for } d=0\wedge r=0\\ -\frac{x^{-r}}{e^2r} & \text{for } d=0\\ \frac{\log(x)}{de+e^2} & \text{for } r=0\\ \frac{\log(x)}{de}-\frac{\log\left(\frac{d}{e}+x^r\right)}{der} & \text{otherwise}\end{cases} & \text{otherwise}\end{cases}\right)}{dr}-\frac{be\left(\begin{cases}\frac{x^r}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^r} & \text{otherwise}\end{cases}\right)\log(cx^n)}{dr}+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{r} & \text{for } r\neq 0\\ \log(x) & \text{otherwise}\end{cases}}{d} & \text{for } e=0\\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for } \frac{1}{|x|}<1\wedge |x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^2r}-\frac{be\left(\begin{cases}\frac{x^r}{d} & \text{for } e=0\\ \frac{\log(d+ex^r)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2r}+\frac{bn\left(\begin{cases}0 & \text{for } r=0\\ -\frac{\log(x^r)^2}{2r} & \text{otherwise}\end{cases}\right)}{d^2r}+\frac{b\log(x^r)\log(cx^n)}{d^2r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**2,x)
```

```
[Out] -a*e*Piecewise((x**r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))/(d*r) -
 a*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))/(d**2*r) + a*
log(x**r)/(d**2*r) + b*e*n*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log(x)
, True))/d**2, Eq(e, 0)), (-Piecewise((log(x)/e**2, Eq(d, 0) & Eq(r, 0)), (
-1/(e**2*r*x**r), Eq(d, 0)), (log(x)/(d*e + e**2), Eq(r, 0)), (log(x)/(d*e)
 - log(d/e + x**r)/(d*e*r), True)), True))/(d*r) - b*e*Piecewise((x**r/d**2
, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))*log(c*x**n)/(d*r) + b*e*n*Piecew
ise((Piecewise((x**r/r, Ne(r, 0)), (log(x), True))/d, Eq(e, 0)), (Piecewise
((-polylog(2, e*x**r*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)),
(log(d)*log(x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log
(d)*log(1/x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-mei
jerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0,
 0)), x)*log(d) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True))/e, True))/
(d**2*r) - b*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))*log
(c*x**n)/(d**2*r) + b*n*Piecewise((0, Eq(r, 0)), (-log(x**r)**2/(2*r), True
))/(d**2*r) + b*log(x**r)*log(c*x**n)/(d**2*r)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^2*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x^r\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^2),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^2), x)
```

3.426 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$

Optimal. Leaf size=169

$$-\frac{bn}{2d^2r^2\left(d+ex^r\right)}-\frac{bn\log(x)}{2d^3r}+\frac{a+b\log\left(cx^n\right)}{2dr\left(d+ex^r\right)^2}-\frac{ex^r\left(a+b\log\left(cx^n\right)\right)}{d^3r\left(d+ex^r\right)}-\frac{\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r}+\frac{3bn\,\mathrm{l}}{}$$

```
[Out] -1/2*b*n/d^2/r^2/(d+e*x^r)-1/2*b*n*ln(x)/d^3/r+1/2*(a+b*ln(c*x^n))/d/r/(d+e
*x^r)^2-e*x^r*(a+b*ln(c*x^n))/d^3/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r
))/d^3/r+3/2*b*n*ln(d+e*x^r)/d^3/r^2+b*n*polylog(2,-d/e/(x^r))/d^3/r^2
```

Rubi [A]
time = 0.29, antiderivative size = 169, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2391, 2379, 2438, 2373, 266, 2376, 272, 46}

$$\frac{bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^3r}-\frac{ex^r\left(a+b\log\left(cx^n\right)\right)}{d^3r\left(d+ex^r\right)}+\frac{a+b\log\left(cx^n\right)}{2dr\left(d+ex^r\right)^2}+\frac{3bn\log\left(d+ex^r\right)}{2d^3r^2}-\frac{bn\log(x)}{2d^3r}-\frac{bn}{2d^2r^2\left(d+ex^r\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^3),x]
```

```
[Out] -1/2*(b*n)/(d^2*r^2*(d + e*x^r)) - (b*n*Log[x])/(2*d^3*r) + (a + b*Log[c*x^
n])/(2*d*r*(d + e*x^r)^2) - (e*x^r*(a + b*Log[c*x^n]))/(d^3*r*(d + e*x^r))
- ((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d^3*r) + (3*b*n*Log[d + e*x^r])/
(2*d^3*r^2) + (b*n*PolyLog[2, -(d/(e*x^r))])/(d^3*r^2)
```

Rule 46

```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 NeQ[b*c - a*d, 0] && ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m +
 n + 2, 0])
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx = \frac{\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx}{d} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))}{(d+ex^r)^3}\,dx}{d}$$

$$= \frac{a+b\log(cx^n)}{2dr(d+ex^r)^2} + \frac{\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx}{d^2} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))}{(d+ex^r)^2}\,dx}{d^2} - \frac{(bn)\int \frac{1}{x(d+ex^r)^2}\,dx}{2dr}$$

$$= \frac{a+b\log(cx^n)}{2dr(d+ex^r)^2} - \frac{ex^r(a+b\log(cx^n))}{d^3r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r} - \frac{(bn)\text{Sub}}{}$$

$$= \frac{a+b\log(cx^n)}{2dr(d+ex^r)^2} - \frac{ex^r(a+b\log(cx^n))}{d^3r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r} + \frac{bn\log(a}{d^3}$$

$$= -\frac{bn}{2d^2r^2(d+ex^r)} - \frac{bn\log(x)}{2d^3r} + \frac{a+b\log(cx^n)}{2dr(d+ex^r)^2} - \frac{ex^r(a+b\log(cx^n))}{d^3r(d+ex^r)} - \frac{(a+b\log}{}$$

Mathematica [A]
time = 0.14, size = 170, normalized size = 1.01

$$\frac{\frac{d^2r(a+b\log(cx^n))}{(d+ex^r)^2} + \frac{d(-bn+2ar+2br\log(cx^n))}{d+ex^r} + 3bn\log(d-dx^r) - 2ar\log(d-dx^r) + 2br(n\log(x)-\log(cx^n))\log(d-dx^r) + 2bn\left(\frac{1}{2}r^2\log^2(x) + \left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r) + \text{Li}_2\left(1+\frac{ex^r}{d}\right)\right)}{2d^3r^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^3),x]
```

```
[Out] ((d^2*r*(a + b*Log[c*x^n]))/(d + e*x^r)^2 + (d*(-(b*n) + 2*a*r + 2*b*r*Log[
c*x^n]))/(d + e*x^r) + 3*b*n*Log[d - d*x^r] - 2*a*r*Log[d - d*x^r] + 2*b*r*
(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + 2*b*n*((r^2*Log[x]^2)/2 + (-(r*Log
[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]))/(2*d
^3*r^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 1012, normalized size = 5.99

method	result	size
risch	Expression too large to display	1012

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*ln(d+e*x^r)-1/2*I/r*b*
Pi*csgn(I*c*x^n)^3/d^2/(d+e*x^r)+b/r/d^3*ln(d+e*x^r)*n*ln(x)-b/r/d^2/(d+e*x
^r)*n*ln(x)-b/r*n/d^3*ln(x)*ln((d+e*x^r)/d)-1/2*b/r/d/(d+e*x^r)^2*n*ln(x)-b
```

```
/r/d^3*ln(x^r)*n*ln(x)-1/4*I/r*b*Pi*csgn(I*c*x^n)^3/d/(d+e*x^r)^2+1/r*b*ln(
c)/d^2/(d+e*x^r)+1/2/r*b*ln(c)/d/(d+e*x^r)^2+1/r*b*ln(c)/d^3*ln(x^r)-b/r/d^
3*ln(d+e*x^r)*ln(x^n)-1/2*I/r*b*Pi*csgn(I*c*x^n)^3/d^3*ln(x^r)-1/2*b*n/d^2/
r^2/(d+e*x^r)-1/2*b/r*n*e^2/d^3*ln(x)*(x^r)^2/(d+e*x^r)^2-b/r*n*e/d^2*ln(x)
*x^r/(d+e*x^r)^2+1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*ln(x^r)+1/4*I
/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d/(d+e*x^r)^2+a/r/d^3*ln(x^r)+a/r/d^2/(
d+e*x^r)+1/2*a/r/d/(d+e*x^r)^2+1/4*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d/(d+
e*x^r)^2-a/r/d^3*ln(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^3*l
n(d+e*x^r)-b/r*n*e/d^3*ln(x)*x^r/(d+e*x^r)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2/d^3*ln(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2/d^2/(d+e*x^r)
+1/2*I/r*b*Pi*csgn(I*c*x^n)^3/d^3*ln(d+e*x^r)+1/2*I/r*b*Pi*csgn(I*c)*csgn(I
*c*x^n)^2/d^3*ln(x^r)+1/2*I/r*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2/d^2/(d+e*x^r
)+1/2*b*n/d^3*ln(x)^2-1/r*b*ln(c)/d^3*ln(d+e*x^r)+b/r/d^2/(d+e*x^r)*ln(x^n)
+1/2*b/r/d/(d+e*x^r)^2*ln(x^n)+b/r/d^3*ln(x^r)*ln(x^n)-b/r^2*n/d^3*dilog((d
+e*x^r)/d)-1/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^2/(d+e*x^r)-1
/2*I/r*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d^3*ln(x^r)-1/4*I/r*b*Pi*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)/d/(d+e*x^r)^2+3/2*b*n*ln(d+e*x^r)/d^3/r^2
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="maxima")
```

```
[Out] 1/2*a*((2*e*x^r + 3*d)/(d^2*e^2*r*x^(2*r) + 2*d^3*e*r*x^r + d^4*r) + 2*log(
x)/d^3 - 2*log((e*x^r + d)/e)/(d^3*r)) + b*integrate((log(c) + log(x^n))/(e
^3*x*x^(3*r) + 3*d*e^2*x*x^(2*r) + 3*d^2*e*x*x^r + d^3*x), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 411 vs. 2(163) = 326.
time = 0.35, size = 411, normalized size = 2.43

$$\frac{bd^2nr^2\log(x)^2 + 3bd^2r\log(c) - bd^2n + 3ad^2r + (bnr^2e^2\log(x)^2 + (2br^2e^2\log(c) - (3bnr - 2ar^2)e^2)\log(x))x^{2r} + (2bdnr^2e\log(x)^2 + 2bdre\log(c) - (bdn - 2adr)e + 4(bdr^2e\log(c) - (bdnr - adr^2)e)\log(x))x^r - 2(2bdnx^re + bd^2n + bnx^{2r}e^2)\mathrm{Li}_2(-\frac{x^re+d}{d} + 1) - (2bd^2r\log(c) - 3bd^2n + 2ad^2r + (2bre^2\log(c) - (3bn - 2ar)e^2)x^{2r} + 2(2bdre\log(c) - (3bdn - 2adr)e)x^r)\log(x^re + d) + 2(bd^2r^2\log(c) + ad^2r^2)\log(x) - 2(2bdnrx^re\log(x) + bd^2nr\log(x) + bnrx^{2r}e^2\log(x))\log(\frac{x^re+d}{d})}{2(2d^4r^2x^re + d^5r^2 + d^3r^2x^{2r}e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(b*d^2*n*r^2*log(x)^2 + 3*b*d^2*r*log(c) - b*d^2*n + 3*a*d^2*r + (b*n*r
^2*e^2*log(x)^2 + (2*b*r^2*e^2*log(c) - (3*b*n*r - 2*a*r^2)*e^2)*log(x))*x^
(2*r) + (2*b*d*n*r^2*e*log(x)^2 + 2*b*d*r*e*log(c) - (b*d*n - 2*a*d*r)*e +
4*(b*d*r^2*e*log(c) - (b*d*n*r - a*d*r^2)*e)*log(x))*x^r - 2*(2*b*d*n*x^r*e
 + b*d^2*n + b*n*x^(2*r)*e^2)*dilog(-(x^r*e + d)/d + 1) - (2*b*d^2*r*log(c)
 - 3*b*d^2*n + 2*a*d^2*r + (2*b*r*e^2*log(c) - (3*b*n - 2*a*r)*e^2)*x^(2*r)
 + 2*(2*b*d*r*e*log(c) - (3*b*d*n - 2*a*d*r)*e)*x^r)*log(x^r*e + d) + 2*(b*
```

```
d^2*r^2*log(c) + a*d^2*r^2)*log(x) - 2*(2*b*d*n*r*x^r*e*log(x) + b*d^2*n*r*
log(x) + b*n*r*x^(2*r)*e^2*log(x))*log((x^r*e + d)/d))/(2*d^4*r^2*x^r*e + d
^5*r^2 + d^3*r^2*x^(2*r)*e^2)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**3,x)
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^3*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x^r\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^3),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^3), x)
```

3.427 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx$

Optimal. Leaf size=245

$$\frac{6b^2d^2en^2x^r}{r^3}+\frac{3b^2de^2n^2x^{2r}}{4r^3}+\frac{2b^2e^3n^2x^{3r}}{27r^3}-\frac{6bd^2enx^r(a+b\log{(cx^n)})}{r^2}-\frac{3bde^2nx^{2r}(a+b\log{(cx^n)})}{2r^2}-\frac{2be^3nx^{3r}(a\ \cdots}{9\cdots}$$

```
[Out] 6*b^2*d^2*e*n^2*x^r/r^3+3/4*b^2*d*e^2*n^2*x^(2*r)/r^3+2/27*b^2*e^3*n^2*x^(3
*r)/r^3-6*b*d^2*e*n*x^r*(a+b*ln(c*x^n))/r^2-3/2*b*d*e^2*n*x^(2*r)*(a+b*ln(c
*x^n))/r^2-2/9*b*e^3*n*x^(3*r)*(a+b*ln(c*x^n))/r^2+3*d^2*e*x^r*(a+b*ln(c*x^
n))^2/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c*x^n))^2/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n
))^2/r+1/3*d^3*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.21, antiderivative size = 245, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 5, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2395, 2339, 30, 2342, 2341}

$$\frac{d^3(a+b\log{(cx^n)})^3}{3bn}-\frac{6bd^2enx^r(a+b\log{(cx^n)})}{r^2}+\frac{3d^2ex^r(a+b\log{(cx^n)})^2}{r}-\frac{3bde^2nx^{2r}(a+b\log{(cx^n)})}{2r^2}+\frac{3de^2x^{2r}(a+b\log{(cx^n)})^2}{2r}-\frac{2be^3nx^{3r}(a+b\log{(cx^n)})}{9r^2}+\frac{e^3x^{3r}(a+b\log{(cx^n)})^2}{3r}+\frac{6b^2d^2en^2x^r}{r^3}+\frac{3b^2de^2n^2x^{2r}}{4r^3}+\frac{2b^2e^3n^2x^{3r}}{27r^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^3*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (6*b^2*d^2*e*n^2*x^r)/r^3 + (3*b^2*d*e^2*n^2*x^(2*r))/(4*r^3) + (2*b^2*e^3*
n^2*x^(3*r))/(27*r^3) - (6*b*d^2*e*n*x^r*(a + b*Log[c*x^n]))/r^2 - (3*b*d*e
^2*n*x^(2*r)*(a + b*Log[c*x^n]))/(2*r^2) - (2*b*e^3*n*x^(3*r)*(a + b*Log[c*
x^n]))/(9*r^2) + (3*d^2*e*x^r*(a + b*Log[c*x^n])^2)/r + (3*d*e^2*x^(2*r)*(a
 + b*Log[c*x^n])^2)/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n])^2)/(3*r) + (d^3
*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))^2}{x}\,dx = \int \left(\frac{d^3(a+b\log(cx^n))^2}{x} + 3d^2ex^{-1+r}(a+b\log(cx^n))^2 + 3de^2x^{-1+2r}(a\right.$$

$$= d^3\int \frac{(a+b\log(cx^n))^2}{x}\,dx + \left(3d^2e\right)\int x^{-1+r}(a+b\log(cx^n))^2\,dx + (3$$

$$= \frac{3d^2ex^r(a+b\log(cx^n))^2}{r} + \frac{3de^2x^{2r}(a+b\log(cx^n))^2}{2r} + \frac{e^3x^{3r}(a+b\log}{3r}$$

$$= \frac{6b^2d^2en^2x^r}{r^3} + \frac{3b^2de^2n^2x^{2r}}{4r^3} + \frac{2b^2e^3n^2x^{3r}}{27r^3} - \frac{6bd^2enx^r(a+b\log(cx^n))}{r^2}$$

Mathematica [A]
time = 0.29, size = 262, normalized size = 1.07

$$\frac{1}{3}b^2d^3n^2\log^3(x) - bd^3n\log^2(x)\,(a+b\log(cx^n)) + d^3\log(x)\,(a+b\log(cx^n))^2 + \frac{ex^r\left(18a^2r^2(18d^2+9dex^r+2e^2x^{2r}) - 6abnr(108d^2+27dex^r+4e^2x^{2r}) + b^2n^2(648d^2+81dex^r+8e^2x^{2r}) - 6br(-6ar(18d^2+9dex^r+2e^2x^{2r}) + bn(108d^2+27dex^r+4e^2x^{2r}))\log(cx^n) + 18b^2r^2(18d^2+9dex^r+2e^2x^{2r})\log^2(cx^n)\right)}{108r^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (b^2*d^3*n^2*Log[x]^3)/3 - b*d^3*n*Log[x]^2*(a + b*Log[c*x^n]) + d^3*Log[x]
*(a + b*Log[c*x^n])^2 + (e*x^r*(18*a^2*r^2*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2
*r)) - 6*a*b*n*r*(108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r)) + b^2*n^2*(648*d^2
+ 81*d*e*x^r + 8*e^2*x^(2*r)) - 6*b*r*(-6*a*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x
^(2*r)) + b*n*(108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r)))*Log[c*x^n] + 18*b^2*r
^2*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r))*Log[c*x^n]^2))/(108*r^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.33, size = 3984, normalized size = 16.26

method	result	size
risch	Expression too large to display	3984

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^3*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*I/r*Pi*ln(c)*b^2*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3-1/3*I
/r*Pi*a*b*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+1/9*I/r^2*Pi*b^2*
e^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^3+3/2*I/r*Pi*ln(c)*b^2*d*e^
2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+3/2*I/r*Pi*ln(c)*b^2*d*e^2*csgn(I*x^n)*
csgn(I*c*x^n)^2*(x^r)^2+3/2*I/r*Pi*a*b*d*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r
)^2-3*I/r^2*Pi*b^2*d^2*e*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-3/4*I/r^2*Pi*b^2
*d*e^2*n*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+3/2*I/r*Pi*a*b*d*e^2*csgn(I*x^n)
*csgn(I*c*x^n)^2*(x^r)^2-3/4*I/r^2*Pi*b^2*d*e^2*n*csgn(I*x^n)*csgn(I*c*x^n)
^2*(x^r)^2+3*I/r*Pi*ln(c)*b^2*d^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+1/3*a^2/r
*(x^r)^3*e^3+1/6*b^2*(2*e^3*(x^r)^3+6*d^3*ln(x)*r+9*d*e^2*(x^r)^2+18*d^2*e*
x^r)/r*ln(x^n)^2-3*I/r*Pi*a*b*d^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r
+3*I/r^2*Pi*b^2*d^2*e*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-3/2*I/r*Pi*
ln(c)*b^2*d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-3/2*I/r*Pi*a*b*
d*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+6*b^2*d^2*e*n^2*x^r/r^3+3
*a^2/r*x^r*d^2*e+3/2*a^2/r*(x^r)^2*d*e^2+ln(x)*ln(c)^2*b^2*d^3+1/3*b^2*d^3*
n^2*ln(x)^3+1/2*I*Pi*b^2*d^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*ln(x)^2-
I*ln(x)*Pi*ln(c)*b^2*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*ln(x)*Pi*a*b
*d^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3/4*I/r^2*Pi*b^2*d*e^2*n*csgn(I*c*
x^n)^3*(x^r)^2-3*I/r*Pi*ln(c)*b^2*d^2*e*csgn(I*c*x^n)^3*x^r-3*I/r*Pi*a*b*d^
2*e*csgn(I*c*x^n)^3*x^r+3*I/r^2*Pi*b^2*d^2*e*n*csgn(I*c*x^n)^3*x^r+1/3*I/r*
Pi*ln(c)*b^2*e^3*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+1/3*I/r*Pi*ln(c)*b^2*e^3
*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3+1/3*I/r*Pi*a*b*e^3*csgn(I*c)*csgn(I*c*
x^n)^2*(x^r)^3-1/9*I/r^2*Pi*b^2*e^3*n*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^3+1/3
*I/r*Pi*a*b*e^3*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-1/9*I/r^2*Pi*b^2*e^3*n*
csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^3-3/2*I/r*Pi*ln(c)*b^2*d*e^2*csgn(I*c*x^n
)^3*(x^r)^2-3/2*I/r*Pi*a*b*d*e^2*csgn(I*c*x^n)^3*(x^r)^2+2/3/r*ln(c)*a*b*e^
3*(x^r)^3-2/9/r^2*ln(c)*b^2*e^3*n*(x^r)^3+3/2/r*ln(c)^2*b^2*d*e^2*(x^r)^2-2
/9/r^2*a*b*e^3*n*(x^r)^3+3/r*ln(c)^2*b^2*d^2*e*x^r+3/4/r^3*b^2*d*e^2*n^2*(x
^r)^2-1/12/r*Pi^2*b^2*e^3*csgn(I*c)^2*csgn(I*c*x^n)^4*(x^r)^3+1/6/r*Pi^2*b^
2*e^3*csgn(I*c)*csgn(I*c*x^n)^5*(x^r)^3+1/6/r*Pi^2*b^2*e^3*csgn(I*x^n)*csgn
(I*c*x^n)^5*(x^r)^3-1/12/r*Pi^2*b^2*e^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4*(x^r)
^3-3/8/r*Pi^2*b^2*d*e^2*csgn(I*c*x^n)^6*(x^r)^2-3/4/r*Pi^2*b^2*d^2*e*csgn(I
*c*x^n)^6*x^r+3/r*ln(c)*a*b*d*e^2*(x^r)^2-3/2/r^2*ln(c)*b^2*d*e^2*n*(x^r)^2
-3/2/r^2*a*b*d*e^2*n*(x^r)^2+6/r*ln(c)*a*b*d^2*e*x^r-1/18*b*(-54*ln(c)*b*d*
e^2*r*(x^r)^2-36*ln(x)*ln(c)*b*d^3*r^2+18*b*d^3*n*ln(x)^2*r^2-54*a*d*e^2*r*
(x^r)^2-108*a*d^2*e*r*x^r+4*b*e^3*n*(x^r)^3-6*I*Pi*b*e^3*r*csgn(I*c)*csgn(I
*c*x^n)^2*(x^r)^3+27*b*d*e^2*n*(x^r)^2+108*b*d^2*e*n*x^r-54*I*Pi*b*d^2*e*r*
```

```
csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+18*I*ln(x)*Pi*b*d^3*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*r^2-36*ln(x)*a*d^3*r^2-12*a*e^3*r*(x^r)^3-12*ln(c)*b*e^3*r*(x^
r)^3-18*I*ln(x)*Pi*b*d^3*csgn(I*x^n)*csgn(I*c*x^n)^2*r^2+54*I*Pi*b*d^2*e*r*
csgn(I*c*x^n)^3*x^r+6*I*Pi*b*e^3*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r
)^3-27*I*Pi*b*d*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2+54*I*Pi*b*d^2*e*r*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-108*ln(c)*b*d^2*e*r*x^r+27*I*Pi*b*d*
e^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-6*I*Pi*b*e^3*r*csgn(I*x^n
)*csgn(I*c*x^n)^2*(x^r)^3+27*I*Pi*b*d*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-18*I*ln
(x)*Pi*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2*r^2+6*I*Pi*b*e^3*r*csgn(I*c*x^n)^3*(
x^r)^3+18*I*ln(x)*Pi*b*d^3*csgn(I*c*x^n)^3*r^2-27*I*Pi*b*d*e^2*r*csgn(I*x^n
)*csgn(I*c*x^n)^2*(x^r)^2-54*I*Pi*b*d^2*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r)/
r^2*ln(x^n)+ln(x)*a^2*d^3+2/27/r^3*b^2*e^3*n^2*(x^r)^3-ln(c)*b^2*d^3*n*ln(x
)^2-a*b*d^3*n*ln(x)^2+2*ln(x)*ln(c)*a*b*d^3+1/3/r*ln(c)^2*b^2*e^3*(x^r)^3-1
/12/r*Pi^2*b^2*e^3*csgn(I*c*x^n)^6*(x^r)^3+1/2*csgn(I*c*x^n)^3*csgn(I*x^n)^
2*csgn(I*c)*d^3*b^2*Pi^2*ln(x)-csgn(I*c*x^n)^4*csgn(I*x^n)*csgn(I*c)*d^3*b^
2*Pi^2*ln(x)-1/4*csgn(I*c*x^n)^2*csgn(I*x^n)^2*csgn(I*c)^2*d^3*b^2*Pi^2*ln(
x)+1/2*csgn(I*c*x^n)^3*csgn(I*x^n)*csgn(I*c)^2*d^3*b^2*Pi^2*ln(x)+3*I/r*Pi*
ln(c)*b^2*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+3*I/r*Pi*a*b*d^2*e*csgn(I*c
)*csgn(I*c*x^n)^2*x^r-3*I/r^2*Pi*b^2*d^2*e*n*csgn(I*c)*csgn(I*c*x^n)^2*x^r+
3*I/r*Pi*a*b*d^2*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-1/4*csgn(I*c*x^n)^6*d^3*
b^2*Pi^2*ln(x)+1/6/r*Pi^2*b^2*e^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*(
x^r)^3-1/12/r*Pi^2*b^2*e^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*(x^r)^
3-1/3/r*Pi^2*b^2*e^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*(x^r)^3+1/6/r*Pi
^2*b^2*e^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*(x^r)^3+I*ln(x)*Pi*ln(c)
*b^2*d^3*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x)*Pi*ln(c)*b^2*d^3*csgn(I*x^n)*csg
n(I*c*x^n)^2+I*ln(x)*Pi*a*b*d^3*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x)*Pi*a*b*d^
3*csgn(I*x^n)*csgn(I*c*x^n)^2-3/8/r*Pi^2*b^2*d*e^2*csgn(I*c)^2*csgn(I*c*x^n
)^4*(x^r)^2+3/4/r*Pi^2*b^2*d*e^2*csgn(I*c)*csgn(I*c*x^n)^5*(x^r)^2+3/4/r*Pi
^2*b^2*d*e^2*csgn(I*x^n)*csgn(I*c*x^n)^5*(x^r)^2-3/8/r*Pi^2*b^2*d*e^2*csgn(
I*x^n)^2*csgn(I*c*x^n)^4*(x^r)^2-3/4/r*Pi^2*b^2...
```

Maxima [A]
time = 0.29, size = 391, normalized size = 1.60

$$\frac{b^2e^3x^{3r}\log(cx^n)^2}{3r}+\frac{3b^2de^2x^{2r}\log(cx^n)^2}{2r}+\frac{3b^2d^2ex^r\log(cx^n)^2}{r}+\frac{b^2d^3\log(cx^n)^3}{3n}-\frac{2}{27}b^2e^3\left(\frac{3nx^{3r}\log(cx^n)}{r^2}-\frac{n^2x^{3r}}{r^3}\right)-\frac{3}{4}b^2de^2\left(\frac{2nx^{2r}\log(cx^n)}{r^2}-\frac{n^2x^{2r}}{r^3}\right)-6b^2d^2e\left(\frac{nx^r\log(cx^n)}{r^2}-\frac{n^2x^r}{r^3}\right)+\frac{2abe^3x^{3r}\log(cx^n)}{3r}+\frac{3abde^2x^{2r}\log(cx^n)}{r}+\frac{6abd^2ex^r\log(cx^n)}{r}+\frac{abd^3\log(cx^n)^2}{n}+a^2d^3\log(x)-\frac{2abe^3nx^{3r}}{9r^2}+\frac{a^2e^3x^{3r}}{3r}-\frac{3abde^2nx^{2r}}{2r^2}+\frac{3a^2de^2x^{2r}}{2r}-\frac{6abd^2enx^r}{r^2}+\frac{3a^2d^2ex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] 1/3*b^2*e^3*x^(3*r)*log(c*x^n)^2/r + 3/2*b^2*d*e^2*x^(2*r)*log(c*x^n)^2/r +
 3*b^2*d^2*e*x^r*log(c*x^n)^2/r + 1/3*b^2*d^3*log(c*x^n)^3/n - 2/27*b^2*e^3
*(3*n*x^(3*r)*log(c*x^n)/r^2 - n^2*x^(3*r)/r^3) - 3/4*b^2*d*e^2*(2*n*x^(2*r
)*log(c*x^n)/r^2 - n^2*x^(2*r)/r^3) - 6*b^2*d^2*e*(n*x^r*log(c*x^n)/r^2 - n
^2*x^r/r^3) + 2/3*a*b*e^3*x^(3*r)*log(c*x^n)/r + 3*a*b*d*e^2*x^(2*r)*log(c*
x^n)/r + 6*a*b*d^2*e*x^r*log(c*x^n)/r + a*b*d^3*log(c*x^n)^2/n + a^2*d^3*lo
```

```
g(x) - 2/9*a*b*e^3*n*x^(3*r)/r^2 + 1/3*a^2*e^3*x^(3*r)/r - 3/2*a*b*d*e^2*n*
x^(2*r)/r^2 + 3/2*a^2*d*e^2*x^(2*r)/r - 6*a*b*d^2*e*n*x^r/r^2 + 3*a^2*d^2*e
*x^r/r
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 500 vs. $2(228) = 456$.
time = 0.39, size = 500, normalized size = 2.04

$$\frac{36\,b^2d^3n^2r^3\log(x)^3 + 108\,(b^2d^3nr^3\log(c) + abd^3nr^3)\log(x)^2 + 4\,(9\,b^2n^2r^2e^3\log(x)^2 + 9\,b^2r^2e^3\log(c)^2 - 6\,(b^2nr - 3\,abr^2)e^3\log(c) + (2\,b^2n^2 - 6\,abnr + 9\,a^2r^2)e^3 + 6\,(3\,b^2nr^2e^3\log(c) - (b^2n^2r - 3\,abnr^2)e^3)\log(x))x^{3r} + 81\,(2\,b^2dn^2r^2e^2\log(x)^2 + 2\,b^2dr^2e^2\log(c)^2 - 2\,(b^2dnr - 2\,abdr^2)e^2\log(c) + (b^2dn^2 - 2\,abdnr + 2\,a^2dr^2)e^2 + 2\,(2\,b^2dnr^2e^2\log(c) - (b^2dn^2r - 2\,abdnr^2)e^2)\log(x))x^{2r} + 324\,(b^2d^2n^2r^2e\log(x)^2 + b^2d^2r^2e\log(c)^2 - 2\,(b^2d^2nr - abd^2r^2)e\log(c) + (2\,b^2d^2n^2 - 2\,abd^2nr + a^2d^2r^2)e + 2\,(b^2d^2nr^2e\log(c) - (b^2d^2n^2r - abd^2nr^2)e)\log(x))x^r + 108\,(b^2d^3r^3\log(c)^2 + 2\,abd^3r^3\log(c) + a^2d^3r^3)\log(x)}{108\,r^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

```
[Out] 1/108*(36*b^2*d^3*n^2*r^3*log(x)^3 + 108*(b^2*d^3*n*r^3*log(c) + a*b*d^3*n*
r^3)*log(x)^2 + 4*(9*b^2*n^2*r^2*e^3*log(x)^2 + 9*b^2*r^2*e^3*log(c)^2 - 6*
(b^2*n*r - 3*a*b*r^2)*e^3*log(c) + (2*b^2*n^2 - 6*a*b*n*r + 9*a^2*r^2)*e^3
+ 6*(3*b^2*n*r^2*e^3*log(c) - (b^2*n^2*r - 3*a*b*n*r^2)*e^3)*log(x))*x^(3*r
) + 81*(2*b^2*d*n^2*r^2*e^2*log(x)^2 + 2*b^2*d*r^2*e^2*log(c)^2 - 2*(b^2*d*
n*r - 2*a*b*d*r^2)*e^2*log(c) + (b^2*d*n^2 - 2*a*b*d*n*r + 2*a^2*d*r^2)*e^2
 + 2*(2*b^2*d*n*r^2*e^2*log(c) - (b^2*d*n^2*r - 2*a*b*d*n*r^2)*e^2)*log(x))
*x^(2*r) + 324*(b^2*d^2*n^2*r^2*e*log(x)^2 + b^2*d^2*r^2*e*log(c)^2 - 2*(b^
2*d^2*n*r - a*b*d^2*r^2)*e*log(c) + (2*b^2*d^2*n^2 - 2*a*b*d^2*n*r + a^2*d^
2*r^2)*e + 2*(b^2*d^2*n*r^2*e*log(c) - (b^2*d^2*n^2*r - a*b*d^2*n*r^2)*e)*l
og(x))*x^r + 108*(b^2*d^3*r^3*log(c)^2 + 2*a*b*d^3*r^3*log(c) + a^2*d^3*r^3
)*log(x))/r^3
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 588 vs. $2(246) = 492$.
time = 16.58, size = 588, normalized size = 2.40

$$\begin{cases} (a + b\log(c))^2 (d+e)^3 \log(x) & \text{for}\: n = 0 \wedge r = 0 \\ (d+e)^3 \left(\begin{cases} \frac{a^2\log(cx^n) + ab\log(cx^n)^2 + \frac{b^2\log(cx^n)^3}{3}}{n} & \text{for}\: n \neq 0 \\ (a^2 + 2ab\log(c) + b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}\right) & \text{for}\: r = 0 \\ (a + b\log(c))^2 \left(d^3\log(x) + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) & \text{for}\: n = 0 \\ \frac{a^2d^3\log(cx^n)}{n} + \frac{3a^2d^2ex^r}{r} + \frac{3a^2de^2x^{2r}}{2r} + \frac{a^2e^3x^{3r}}{3r} + \frac{abd^3\log(cx^n)^2}{n} - \frac{6abd^2enx^r}{r^2} + \frac{6abd^2ex^r\log(cx^n)}{r} - \frac{3abde^2nx^{2r}}{2r^2} + \frac{3abde^2x^{2r}\log(cx^n)}{r} - \frac{2abe^3nx^{3r}}{9r^2} + \frac{2abe^3x^{3r}\log(cx^n)}{3r} + \frac{b^2d^3\log(cx^n)^3}{3n} + \frac{6b^2d^2en^2x^r}{r^3} - \frac{6b^2d^2enx^r\log(cx^n)}{r^2} + \frac{3b^2d^2ex^r\log(cx^n)^2}{r} + \frac{3b^2de^2n^2x^{2r}}{4r^3} - \frac{3b^2de^2nx^{2r}\log(cx^n)}{2r^2} + \frac{3b^2de^2x^{2r}\log(cx^n)^2}{2r} + \frac{2b^2e^3n^2x^{3r}}{27r^3} - \frac{2b^2e^3nx^{3r}\log(cx^n)}{9r^2} + \frac{b^2e^3x^{3r}\log(cx^n)^2}{3r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**3*(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Piecewise(((a + b*log(c))**2*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((d +
 e)**3*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)
**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))
, Eq(r, 0)), ((a + b*log(c))**2*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x
**(2*r)/(2*r) + e**3*x**(3*r)/(3*r)), Eq(n, 0)), (a**2*d**3*log(c*x**n)/n +
 3*a**2*d**2*e*x**r/r + 3*a**2*d*e**2*x**(2*r)/(2*r) + a**2*e**3*x**(3*r)/(
3*r) + a*b*d**3*log(c*x**n)**2/n - 6*a*b*d**2*e*n*x**r/r**2 + 6*a*b*d**2*e*
x**r*log(c*x**n)/r - 3*a*b*d*e**2*n*x**(2*r)/(2*r**2) + 3*a*b*d*e**2*x**(2*
r)*log(c*x**n)/r - 2*a*b*e**3*n*x**(3*r)/(9*r**2) + 2*a*b*e**3*x**(3*r)*log
```

```
(c*x**n)/(3*r) + b**2*d**3*log(c*x**n)**3/(3*n) + 6*b**2*d**2*e*n**2*x**r/r
**3 - 6*b**2*d**2*e*n*x**r*log(c*x**n)/r**2 + 3*b**2*d**2*e*x**r*log(c*x**n
)**2/r + 3*b**2*d*e**2*n**2*x**(2*r)/(4*r**3) - 3*b**2*d*e**2*n*x**(2*r)*lo
g(c*x**n)/(2*r**2) + 3*b**2*d*e**2*x**(2*r)*log(c*x**n)**2/(2*r) + 2*b**2*e
**3*n**2*x**(3*r)/(27*r**3) - 2*b**2*e**3*n*x**(3*r)*log(c*x**n)/(9*r**2) +
 b**2*e**3*x**(3*r)*log(c*x**n)**2/(3*r), True))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 634 vs. 2(228) = 456.
time = 3.75, size = 634, normalized size = 2.59

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

```
[Out] 1/3*b^2*d^3*n^2*log(x)^3 + 3*b^2*d^2*n^2*x^r*e*log(x)^2/r + b^2*d^3*n*log(c
)*log(x)^2 + 6*b^2*d^2*n*x^r*e*log(c)*log(x)/r + b^2*d^3*log(c)^2*log(x) +
a*b*d^3*n*log(x)^2 + 3/2*b^2*d*n^2*x^(2*r)*e^2*log(x)^2/r + 3*b^2*d^2*x^r*e
*log(c)^2/r - 6*b^2*d^2*n^2*x^r*e*log(x)/r^2 + 6*a*b*d^2*n*x^r*e*log(x)/r +
 2*a*b*d^3*log(c)*log(x) + 3*b^2*d*n*x^(2*r)*e^2*log(c)*log(x)/r + 1/3*b^2*
n^2*x^(3*r)*e^3*log(x)^2/r - 6*b^2*d^2*n*x^r*e*log(c)/r^2 + 6*a*b*d^2*x^r*e
*log(c)/r + 3/2*b^2*d*x^(2*r)*e^2*log(c)^2/r + a^2*d^3*log(x) - 3/2*b^2*d*n
^2*x^(2*r)*e^2*log(x)/r^2 + 3*a*b*d*n*x^(2*r)*e^2*log(x)/r + 2/3*b^2*n*x^(3
*r)*e^3*log(c)*log(x)/r + 6*b^2*d^2*n^2*x^r*e/r^3 - 6*a*b*d^2*n*x^r*e/r^2 +
 3*a^2*d^2*x^r*e/r - 3/2*b^2*d*n*x^(2*r)*e^2*log(c)/r^2 + 3*a*b*d*x^(2*r)*e
^2*log(c)/r + 1/3*b^2*x^(3*r)*e^3*log(c)^2/r - 2/9*b^2*n^2*x^(3*r)*e^3*log(
x)/r^2 + 2/3*a*b*n*x^(3*r)*e^3*log(x)/r + 3/4*b^2*d*n^2*x^(2*r)*e^2/r^3 - 3
/2*a*b*d*n*x^(2*r)*e^2/r^2 + 3/2*a^2*d*x^(2*r)*e^2/r - 2/9*b^2*n*x^(3*r)*e^
3*log(c)/r^2 + 2/3*a*b*x^(3*r)*e^3*log(c)/r + 2/27*b^2*n^2*x^(3*r)*e^3/r^3
- 2/9*a*b*n*x^(3*r)*e^3/r^2 + 1/3*a^2*x^(3*r)*e^3/r
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^3*(a + b*log(c*x^n))^2)/x,x)
```

```
[Out] int(((d + e*x^r)^3*(a + b*log(c*x^n))^2)/x, x)
```

3.428 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx$

Optimal. Leaf size=161

$$\frac{4b^2den^2x^r}{r^3}+\frac{b^2e^2n^2x^{2r}}{4r^3}-\frac{4bdenx^r(a+b\log(cx^n))}{r^2}-\frac{be^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{2dex^r(a+b\log(cx^n))^2}{r}+\frac{e^2x^{2r}(\cdots}{}$$

```
[Out] 4*b^2*d*e*n^2*x^r/r^3+1/4*b^2*e^2*n^2*x^(2*r)/r^3-4*b*d*e*n*x^r*(a+b*ln(c*x
^n))/r^2-1/2*b*e^2*n*x^(2*r)*(a+b*ln(c*x^n))/r^2+2*d*e*x^r*(a+b*ln(c*x^n))^
2/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))^2/r+1/3*d^2*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.17, antiderivative size = 161, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 5, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2395, 2339, 30, 2342, 2341}

$$\frac{d^2(a+b\log(cx^n))^3}{3bn}-\frac{4bdenx^r(a+b\log(cx^n))}{r^2}+\frac{2dex^r(a+b\log(cx^n))^2}{r}-\frac{be^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{e^2x^{2r}(a+b\log(cx^n))^2}{2r}+\frac{4b^2den^2x^r}{r^3}+\frac{b^2e^2n^2x^{2r}}{4r^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^2*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (4*b^2*d*e*n^2*x^r)/r^3 + (b^2*e^2*n^2*x^(2*r))/(4*r^3) - (4*b*d*e*n*x^r*(a
 + b*Log[c*x^n]))/r^2 - (b*e^2*n*x^(2*r)*(a + b*Log[c*x^n]))/(2*r^2) + (2*d
*e*x^r*(a + b*Log[c*x^n])^2)/r + (e^2*x^(2*r)*(a + b*Log[c*x^n])^2)/(2*r) +
 (d^2*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
```

```
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx = \int \left(\frac{d^2(a+b\log(cx^n))^2}{x} + 2dex^{-1+r}(a+b\log(cx^n))^2 + e^2x^{-1+2r}(a+\right.$$

$$= d^2\int \frac{(a+b\log(cx^n))^2}{x}\,dx + (2de)\int x^{-1+r}(a+b\log(cx^n))^2\,dx + e^2\int$$

$$= \frac{2dex^r(a+b\log(cx^n))^2}{r} + \frac{e^2x^{2r}(a+b\log(cx^n))^2}{2r} + \frac{d^2\mathrm{Subst}\left(\int x^2\,dx, x\right.}{bn}$$

$$= \frac{4b^2den^2x^r}{r^3} + \frac{b^2e^2n^2x^{2r}}{4r^3} - \frac{4bdenx^r(a+b\log(cx^n))}{r^2} - \frac{be^2nx^{2r}(a+b\log}{2r^2}$$

Mathematica [A]
time = 0.22, size = 178, normalized size = 1.11

$$\frac{1}{3}b^2d^2n^2\log^3(x) - bd^2n\log^2(x)(a+b\log(cx^n)) + d^2\log(x)(a+b\log(cx^n))^2 + \frac{ex^r\left(2a^2r^2(4d+ex^r) - 2abnr(8d+ex^r) + b^2n^2(16d+ex^r) - 2br(-2ar(4d+ex^r)+bn(8d+ex^r))\log(cx^n) + 2b^2r^2(4d+ex^r)\log^2(cx^n)\right)}{4r^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (b^2*d^2*n^2*Log[x]^3)/3 - b*d^2*n*Log[x]^2*(a + b*Log[c*x^n]) + d^2*Log[x]
*(a + b*Log[c*x^n])^2 + (e*x^r*(2*a^2*r^2*(4*d + e*x^r) - 2*a*b*n*r*(8*d +
e*x^r) + b^2*n^2*(16*d + e*x^r) - 2*b*r*(-2*a*r*(4*d + e*x^r) + b*n*(8*d +
e*x^r))*Log[c*x^n] + 2*b^2*r^2*(4*d + e*x^r)*Log[c*x^n]^2))/(4*r^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.28, size = 2844, normalized size = 17.66

method	result	size
risch	Expression too large to display	2844

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^2*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

```
[Out] a^2*d^2*ln(x)-1/4*csgn(I*c*x^n)^6*d^2*b^2*Pi^2*ln(x)-1/8/r*Pi^2*b^2*e^2*csg
n(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*(x^r)^2+1/4/r*Pi^2*b^2*e^2*csgn(I*c)
^2*csgn(I*x^n)*csgn(I*c*x^n)^3*(x^r)^2+1/4/r*Pi^2*b^2*e^2*csgn(I*c)*csgn(I*
x^n)^2*csgn(I*c*x^n)^3*(x^r)^2-1/2/r*Pi^2*b^2*e^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4*(x^r)^2-1/2/r*Pi^2*b^2*d*e*csgn(I*c)^2*csgn(I*c*x^n)^4*x^r+1/r
*Pi^2*b^2*d*e*csgn(I*c)*csgn(I*c*x^n)^5*x^r-1/2/r*Pi^2*b^2*d*e*csgn(I*x^n)^
2*csgn(I*c*x^n)^4*x^r+1/r*Pi^2*b^2*d*e*csgn(I*x^n)*csgn(I*c*x^n)^5*x^r+1/2*
b^2*(2*d^2*ln(x)*r+e^2*(x^r)^2+4*d*e*x^r)/r*ln(x^n)^2+1/2/r*ln(c)^2*b^2*e^2
*(x^r)^2+1/4/r^3*b^2*e^2*n^2*(x^r)^2+1/2*a^2/r*(x^r)^2*e^2+4*b^2*d*e*n^2*x^
r/r^3+2*a^2/r*x^r*d*e-1/2*b*(4*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)*x^r-4*I*Pi*b*d*e*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+2*I*ln(x)*Pi*b*d^2*
csgn(I*c*x^n)^3*r^2-2*I*ln(x)*Pi*b*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2*r^2-2*I*
ln(x)*Pi*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2*r^2+I*Pi*b*e^2*r*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)*(x^r)^2-I*Pi*b*e^2*r*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-4
*I*Pi*b*d*e*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r+2*I*ln(x)*Pi*b*d^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)*r^2+I*Pi*b*e^2*r*csgn(I*c*x^n)^3*(x^r)^2-I*Pi*b*e^2
*r*csgn(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+4*I*Pi*b*d*e*r*csgn(I*c*x^n)^3*x^r+2
*b*d^2*n*ln(x)^2*r^2-4*ln(x)*ln(c)*b*d^2*r^2-2*ln(c)*b*e^2*r*(x^r)^2-4*ln(x
)*a*d^2*r^2-8*ln(c)*b*d*e*r*x^r-2*a*e^2*r*(x^r)^2+b*e^2*n*(x^r)^2-8*a*d*e*r
*x^r+8*b*d*e*n*x^r)/r^2*ln(x^n)+ln(x)*ln(c)^2*b^2*d^2+1/3*b^2*d^2*n^2*ln(x)
^3+2*ln(x)*ln(c)*a*b*d^2+1/r*Pi^2*b^2*d*e*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*
x^n)^3*x^r-2/r*Pi^2*b^2*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x^r-1/2/r
*Pi^2*b^2*d*e*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2*x^r+1/r*Pi^2*b^2*d*
e*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x^r+1/2*I/r*Pi*ln(c)*b^2*e^2*csgn
(I*x^n)*csgn(I*c*x^n)^2*(x^r)^2+1/2*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)*ln(x)^2-I*ln(x)*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)-I*ln(x)*Pi*a*b*d^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/r*Pi*a*b
*e^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-1/4*I/r^2*Pi*b^2*e^2*n*csgn(I*c)*csg
n(I*c*x^n)^2*(x^r)^2-ln(x)^2*ln(c)*b^2*d^2*n-ln(x)^2*b*d^2*n*a-1/2*I/r*Pi*l
n(c)*b^2*e^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2-1/2*I/r*Pi*a*b*e^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+1/4*I/r^2*Pi*b^2*e^2*n*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)*(x^r)^2+2*I/r*Pi*ln(c)*b^2*d*e*csgn(I*c)*csgn(
I*c*x^n)^2*x^r+2*I/r*Pi*ln(c)*b^2*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+2*I/r
*Pi*a*b*d*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2*I/r^2*Pi*b^2*d*e*n*csgn(I*c)*cs
gn(I*c*x^n)^2*x^r+2*I/r*Pi*a*b*d*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-2*I/r^2*
Pi*b^2*d*e*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+1/2*csgn(I*c*x^n)^5*csgn(I*c)*
d^2*b^2*Pi^2*ln(x)-1/4*csgn(I*c*x^n)^4*csgn(I*x^n)^2*d^2*b^2*Pi^2*ln(x)+1/2
*csgn(I*c*x^n)^5*csgn(I*x^n)*d^2*b^2*Pi^2*ln(x)-1/4*csgn(I*c*x^n)^4*csgn(I*
c)^2*d^2*b^2*Pi^2*ln(x)-1/8/r*Pi^2*b^2*e^2*csgn(I*c)^2*csgn(I*c*x^n)^4*(x^r
)^2+1/4/r*Pi^2*b^2*e^2*csgn(I*c)*csgn(I*c*x^n)^5*(x^r)^2-1/8/r*Pi^2*b^2*e^2
```

```
*csgn(I*x^n)^2*csgn(I*c*x^n)^4*(x^r)^2+1/4/r*Pi^2*b^2*e^2*csgn(I*x^n)*csgn(
I*c*x^n)^5*(x^r)^2-1/2/r*Pi^2*b^2*d*e*csgn(I*c*x^n)^6*x^r+4/r*ln(c)*a*b*d*e
*x^r-4/r^2*ln(c)*b^2*d*e*n*x^r-4/r^2*a*b*d*e*n*x^r+1/2*I*Pi*b^2*d^2*n*csgn(
I*c*x^n)^3*ln(x)^2-I*ln(x)*Pi*ln(c)*b^2*d^2*csgn(I*c*x^n)^3-I*ln(x)*Pi*a*b*
d^2*csgn(I*c*x^n)^3-1/4*csgn(I*c*x^n)^2*csgn(I*x^n)^2*csgn(I*c)^2*d^2*b^2*P
i^2*ln(x)+1/2*csgn(I*c*x^n)^3*csgn(I*x^n)*csgn(I*c)^2*d^2*b^2*Pi^2*ln(x)+1/
2*csgn(I*c*x^n)^3*csgn(I*x^n)^2*csgn(I*c)*d^2*b^2*Pi^2*ln(x)-csgn(I*c*x^n)^
4*csgn(I*x^n)*csgn(I*c)*d^2*b^2*Pi^2*ln(x)+1/2*I/r*Pi*a*b*e^2*csgn(I*x^n)*c
sgn(I*c*x^n)^2*(x^r)^2-1/4*I/r^2*Pi*b^2*e^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2*(
x^r)^2-2*I/r*Pi*ln(c)*b^2*d*e*csgn(I*c*x^n)^3*x^r-2*I/r*Pi*a*b*d*e*csgn(I*c
*x^n)^3*x^r+2*I/r^2*Pi*b^2*d*e*n*csgn(I*c*x^n)^3*x^r+1/2*I/r*Pi*ln(c)*b^2*e
^2*csgn(I*c)*csgn(I*c*x^n)^2*(x^r)^2-1/2/r^2*a*b*e^2*n*(x^r)^2-1/8/r*Pi^2*b
^2*e^2*csgn(I*c*x^n)^6*(x^r)^2+1/r*ln(c)*a*b*e^2*(x^r)^2-1/2/r^2*ln(c)*b^2*
e^2*n*(x^r)^2+2/r*ln(c)^2*b^2*d*e*x^r-2*I/r*Pi*ln(c)*b^2*d*e*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)*x^r-2*I/r*Pi*a*b*d*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)*x^r+2*I/r^2*Pi*b^2*d*e*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+I*ln(x
)*Pi*a*b*d^2*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x)*Pi*a*b*d^2*csgn(I*x^n)*csgn(
I*c*x^n)^2+I*ln(x)*Pi*ln(c)*b^2*d^2*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(x)*Pi*ln
(c)*b^2*d^2*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/r*Pi*ln(c)*b^2*e^2*csgn(I*c*x
^n)^3*(x^r)^2-1/2*I/r*Pi*a*b*e^2*csgn(I*c*x^n)^3*(x^r)^2+1/4*I/r^2*Pi*b^2*e
^2*n*csgn(I*c*x^n)^3*(x^r)^2-1/2*I*Pi*b^2*d^2*n*csgn(I*c)*csgn(I*c*x^n)^2*l
n(x)^2-1/2*I*Pi*b^2*d^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2*ln(x)^2
```

Maxima [A]
time = 0.29, size = 259, normalized size = 1.61

$$\frac{b^2e^2x^{2r}\log\left(cx^n\right)^2}{2r}+\frac{2\,b^2dex^r\log\left(cx^n\right)^2}{r}+\frac{b^2d^2\log\left(cx^n\right)^3}{3\,n}-\frac{1}{4}\,b^2e^2\left(\frac{2\,nx^{2r}\log\left(cx^n\right)}{r^2}-\frac{n^2x^{2r}}{r^3}\right)-4\,b^2de\left(\frac{nx^r\log\left(cx^n\right)}{r^2}-\frac{n^2x^r}{r^3}\right)+\frac{abe^2x^{2r}\log\left(cx^n\right)}{r}+\frac{4\,abdex^r\log\left(cx^n\right)}{r}+\frac{abd^2\log\left(cx^n\right)^2}{n}+a^2d^2\log\left(x\right)-\frac{abe^2nx^{2r}}{2\,r^2}+\frac{a^2e^2x^{2r}}{2\,r}-\frac{4\,abdenx^r}{r^2}+\frac{2\,a^2dex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] 1/2*b^2*e^2*x^(2*r)*log(c*x^n)^2/r + 2*b^2*d*e*x^r*log(c*x^n)^2/r + 1/3*b^2
*d^2*log(c*x^n)^3/n - 1/4*b^2*e^2*(2*n*x^(2*r)*log(c*x^n)/r^2 - n^2*x^(2*r)
/r^3) - 4*b^2*d*e*(n*x^r*log(c*x^n)/r^2 - n^2*x^r/r^3) + a*b*e^2*x^(2*r)*lo
g(c*x^n)/r + 4*a*b*d*e*x^r*log(c*x^n)/r + a*b*d^2*log(c*x^n)^2/n + a^2*d^2*
log(x) - 1/2*a*b*e^2*n*x^(2*r)/r^2 + 1/2*a^2*e^2*x^(2*r)/r - 4*a*b*d*e*n*x^
r/r^2 + 2*a^2*d*e*x^r/r
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 346 vs. $2(153) = 306$.
time = 0.36, size = 346, normalized size = 2.15

$$\frac{4\,b^2d^2n^2r^3\log\left(x\right)^3+12\,\left(b^2d^2nr^3\log\left(c\right)+abd^2nr^3\right)\log\left(x\right)^2+3\,\left(2\,b^2n^2r^2e^2\log\left(x\right)^2+2\,b^2r^2e^2\log\left(c\right)^2-2\,\left(b^2nr-2\,abr^2\right)e^2\log\left(c\right)+\left(b^2n^2-2\,abnr+2\,a^2r^2\right)e^2+2\,\left(2\,b^2nr^2e^2\log\left(c\right)-\left(b^2n^2r-2\,abnr^2\right)e^2\right)\log\left(x\right)\right)x^{2r}+24\,\left(b^2dn^2r^2e\log\left(x\right)^2+b^2dr^2e\log\left(c\right)^2-2\,\left(b^2dnr-abdr^2\right)e\log\left(c\right)+\left(2\,b^2dn^2-2\,abdnr+a^2dr^2\right)e+2\,\left(b^2dnr^2e\log\left(c\right)-\left(b^2dn^2r-abdnr^2\right)e\right)\log\left(x\right)\right)x^r+12\,\left(b^2d^2r^3\log\left(c\right)^2+2\,abd^2r^3\log\left(c\right)+a^2d^2r^3\right)\log\left(x\right)}{12\,r^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

```
[Out] 1/12*(4*b^2*d^2*n^2*r^3*log(x)^3 + 12*(b^2*d^2*n*r^3*log(c) + a*b*d^2*n*r^3
)*log(x)^2 + 3*(2*b^2*n^2*r^2*e^2*log(x)^2 + 2*b^2*r^2*e^2*log(c)^2 - 2*(b^
2*n*r - 2*a*b*r^2)*e^2*log(c) + (b^2*n^2 - 2*a*b*n*r + 2*a^2*r^2)*e^2 + 2*(
2*b^2*n*r^2*e^2*log(c) - (b^2*n^2*r - 2*a*b*n*r^2)*e^2)*log(x))*x^(2*r) + 2
4*(b^2*d*n^2*r^2*e*log(x)^2 + b^2*d*r^2*e*log(c)^2 - 2*(b^2*d*n*r - a*b*d*r
^2)*e*log(c) + (2*b^2*d*n^2 - 2*a*b*d*n*r + a^2*d*r^2)*e + 2*(b^2*d*n*r^2*e
*log(c) - (b^2*d*n^2*r - a*b*d*n*r^2)*e)*log(x))*x^r + 12*(b^2*d^2*r^3*log(
c)^2 + 2*a*b*d^2*r^3*log(c) + a^2*d^2*r^3)*log(x))/r^3
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 408 vs. $2(156) = 312$.
time = 15.61, size = 408, normalized size = 2.53

$$\begin{cases} (a + b\log(c))^2 (d+e)^2 \log(x) & \text{for } n = 0 \wedge r = 0 \\ (d+e)^2 \left(\begin{cases} \frac{a^2 \log(cx^n) + ab\log(cx^n)^2 + \frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2 + 2ab\log(c) + b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases} \right) & \text{for } r = 0 \\ (a + b\log(c))^2 \left(d^2 \log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r} \right) & \text{for } n = 0 \\ \frac{a^2d^2\log(cx^n)}{n} + \frac{2a^2dex^r}{r} + \frac{a^2e^2x^{2r}}{2r} + \frac{abd^2\log(cx^n)^2}{n} - \frac{4abdenx^r}{r^2} + \frac{4abdex^r\log(cx^n)}{r} - \frac{abe^2nx^{2r}}{2r^2} + \frac{abe^2x^{2r}\log(cx^n)}{r} + \frac{b^2d^2\log(cx^n)^3}{3n} + \frac{4b^2den^2x^r}{r^3} - \frac{4b^2denx^r\log(cx^n)}{r^2} + \frac{2b^2dex^r\log(cx^n)^2}{r} + \frac{b^2e^2n^2x^{2r}}{4r^3} - \frac{b^2e^2nx^{2r}\log(cx^n)}{2r^2} + \frac{b^2e^2x^{2r}\log(cx^n)^2}{2r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**2*(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Piecewise(((a + b*log(c))**2*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((d +
 e)**2*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)
**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))
, Eq(r, 0)), ((a + b*log(c))**2*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)
/(2*r)), Eq(n, 0)), (a**2*d**2*log(c*x**n)/n + 2*a**2*d*e*x**r/r + a**2*e**
2*x**(2*r)/(2*r) + a*b*d**2*log(c*x**n)**2/n - 4*a*b*d*e*n*x**r/r**2 + 4*a*
b*d*e*x**r*log(c*x**n)/r - a*b*e**2*n*x**(2*r)/(2*r**2) + a*b*e**2*x**(2*r)
*log(c*x**n)/r + b**2*d**2*log(c*x**n)**3/(3*n) + 4*b**2*d*e*n**2*x**r/r**3
 - 4*b**2*d*e*n*x**r*log(c*x**n)/r**2 + 2*b**2*d*e*x**r*log(c*x**n)**2/r +
b**2*e**2*n**2*x**(2*r)/(4*r**3) - b**2*e**2*n*x**(2*r)*log(c*x**n)/(2*r**2
) + b**2*e**2*x**(2*r)*log(c*x**n)**2/(2*r), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 421 vs. $2(153) = 306$.
time = 4.84, size = 421, normalized size = 2.61

$$\frac{1}{3} b^2 d^2 n^2 \log(x)^3 + \frac{2 b^2 d n^2 x^r e \log(x)^2}{r} + b^2 d^2 n \log(c) \log(x)^2 + \frac{4 b^2 d n x^r e \log(c) \log(x)}{r} + b^2 d^2 \log(c)^2 \log(x) + abd^2 n \log(x)^2 + \frac{b^2 n^2 x^{2r} e^2 \log(x)^2}{2r} + \frac{2 b^2 d x^r e \log(c)^2}{r} - \frac{4 b^2 d n^2 x^r e \log(x)}{r^2} + \frac{4 abdn x^r e \log(x)}{r} + 2 abd^2 \log(c) \log(x) + \frac{b^2 n x^{2r} e^2 \log(c) \log(x)}{r} - \frac{4 b^2 d n x^r e \log(c)}{r^2} + \frac{4 abd x^r e \log(c)}{r} + \frac{b^2 x^{2r} e^2 \log(c)^2}{2r} + a^2 d^2 \log(x) - \frac{b^2 n^2 x^{2r} e^2 \log(x)}{2r^2} + \frac{abn x^{2r} e^2 \log(x)}{r} + \frac{4 b^2 d n^2 x^r e}{r^3} - \frac{4 abdn x^r e}{r^2} + \frac{2 a^2 d x^r e}{r} - \frac{b^2 n x^{2r} e^2 \log(c)}{2r^2} + \frac{ab x^{2r} e^2 \log(c)}{r} + \frac{b^2 n^2 x^{2r} e^2}{4r^3} - \frac{abn x^{2r} e^2}{2r^2} + \frac{a^2 x^{2r} e^2}{2r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

```
[Out] 1/3*b^2*d^2*n^2*log(x)^3 + 2*b^2*d*n^2*x^r*e*log(x)^2/r + b^2*d^2*n*log(c)*
log(x)^2 + 4*b^2*d*n*x^r*e*log(c)*log(x)/r + b^2*d^2*log(c)^2*log(x) + a*b*
d^2*n*log(x)^2 + 1/2*b^2*n^2*x^(2*r)*e^2*log(x)^2/r + 2*b^2*d*x^r*e*log(c)^
2/r - 4*b^2*d*n^2*x^r*e*log(x)/r^2 + 4*a*b*d*n*x^r*e*log(x)/r + 2*a*b*d^2*l
```

```
og(c)*log(x) + b^2*n*x^(2*r)*e^2*log(c)*log(x)/r - 4*b^2*d*n*x^r*e*log(c)/r
^2 + 4*a*b*d*x^r*e*log(c)/r + 1/2*b^2*x^(2*r)*e^2*log(c)^2/r + a^2*d^2*log(
x) - 1/2*b^2*n^2*x^(2*r)*e^2*log(x)/r^2 + a*b*n*x^(2*r)*e^2*log(x)/r + 4*b^
2*d*n^2*x^r*e/r^3 - 4*a*b*d*n*x^r*e/r^2 + 2*a^2*d*x^r*e/r - 1/2*b^2*n*x^(2*
r)*e^2*log(c)/r^2 + a*b*x^(2*r)*e^2*log(c)/r + 1/4*b^2*n^2*x^(2*r)*e^2/r^3
- 1/2*a*b*n*x^(2*r)*e^2/r^2 + 1/2*a^2*x^(2*r)*e^2/r
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^2*(a + b*log(c*x^n))^2)/x,x)
[Out] int(((d + e*x^r)^2*(a + b*log(c*x^n))^2)/x, x)
```

3.429 $\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx$

Optimal. Leaf size=80

$$\frac{2b^2en^2x^r}{r^3}-\frac{2benx^r(a+b\log(cx^n))}{r^2}+\frac{ex^r(a+b\log(cx^n))^2}{r}+\frac{d(a+b\log(cx^n))^3}{3bn}$$

```
[Out] 2*b^2*e*n^2*x^r/r^3-2*b*e*n*x^r*(a+b*ln(c*x^n))/r^2+e*x^r*(a+b*ln(c*x^n))^2
/r+1/3*d*(a+b*ln(c*x^n))^3/b/n
```

Rubi [A]
time = 0.10, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2395, 2339, 30, 2342, 2341}

$$\frac{d(a+b\log(cx^n))^3}{3bn}-\frac{2benx^r(a+b\log(cx^n))}{r^2}+\frac{ex^r(a+b\log(cx^n))^2}{r}+\frac{2b^2en^2x^r}{r^3}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (2*b^2*e*n^2*x^r)/r^3 - (2*b*e*n*x^r*(a + b*Log[c*x^n]))/r^2 + (e*x^r*(a +
b*Log[c*x^n])^2)/r + (d*(a + b*Log[c*x^n])^3)/(3*b*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
```

```
c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx &= \int \left(\frac{d(a+b\log(cx^n))^2}{x}+ex^{-1+r}(a+b\log(cx^n))^2\right)dx\\ &= d\int \frac{(a+b\log(cx^n))^2}{x}\,dx+e\int x^{-1+r}(a+b\log(cx^n))^2\,dx\\ &= \frac{ex^r(a+b\log(cx^n))^2}{r}+\frac{d\text{Subst}\left(\int x^2\,dx,x,a+b\log(cx^n)\right)}{bn}-\frac{(2ben)\int \text{:}}{}\\ &= \frac{2b^2en^2x^r}{r^3}-\frac{2benx^r(a+b\log(cx^n))}{r^2}+\frac{ex^r(a+b\log(cx^n))^2}{r}+\frac{d(a+b\text{l}}{3}\end{aligned}$$

Mathematica [A]
time = 0.09, size = 114, normalized size = 1.42

$$\frac{1}{3}b^2dn^2\log^3(x)-bdn\log^2(x)(a+b\log(cx^n))+d\log(x)(a+b\log(cx^n))^2+\frac{ex^r(2b^2n^2-2abnr+a^2r^2+2br(-bn+ar)\log(cx^n)+b^2r^2\log^2(cx^n))}{r^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x^r)*(a + b*Log[c*x^n])^2)/x,x]
```

```
[Out] (b^2*d*n^2*Log[x]^3)/3 - b*d*n*Log[x]^2*(a + b*Log[c*x^n]) + d*Log[x]*(a +
b*Log[c*x^n])^2 + (e*x^r*(2*b^2*n^2 - 2*a*b*n*r + a^2*r^2 + 2*b*r*(-(b*n) +
 a*r)*Log[c*x^n] + b^2*r^2*Log[c*x^n]^2))/r^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.18, size = 1712, normalized size = 21.40

method	result	size
risch	Expression too large to display	1712

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/r*ln(c)^2*b^2*e*x^r+ln(x)*a^2*d-b*(I*ln(x)*Pi*b*d*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)*r^2-I*ln(x)*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r^2-I*ln(x)*Pi*b*
d*csgn(I*x^n)*csgn(I*c*x^n)^2*r^2+I*ln(x)*Pi*b*d*csgn(I*c*x^n)^3*r^2+I*Pi*b
*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r-I*Pi*b*e*csgn(I*c)*csgn(I*c*x^
n)^2*x^r*r-I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r*r+I*Pi*b*e*csgn(I*c*x^n
)^3*x^r*r+b*d*n*ln(x)^2*r^2-2*ln(x)*ln(c)*b*d*r^2-2*ln(x)*a*d*r^2-2*ln(c)*b
*e*x^r*r-2*x^r*a*e*r+2*x^r*b*e*n)/r^2*ln(x^n)+b^2*(d*r*ln(x)+e*x^r)/r*ln(x^
n)^2+a^2/r*x^r*e+ln(x)*ln(c)^2*b^2*d+1/3*b^2*d*n^2*ln(x)^3-1/4*csgn(I*c*x^n
)^6*d*b^2*Pi^2*ln(x)-1/4/r*Pi^2*b^2*e*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^
n)^2*x^r+1/2/r*Pi^2*b^2*e*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3*x^r+I/r*P
i*a*b*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+I/r*Pi*a*b*e*csgn(I*x^n)*csgn(I*c*x^n
)^2*x^r-1/4/r*Pi^2*b^2*e*csgn(I*c*x^n)^6*x^r+2/r*ln(c)*a*b*e*x^r-2/r^2*ln(c
)*b^2*e*n*x^r-2/r^2*a*b*e*n*x^r-1/4*csgn(I*c*x^n)^2*csgn(I*x^n)^2*csgn(I*c)
^2*d*b^2*Pi^2*ln(x)+2*b^2*e*n^2*x^r/r^3+2*ln(x)*ln(c)*a*b*d-ln(x)^2*ln(c)*b
^2*d*n-ln(x)^2*a*d*b*n-csgn(I*c*x^n)^4*csgn(I*x^n)*csgn(I*c)*d*b^2*Pi^2*ln(
x)+I/r*Pi*ln(c)*b^2*e*csgn(I*c)*csgn(I*c*x^n)^2*x^r+I/r*Pi*ln(c)*b^2*e*csgn
(I*x^n)*csgn(I*c*x^n)^2*x^r-I/r^2*Pi*b^2*e*n*csgn(I*c)*csgn(I*c*x^n)^2*x^r-
I/r^2*Pi*b^2*e*n*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+1/2*I*Pi*b^2*d*n*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*ln(x)^2-I*ln(x)*Pi*ln(c)*b^2*d*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)-I*ln(x)*Pi*a*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/r
^2*Pi*b^2*e*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-I/r*Pi*ln(c)*b^2*e*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-I/r*Pi*a*b*e*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)*x^r+1/2/r*Pi^2*b^2*e*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3*x^
r-1/r*Pi^2*b^2*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4*x^r+I/r^2*Pi*b^2*e*n
*csgn(I*c*x^n)^3*x^r+I*ln(x)*Pi*ln(c)*b^2*d*csgn(I*c)*csgn(I*c*x^n)^2+I*ln(
x)*Pi*ln(c)*b^2*d*csgn(I*x^n)*csgn(I*c*x^n)^2+I*ln(x)*Pi*a*b*d*csgn(I*c)*cs
gn(I*c*x^n)^2+I*ln(x)*Pi*a*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2-I/r*Pi*ln(c)*b^2
*e*csgn(I*c*x^n)^3*x^r-I/r*Pi*a*b*e*csgn(I*c*x^n)^3*x^r-1/2*I*Pi*b^2*d*n*cs
gn(I*c)*csgn(I*c*x^n)^2*ln(x)^2-1/2*I*Pi*b^2*d*n*csgn(I*x^n)*csgn(I*c*x^n)^
2*ln(x)^2-1/4*csgn(I*c*x^n)^4*csgn(I*x^n)^2*d*b^2*Pi^2*ln(x)+1/2*csgn(I*c*x
^n)^5*csgn(I*x^n)*d*b^2*Pi^2*ln(x)-1/4*csgn(I*c*x^n)^4*csgn(I*c)^2*d*b^2*Pi
^2*ln(x)+1/2*csgn(I*c*x^n)^5*csgn(I*c)*d*b^2*Pi^2*ln(x)+1/2*csgn(I*c*x^n)^3
*csgn(I*x^n)*csgn(I*c)^2*d*b^2*Pi^2*ln(x)-1/4/r*Pi^2*b^2*e*csgn(I*c)^2*csgn
(I*c*x^n)^4*x^r+1/2/r*Pi^2*b^2*e*csgn(I*c)*csgn(I*c*x^n)^5*x^r-1/4/r*Pi^2*b
^2*e*csgn(I*x^n)^2*csgn(I*c*x^n)^4*x^r+1/2/r*Pi^2*b^2*e*csgn(I*x^n)*csgn(I*
c*x^n)^5*x^r+1/2*I*Pi*b^2*d*n*csgn(I*c*x^n)^3*ln(x)^2-I*ln(x)*Pi*ln(c)*b^2*
d*csgn(I*c*x^n)^3-I*ln(x)*Pi*a*b*d*csgn(I*c*x^n)^3+1/2*csgn(I*c*x^n)^3*csgn
(I*x^n)^2*csgn(I*c)*d*b^2*Pi^2*ln(x)
```

Maxima [A]
time = 0.28, size = 131, normalized size = 1.64

$$\frac{b^2ex^r\log(cx^n)^2}{r}+\frac{b^2d\log(cx^n)^3}{3n}-2b^2e\left(\frac{nx^r\log(cx^n)}{r^2}-\frac{n^2x^r}{r^3}\right)+\frac{2abex^r\log(cx^n)}{r}+\frac{abd\log(cx^n)^2}{n}+a^2d\log(x)-\frac{2abenx^r}{r^2}+\frac{a^2ex^r}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] b^2*e*x^r*log(c*x^n)^2/r + 1/3*b^2*d*log(c*x^n)^3/n - 2*b^2*e*(n*x^r*log(c*
x^n)/r^2 - n^2*x^r/r^3) + 2*a*b*e*x^r*log(c*x^n)/r + a*b*d*log(c*x^n)^2/n +
 a^2*d*log(x) - 2*a*b*e*n*x^r/r^2 + a^2*e*x^r/r
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 200 vs. $2(81) = 162$.
time = 0.36, size = 200, normalized size = 2.50

$$\frac{b^2dn^2r^3\log(x)^3 + 3\left(b^2dnr^3\log(c) + abdnr^3\right)\log(x)^2 + 3\left(b^2n^2r^2e\log(x)^2 + b^2r^2e\log(c)^2 - 2\left(b^2nr - abr^2\right)e\log(c) + \left(2b^2n^2 - 2abnr + a^2r^2\right)e + 2\left(b^2nr^2e\log(c) - \left(b^2n^2r - abnr^2\right)e\right)\log(x)\right)x^r + 3\left(b^2dr^3\log(c)^2 + 2abdr^3\log(c) + a^2dr^3\right)\log(x)}{3r^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

```
[Out] 1/3*(b^2*d*n^2*r^3*log(x)^3 + 3*(b^2*d*n*r^3*log(c) + a*b*d*n*r^3)*log(x)^2
 + 3*(b^2*n^2*r^2*e*log(x)^2 + b^2*r^2*e*log(c)^2 - 2*(b^2*n*r - a*b*r^2)*e
*log(c) + (2*b^2*n^2 - 2*a*b*n*r + a^2*r^2)*e + 2*(b^2*n*r^2*e*log(c) - (b^
2*n^2*r - a*b*n*r^2)*e)*log(x))*x^r + 3*(b^2*d*r^3*log(c)^2 + 2*a*b*d*r^3*l
og(c) + a^2*d*r^3)*log(x))/r^3
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 245 vs. $2(76) = 152$.
time = 12.87, size = 245, normalized size = 3.06

$$\begin{cases} \left(a + b\log(c)\right)^2 (d + e)\log(x) & \text{for } n = 0 \wedge r = 0 \\ (d + e)\left(\begin{cases} \frac{a^2\log(cx^n) + ab\log(cx^n)^2 + \frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ \left(a^2 + 2ab\log(c) + b^2\log(c)^2\right)\log(x) & \text{otherwise} \end{cases}\right) & \text{for } r = 0 \\ \left(a + b\log(c)\right)^2\left(d\log(x) + \frac{ex^r}{r}\right) & \text{for } n = 0 \\ \frac{a^2d\log(cx^n)}{n} + \frac{a^2ex^r}{r} + \frac{abd\log(cx^n)^2}{n} - \frac{2abenx^r}{r^2} + \frac{2abex^r\log(cx^n)}{r} + \frac{b^2d\log(cx^n)^3}{3n} + \frac{2b^2en^2x^r}{r^3} - \frac{2b^2enx^r\log(cx^n)}{r^2} + \frac{b^2ex^r\log(cx^n)^2}{r} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)*(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Piecewise(((a + b*log(c))**2*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((d + e)
*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)
/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True)), Eq(r
, 0)), ((a + b*log(c))**2*(d*log(x) + e*x**r/r), Eq(n, 0)), (a**2*d*log(c*x
**n)/n + a**2*e*x**r/r + a*b*d*log(c*x**n)**2/n - 2*a*b*e*n*x**r/r**2 + 2*a
*b*e*x**r*log(c*x**n)/r + b**2*d*log(c*x**n)**3/(3*n) + 2*b**2*e*n**2*x**r/
r**3 - 2*b**2*e*n*x**r*log(c*x**n)/r**2 + b**2*e*x**r*log(c*x**n)**2/r, Tru
e))
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 219 vs. $2(81) = 162$.
time = 6.29, size = 219, normalized size = 2.74

$$\frac{1}{3}b^2dn^2\log(x)^3 + \frac{b^2n^2x^re\log(x)^2}{r} + b^2dn\log(c)\log(x)^2 + \frac{2b^2nx^re\log(c)\log(x)}{r} + b^2d\log(c)^2\log(x) + abdn\log(x)^2 + \frac{b^2x^re\log(c)^2}{r} - \frac{2b^2n^2x^re\log(x)}{r^2} + \frac{2abnx^re\log(x)}{r} + 2abd\log(c)\log(x) - \frac{2b^2nx^re\log(c)}{r^2} + \frac{2abx^re\log(c)}{r} + a^2d\log(x) + \frac{2b^2n^2x^re}{r^3} - \frac{2abnx^re}{r^2} + \frac{a^2x^re}{r}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

```
[Out] 1/3*b^2*d*n^2*log(x)^3 + b^2*n^2*x^r*e*log(x)^2/r + b^2*d*n*log(c)*log(x)^2
 + 2*b^2*n*x^r*e*log(c)*log(x)/r + b^2*d*log(c)^2*log(x) + a*b*d*n*log(x)^2
 + b^2*x^r*e*log(c)^2/r - 2*b^2*n^2*x^r*e*log(x)/r^2 + 2*a*b*n*x^r*e*log(x)
/r + 2*a*b*d*log(c)*log(x) - 2*b^2*n*x^r*e*log(c)/r^2 + 2*a*b*x^r*e*log(c)/
r + a^2*d*log(x) + 2*b^2*n^2*x^r*e/r^3 - 2*a*b*n*x^r*e/r^2 + a^2*x^r*e/r
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d + e\,x^r)\,\left(a + b\,\ln\left(c\,x^n\right)\right)^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)*(a + b*log(c*x^n))^2)/x,x)
```

```
[Out] int(((d + e*x^r)*(a + b*log(c*x^n))^2)/x, x)
```

3.430 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$

Optimal. Leaf size=94

$$-\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{2bn(a+b\log(cx^n))\,\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}+\frac{2b^2n^2\text{Li}_3\left(-\frac{dx^{-r}}{e}\right)}{dr^3}$$

```
[Out] -(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d/r+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e
/(x^r))/d/r^2+2*b^2*n^2*polylog(3,-d/e/(x^r))/d/r^3
```

Rubi [A]
time = 0.09, antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2379, 2421, 6724}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{dr^2}+\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{dr^3}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)),x]
```

```
[Out] -(((a + b*Log[c*x^n])^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*n*(a + b*Log[c*x^
n])*PolyLog[2, -(d/(e*x^r))])/(d*r^2) + (2*b^2*n^2*PolyLog[3, -(d/(e*x^r))]
)/(d*r^3)
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx &= -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{(2bn)\int\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{x}\,dx}{dr}\\
&= -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{2bn(a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{(2b^2n^2)\int
\end{aligned}
$$

$$
= -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{2bn(a+b\log(cx^n))\,\mathrm{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{dr^2}+\frac{2b^2n^2\mathrm{Li}_3}{dr}
$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 270 vs. 2(94) = 188.
time = 0.18, size = 270, normalized size = 2.87

$$
-\frac{a^2r^2\log(d-dx^r)-2abr^2(n\log(x)-\log(cx^n))\log(d-dx^r)+b^2r^2(-n\log(x)+\log(cx^n))^2\log(d-dx^r)-2abnr\left(\frac{1}{2}r^2\log^2(x)+\left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r)+\mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right)+2b^2nr(n\log(x)-\log(cx^n))\left(\frac{1}{2}r^2\log^2(x)+\left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r)+\mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right)+b^2n^2\left(r^2\log^2(x)\log\left(1+\frac{dx^{-r}}{e}\right)-2r\log(x)\mathrm{Li}_2\left(-\frac{dx^{-r}}{e}\right)-2\mathrm{Li}_3\left(-\frac{dx^{-r}}{e}\right)\right)}{dr^3}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)),x]
```

```
[Out] -((a^2*r^2*Log[d - d*x^r] - 2*a*b*r^2*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r
] + b^2*r^2*(-(n*Log[x]) + Log[c*x^n])^2*Log[d - d*x^r] - 2*a*b*n*r*((r^2*L
og[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2,
1 + (e*x^r)/d]) + 2*b^2*n*r*(n*Log[x] - Log[c*x^n])*((r^2*Log[x]^2)/2 + (-(
r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d])
+ b^2*n^2*(r^2*Log[x]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*PolyLog[2, -(d/(e*x
^r))] - 2*PolyLog[3, -(d/(e*x^r))]))/(d*r^3))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.18, size = 3012, normalized size = 32.04

method	result	size
risch	Expression too large to display	3012

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

```
[Out] -b^2/r/d*ln(d+e*x^r)*ln(x)^2*n^2+1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*x^n)*csgn(
I*c*x^n)^2-I/r/d*ln(x^r)*Pi*a*b*csgn(I*c*x^n)^3-I/r/d*ln(x^r)*ln(c)*Pi*b^2*
csgn(I*c*x^n)^3+1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-1/2/r/d*
ln(d+e*x^r)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-1/2/r/d*ln(d+e
*x^r)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-1/4/r/d*ln(x^r)*Pi^2
```

*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1/2/r/d*ln(x^r)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+1/4/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-1/r/d*ln(x^r)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+I/r/d*ln(d+e*x^r)*ln(c)*Pi*b^2*csgn(I*c*x^n)^3+2*b/r/d*ln(x^r)*ln(x^n)*a-2*b/r^2*n/d*polylog(2,-e*x^r/d)*a+1/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-I/r/d*ln(x^r)*ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3-1/2/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+I/r/d*ln(x^r)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I/r*n/d*ln(x)*ln(1+e*x^r/d)*b^2*Pi*csgn(I*c*x^n)^3+1/4/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+b*n/d*ln(x)^2*a-1/r/d*ln(d+e*x^r)*ln(c)^2*b^2+b^2/r/d*ln(x^r)*ln(x^n)^2+2*b^2/r^3*n^2/d*polylog(3,-e*x^r/d)+I/r/d*ln(x^r)*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/r/d*ln(d+e*x^r)*ln(x^n)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-2*b/r/d*ln(d+e*x^r)*ln(x^n)*a+I/r^2*n/d*polylog(2,-e*x^r/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/r/d*ln(d+e*x^r)*n*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I/r/d*ln(d+e*x^r)*n*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I/r/d*ln(d+e*x^r)*Pi*a*b*csgn(I*c*x^n)^3+I/r*n/d*ln(x)*ln(1+e*x^r/d)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/r/d*ln(d+e*x^r)*n*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*b/r/d*ln(x^r)*n*ln(x)*a+2*b^2/r/d*ln(d+e*x^r)*ln(x)*ln(x^n)*n-2/r*n/d*ln(x)*ln(1+e*x^r/d)*b^2*ln(c)+2/r/d*ln(d+e*x^r)*n*ln(x)*b^2*ln(c)+I/r^2*n/d*polylog(2,-e*x^r/d)*b^2*Pi*csgn(I*c*x^n)^3+I/r/d*ln(d+e*x^r)*ln(x^n)*b^2*Pi*csgn(I*c*x^n)^3-2*b^2/r/d*ln(x^r)*ln(x)*ln(x^n)*n-2*b^2/r*n/d*ln(x)*ln(1+e*x^r/d)*ln(x^n)+a^2/r/d*ln(x^r)-a^2/r/d*ln(d+e*x^r)-2/r/d*ln(x^r)*n*ln(x)*b^2*ln(c)-2*b/r*n/d*ln(x)*ln(1+e*x^r/d)*a+2*b/r/d*ln(d+e*x^r)*n*ln(x)*a+1/2/r/d*ln(x^r)*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+1/2/r/d*ln(x^r)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+I/r/d*ln(d+e*x^r)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/r/d*ln(d+e*x^r)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I/r/d*ln(d+e*x^r)*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/r*n/d*ln(x)*ln(1+e*x^r/d)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/4/r/d*ln(x^r)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+1/2/r/d*ln(x^r)*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5+b^2/r/d*ln(x^r)*ln(x)^2*n^2-2/r/d*ln(d+e*x^r)*ln(c)*a*b+2/r/d*ln(x^r)*ln(c)*a*b-1/4/r/d*ln(x^r)*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+b^2/r*n^2/d*ln(x)^2*ln(1+e*x^r/d)+1/r/d*ln(x^r)*ln(c)^2*b^2-2/3*b^2/d*ln(x)^3*n^2+1/4/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*c*x^n)^6+I/r/d*ln(x^r)*n*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2/r/d*ln(x^r)*ln(x^n)*b^2*ln(c)-2/r^2*n/d*polylog(2,-e*x^r/d)*b^2*ln(c)-2/r/d*ln(d+e*x^r)*ln(x^n)*b^2*ln(c)+n/d*ln(x)^2*b^2*ln(c)-1/4/r/d*ln(x^r)*Pi^2*b^2*csgn(I*c*x^n)^6+1/4/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4-1/2*I*n/d*ln(x)^2*b^2*Pi*csgn(I*c*x^n)^3-1/2/r/d*ln(d+e*x^r)*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-2*b^2/r^2*n/d*polylog(2,-e*x^r/d)*ln(x^n)-b^2/r/d*ln(d+e*x^r)*ln(x^n)^2+b^2*n/d*ln(x)^2*ln(x^n)+I/r/d*ln(x^r)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/r/d*ln(x^r)*n*ln(x)*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I/r/d*ln(x^r)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/r/d*ln(x^r)*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/r/d*ln(d+e*x^r)*ln(x^n)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/r/d*ln(d+e*x^r)*ln(c)*Pi*b^2*csgn(I

```
*x^n)*csgn(I*c*x^n)^2-I/r/d*ln(d+e*x^r)*ln(c)*Pi*b^2*csgn(I*c)*csgn(I*c*x^n
)^2-I/r^2*n/d*polylog(2,-e*x^r/d)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/r/d*ln
(d+e*x^r)*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+I/r/d*ln(x^r)*Pi*a*b*csgn(I*x^n)
*csgn(I*c*x^n)^2+I/r/d*ln(x^r)*n*ln(x)*b^2*Pi*csgn(I*c*x^n)^3+I/r/d*ln(x^r)
*ln(c)*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+I/r/d*ln(x^r)*Pi*a*b*csgn(I*c)*cs
gn(I*c*x^n)^2-I/r/d*ln(x^r)*n*ln(x)*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/r/d*
ln(d+e*x^r)*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-I/r/d*ln(x^r)*ln(c)*Pi*b^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I/r*n/d*ln(x)*ln(1+e*x^r/d)*b^2*Pi*csgn(
I*c)*csgn(I*c*x^n)^2-I/r^2*n/d*polylog(2,-e*x^r/d)*b^2*Pi*csgn(I*x^n)*csgn(
I*c*x^n)^2-I/r/d*ln(d+e*x^r)*n*ln(x)*b^2*Pi*csgn(I*c*x^n)^3
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] a^2*(log(x)/d - log((d + e^(r*log(x) + 1))*e^(-1))/(d*r)) + integrate((b^2*
log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(
d*x + x*e^(r*log(x) + 1)), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 232 vs. 2(90) = 180.
time = 0.39, size = 232, normalized size = 2.47

$$\frac{b^2n^2r^3\log(x)^3 + 6\,b^2n^2\mathrm{polylog}\left(3, -\frac{x^re}{d}\right) + 3\left(b^2nr^3\log(c) + abnr^3\right)\log(x)^2 - 6\left(b^2n^2r\log(x) + b^2nr\log(c) + abnr\right)\mathrm{Li}_2\left(-\frac{x^re+d}{d} + 1\right) - 3\left(b^2r^2\log(c)^2 + 2\,abr^2\log(c) + a^2r^2\right)\log(x^re + d) + 3\left(b^2r^3\log(c)^2 + 2\,abr^3\log(c) + a^2r^3\right)\log(x) - 3\left(b^2n^2r^2\log(x)^2 + 2\left(b^2nr^2\log(c) + abnr^2\right)\log(x)\right)\log\left(\frac{x^re+d}{d}\right)}{3\,dr^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] 1/3*(b^2*n^2*r^3*log(x)^3 + 6*b^2*n^2*polylog(3, -x^r*e/d) + 3*(b^2*n*r^3*l
og(c) + a*b*n*r^3)*log(x)^2 - 6*(b^2*n^2*r*log(x) + b^2*n*r*log(c) + a*b*n*
r)*dilog(-(x^r*e + d)/d + 1) - 3*(b^2*r^2*log(c)^2 + 2*a*b*r^2*log(c) + a^2
*r^2)*log(x^r*e + d) + 3*(b^2*r^3*log(c)^2 + 2*a*b*r^3*log(c) + a^2*r^3)*lo
g(x) - 3*(b^2*n^2*r^2*log(x)^2 + 2*(b^2*n*r^2*log(c) + a*b*n*r^2)*log(x))*l
og((x^r*e + d)/d))/(d*r^3)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b\log\left(cx^n\right)\right)^2}{x\left(d + ex^r\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r),x)
[Out] Integral((a + b*log(c*x**n))**2/(x*(d + e*x**r)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)^2/((x^r*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{x\,\left(d+e\,x^r\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x^r)),x)
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x^r)), x)
```

3.431 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2} \, dx$

Optimal. Leaf size=182

$$\frac{(a+b\log(cx^n))^2}{dr(d+ex^r)}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r^2}-\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r}-\frac{2b^2n^2\text{Li}_2\left(-\frac{dx^{-r}}{e}\right)}{d^2r^3}$$

```
[Out] (a+b*ln(c*x^n))^2/d/r/(d+e*x^r)+2*b*n*(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2/r
^2-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d^2/r-2*b^2*n^2*polylog(2,-d/e/(x^r))/
d^2/r^3+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/(x^r))/d^2/r^2+2*b^2*n^2*polyl
og(3,-d/e/(x^r))/d^2/r^3
```

Rubi [A]
time = 0.29, antiderivative size = 182, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2391, 2379, 2421, 6724, 2376, 2438}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{d^2r^2}-\frac{2b^2n^2\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^3}+\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{d^2r^3}+\frac{2bn\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{d^2r^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{d^2r}+\frac{(a+b\log(cx^n))^2}{dr(d+ex^r)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^2),x]
```

```
[Out] (a + b*Log[c*x^n])^2/(d*r*(d + e*x^r)) + (2*b*n*(a + b*Log[c*x^n])*Log[1 +
d/(e*x^r)])/(d^2*r^2) - ((a + b*Log[c*x^n])^2*Log[1 + d/(e*x^r)])/(d^2*r) -
 (2*b^2*n^2*PolyLog[2, -(d/(e*x^r))])/(d^2*r^3) + (2*b*n*(a + b*Log[c*x^n])
*PolyLog[2, -(d/(e*x^r))])/(d^2*r^2) + (2*b^2*n^2*PolyLog[3, -(d/(e*x^r))])
/(d^2*r^3)
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx}{d} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))^2}{(d+ex^r)^2}\,dx}{d}$$

$$= \frac{(a+b\log(cx^n))^2}{dr(d+ex^r)} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{(2bn)\int \frac{(a+b\log(cx^n))\log\left(1+\right.}{x}}{d^2r}$$

$$= \frac{(a+b\log(cx^n))^2}{dr(d+ex^r)} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r^2} - \frac{(a+b\log(cx^n))^2\log\left(\right.}{d^2r}$$

$$= \frac{(a+b\log(cx^n))^2}{dr(d+ex^r)} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r^2} - \frac{(a+b\log(cx^n))^2\log\left(\right.}{d^2r}$$

Mathematica [B] Leaf count is larger than twice the leaf count of optimal. 397 vs. 2(182) = 364.

time = 0.23, size = 397, normalized size = 2.18

$$\frac{\frac{dr^2(a+b\log(cx^n))^2}{d+ex^r} + 2abnr\log(d-dx^r) - a^2r^2\log(d-dx^r) + 2abr^2(n\log(x)-\log(cx^n))\log(d-dx^r) + 2b^2nr(-n\log(x)+\log(cx^n))\log(d-dx^r) - b^2r^2(-n\log(x)+\log(cx^n))^2\log(d-dx^r) - 2b^2n^2\left(\frac{1}{2}r^2\log^2(x) + \left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r) + \mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right) + 2abnr\left(\frac{1}{2}r^2\log^2(x) + \left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r) + \mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right) + 2b^2nr(-n\log(x)+\log(cx^n))\left(\frac{1}{2}r^2\log^2(x) + \left(-r\log(x)+\log\left(-\frac{ex^r}{d}\right)\right)\log(d+ex^r) + \mathrm{Li}_2\left(1+\frac{ex^r}{d}\right)\right) - b^2n^2\left(r^2\log^2(x)\log\left(1+\frac{dx^{-r}}{e}\right) - 2r\log(x)\mathrm{Li}_2\left(-\frac{dx^{-r}}{e}\right) - 2\mathrm{Li}_3\left(-\frac{dx^{-r}}{e}\right)\right)}{d^2r^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^2),x]
```

```
[Out] ((d*r^2*(a + b*Log[c*x^n])^2)/(d + e*x^r) + 2*a*b*n*r*Log[d - d*x^r] - a^2*
r^2*Log[d - d*x^r] + 2*a*b*r^2*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + 2*b
^2*n*r*(-(n*Log[x]) + Log[c*x^n])*Log[d - d*x^r] - b^2*r^2*(-(n*Log[x]) + L
og[c*x^n])^2*Log[d - d*x^r] - 2*b^2*n^2*((r^2*Log[x]^2)/2 + (-(r*Log[x]) +
Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) + 2*a*b*n*r*
((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + Poly
Log[2, 1 + (e*x^r)/d]) + 2*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*((r^2*Log[x]^
2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e
*x^r)/d]) - b^2*n^2*(r^2*Log[x]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*PolyLog[2
, -(d/(e*x^r))] - 2*PolyLog[3, -(d/(e*x^r))]))/(d^2*r^3)
```

Maple [F]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^2,x)
```

```
[Out] int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] a^2*(1/(d^2*r + d*r*e^(r*log(x) + 1)) + log(x)/d^2 - log((d + e^(r*log(x) +
 1))*e^(-1))/(d^2*r)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*lo
g(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(d^2*x + 2*d*x*e^(r*log(x) + 1) + x*e
^(2*r*log(x) + 2)), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 631 vs. 2(176) = 352.
time = 0.36, size = 631, normalized size = 3.47

$$\frac{b^2dn^2r^3\log(x)^3+3b^2dr^2\log(c)^2+6abdr^2\log(c)+3a^2dr^2+3\left(b^2dnr^3\log(c)+abdnr^3\right)\log(x)^2+\left(b^2n^2r^3e\log(x)^3+3\left(b^2nr^3e\log(c)-(b^2n^2r^2-abnr^3)e\right)\log(x)^2+3\left(b^2r^3e\log(c)^2-2(b^2nr^2-abr^3)e\log(c)-(2abnr^2-a^2r^3)e\right)\log(x)\right)x^r-6\left(b^2dn^2r\log(x)+b^2dnr\log(c)-b^2dn^2+abdnr+\left(b^2n^2re\log(x)+b^2nre\log(c)-(b^2n^2-abnr)e\right)x^r\right)\mathrm{Li}_2\left(-\frac{ex^r+d}{d}+1\right)-3\left(b^2dr^2\log(c)^2-2abdnr+a^2dr^2+\left(b^2r^2e\log(c)^2-2(b^2nr-abr^2)e\log(c)-(2abnr-a^2r^2)e\right)x^r-2(b^2dnr-abdr^2)\log(c)\right)\log(x^re+d)+3\left(b^2dr^3\log(c)^2+2abdr^3\log(c)+a^2dr^3\right)\log(x)-3\left(b^2dn^2r^2\log(x)^2+\left(b^2n^2r^2e\log(x)^2+2\left(b^2nr^2e\log(c)-(b^2n^2r-abnr^2)e\right)\log(x)\right)x^r+2\left(b^2dnr^2\log(c)-b^2dn^2r+abdnr^2\right)\log(x)\right)\log\left(\frac{ex^r+d}{d}\right)+6\left(b^2n^2x^re+b^2dn^2\right)\mathrm{polylog}\left(3,-\frac{ex^r}{d}\right)}{3\left(d^2r^3x^re+d^3r^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] 1/3*(b^2*d*n^2*r^3*log(x)^3 + 3*b^2*d*r^2*log(c)^2 + 6*a*b*d*r^2*log(c) + 3
*a^2*d*r^2 + 3*(b^2*d*n*r^3*log(c) + a*b*d*n*r^3)*log(x)^2 + (b^2*n^2*r^3*e
*log(x)^3 + 3*(b^2*n*r^3*e*log(c) - (b^2*n^2*r^2 - a*b*n*r^3)*e)*log(x)^2 +
 3*(b^2*r^3*e*log(c)^2 - 2*(b^2*n*r^2 - a*b*r^3)*e*log(c) - (2*a*b*n*r^2 -
a^2*r^3)*e)*log(x))*x^r - 6*(b^2*d*n^2*r*log(x) + b^2*d*n*r*log(c) - b^2*d*
n^2 + a*b*d*n*r + (b^2*n^2*r*e*log(x) + b^2*n*r*e*log(c) - (b^2*n^2 - a*b*n
*r)*e)*x^r)*dilog(-(x^r*e + d)/d + 1) - 3*(b^2*d*r^2*log(c)^2 - 2*a*b*d*n*r
 + a^2*d*r^2 + (b^2*r^2*e*log(c)^2 - 2*(b^2*n*r - a*b*r^2)*e*log(c) - (2*a*
b*n*r - a^2*r^2)*e)*x^r - 2*(b^2*d*n*r - a*b*d*r^2)*log(c))*log(x^r*e + d)
+ 3*(b^2*d*r^3*log(c)^2 + 2*a*b*d*r^3*log(c) + a^2*d*r^3)*log(x) - 3*(b^2*d
*n^2*r^2*log(x)^2 + (b^2*n^2*r^2*e*log(x)^2 + 2*(b^2*n*r^2*e*log(c) - (b^2*
n^2*r - a*b*n*r^2)*e)*log(x))*x^r + 2*(b^2*d*n*r^2*log(c) - b^2*d*n^2*r + a
*b*d*n*r^2)*log(x))*log((x^r*e + d)/d) + 6*(b^2*n^2*x^r*e + b^2*d*n^2)*poly
log(3, -x^r*e/d))/(d^2*r^3*x^r*e + d^3*r^3)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r)**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2/(x*(d + e*x**r)**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x^r*e + d)^2*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^2),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^2), x)
```

3.432 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

Optimal. Leaf size=267

$$\frac{benx^r(a+b\log(cx^n))}{d^3r^2(d+ex^r)}+\frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2}+\frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)}+\frac{3bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r^2}-\frac{(a+b\log$$

```
[Out] b*e*n*x^r*(a+b*ln(c*x^n))/d^3/r^2/(d+e*x^r)+1/2*(a+b*ln(c*x^n))^2/d/r/(d+e*
x^r)^2+(a+b*ln(c*x^n))^2/d^2/r/(d+e*x^r)+3*b*n*(a+b*ln(c*x^n))*ln(1+d/e/(x^
r))/d^3/r^2-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d^3/r-b^2*n^2*ln(d+e*x^r)/d^3
/r^3-3*b^2*n^2*polylog(2,-d/e/(x^r))/d^3/r^3+2*b*n*(a+b*ln(c*x^n))*polylog(
2,-d/e/(x^r))/d^3/r^2+2*b^2*n^2*polylog(3,-d/e/(x^r))/d^3/r^3
```

Rubi [A]
time = 0.61, antiderivative size = 267, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 8, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {2391, 2379, 2421, 6724, 2376, 2438, 2373, 266}

$$\frac{2bn\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{d^3r^2}-\frac{3b^2n^2\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^3}+\frac{2b^2n^2\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{d^3r^3}+\frac{3bn\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{d^3r^2}+\frac{benx^r(a+b\log(cx^n))}{d^3r^2(d+ex^r)}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{d^3r}+\frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)}+\frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2}-\frac{b^2n^2\log(d+ex^r)}{d^3r^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^3),x]
```

```
[Out] (b*e*n*x^r*(a + b*Log[c*x^n]))/(d^3*r^2*(d + e*x^r)) + (a + b*Log[c*x^n])^2
/(2*d*r*(d + e*x^r)^2) + (a + b*Log[c*x^n])^2/(d^2*r*(d + e*x^r)) + (3*b*n*
(a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d^3*r^2) - ((a + b*Log[c*x^n])^2*Lo
g[1 + d/(e*x^r)])/(d^3*r) - (b^2*n^2*Log[d + e*x^r])/(d^3*r^3) - (3*b^2*n^2
*PolyLog[2, -(d/(e*x^r))])/(d^3*r^3) + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2,
 -(d/(e*x^r))])/(d^3*r^2) + (2*b^2*n^2*PolyLog[3, -(d/(e*x^r))])/(d^3*r^3)
```

Rule 266

```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rule 2376

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Dist[b*f^m*n*(p/(e*r*(q + 1))), Int[(d +
e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || Gt
Q[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

Rule 2379

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Dist[b*n*(p/(d*r)), Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

Rule 2391

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Dist[1/d, Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x^
n])^p/x), x], x] - Dist[e/d, Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n])
^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx}{d} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))^2}{(d+ex^r)^3}\,dx}{d}$$

$$= \frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2} + \frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx}{d^2} - \frac{e\int \frac{x^{-1+r}(a+b\log(cx^n))^2}{(d+ex^r)^2}\,dx}{d^2} - \frac{(bn)\int \frac{a+b\log(c}{x(d+ex^r}}{dr}$$

$$= \frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2} + \frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r} + \frac{(2bn)}{}$$

$$= \frac{benx^r(a+b\log(cx^n))}{d^3r^2(d+ex^r)} + \frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2} + \frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)} + \frac{3bn(a+b\log(c}{}$$

$$= \frac{benx^r(a+b\log(cx^n))}{d^3r^2(d+ex^r)} + \frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2} + \frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)} + \frac{3bn(a+b\log(c}{}$$

Mathematica [A]
time = 0.36, size = 459, normalized size = 1.72

[illegible]

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^3),x]
```

```
[Out] ((d^2*r^2*(a + b*Log[c*x^n])^2)/(d + e*x^r)^2 + (2*d*r*(a + b*Log[c*x^n])*(
-(b*n) + a*r + b*r*Log[c*x^n]))/(d + e*x^r) - 2*b^2*n^2*Log[d - d*x^r] + 6*
a*b*n*r*Log[d - d*x^r] - 2*a^2*r^2*Log[d - d*x^r] + 4*a*b*r^2*(n*Log[x] - L
og[c*x^n])*Log[d - d*x^r] + 6*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*Log[d - d*
x^r] - 2*b^2*r^2*(-(n*Log[x]) + Log[c*x^n])^2*Log[d - d*x^r] - 6*b^2*n^2*((
r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLo
g[2, 1 + (e*x^r)/d]) + 4*a*b*n*r*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((
e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) + 4*b^2*n*r*(-(n*Lo
g[x]) + Log[c*x^n])*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*L
og[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) - 2*b^2*n^2*(r^2*Log[x]^2*Log[1
+ d/(e*x^r)] - 2*r*Log[x]*PolyLog[2, -(d/(e*x^r))] - 2*PolyLog[3, -(d/(e*x^
r))]))/(2*d^3*r^3)
```

Maple [F]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x^r)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^3,x)
```

```
[Out] int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="maxima")
```

```
[Out] 1/2*a^2*((3*d + 2*e^(r*log(x) + 1))/(d^4*r + 2*d^3*r*e^(r*log(x) + 1) + d^2
*r*e^(2*r*log(x) + 2)) + 2*log(x)/d^3 - 2*log((d + e^(r*log(x) + 1))*e^(-1)
)/(d^3*r)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b
^2*log(c) + a*b)*log(x^n))/(d^3*x + 3*d^2*x*e^(r*log(x) + 1) + 3*d*x*e^(2*r
*log(x) + 2) + x*e^(3*r*log(x) + 3)), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 1162 vs. 2(263) = 526.
time = 0.39, size = 1162, normalized size = 4.35

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="fricas")
```

```
[Out] 1/6*(2*b^2*d^2*n^2*r^3*log(x)^3 + 9*b^2*d^2*r^2*log(c)^2 - 6*a*b*d^2*n*r +
9*a^2*d^2*r^2 + 6*(b^2*d^2*n*r^3*log(c) + a*b*d^2*n*r^3)*log(x)^2 + (2*b^2*
n^2*r^3*e^2*log(x)^3 + 3*(2*b^2*n*r^3*e^2*log(c) - (3*b^2*n^2*r^2 - 2*a*b*n
*r^3)*e^2)*log(x)^2 + 6*(b^2*r^3*e^2*log(c)^2 - (3*b^2*n*r^2 - 2*a*b*r^3)*e
^2*log(c) + (b^2*n^2*r - 3*a*b*n*r^2 + a^2*r^3)*e^2)*log(x))*x^(2*r) + 2*(2
*b^2*d*n^2*r^3*e*log(x)^3 + 3*b^2*d*r^2*e*log(c)^2 - 3*(b^2*d*n*r - 2*a*b*d
*r^2)*e*log(c) + 6*(b^2*d*n*r^3*e*log(c) - (b^2*d*n^2*r^2 - a*b*d*n*r^3)*e)
*log(x)^2 - 3*(a*b*d*n*r - a^2*d*r^2)*e + 3*(2*b^2*d*r^3*e*log(c)^2 - 4*(b^
2*d*n*r^2 - a*b*d*r^3)*e*log(c) + (b^2*d*n^2*r - 4*a*b*d*n*r^2 + 2*a^2*d*r^
3)*e)*log(x))*x^r - 6*(2*b^2*d^2*n^2*r*log(x) + 2*b^2*d^2*n*r*log(c) - 3*b^
2*d^2*n^2 + 2*a*b*d^2*n*r + (2*b^2*n^2*r*e^2*log(x) + 2*b^2*n*r*e^2*log(c)
- (3*b^2*n^2 - 2*a*b*n*r)*e^2)*x^(2*r) + 2*(2*b^2*d*n^2*r*e*log(x) + 2*b^2*
d*n*r*e*log(c) - (3*b^2*d*n^2 - 2*a*b*d*n*r)*e)*x^r)*dilog(-(x^r*e + d)/d +
 1) - 6*(b^2*d^2*r^2*log(c)^2 + b^2*d^2*n^2 - 3*a*b*d^2*n*r + a^2*d^2*r^2 +
 (b^2*r^2*e^2*log(c)^2 - (3*b^2*n*r - 2*a*b*r^2)*e^2*log(c) + (b^2*n^2 - 3*
a*b*n*r + a^2*r^2)*e^2)*x^(2*r) + 2*(b^2*d*r^2*e*log(c)^2 - (3*b^2*d*n*r -
2*a*b*d*r^2)*e*log(c) + (b^2*d*n^2 - 3*a*b*d*n*r + a^2*d*r^2)*e)*x^r - (3*b
^2*d^2*n*r - 2*a*b*d^2*r^2)*log(c))*log(x^r*e + d) - 6*(b^2*d^2*n*r - 3*a*b
*d^2*r^2)*log(c) + 6*(b^2*d^2*r^3*log(c)^2 + 2*a*b*d^2*r^3*log(c) + a^2*d^2
```

```
*r^3)*log(x) - 6*(b^2*d^2*n^2*r^2*log(x)^2 + (b^2*n^2*r^2*e^2*log(x)^2 + (2
*b^2*n*r^2*e^2*log(c) - (3*b^2*n^2*r - 2*a*b*n*r^2)*e^2)*log(x))*x^(2*r) +
2*(b^2*d*n^2*r^2*e*log(x)^2 + (2*b^2*d*n*r^2*e*log(c) - (3*b^2*d*n^2*r - 2*
a*b*d*n*r^2)*e)*log(x))*x^r + (2*b^2*d^2*n*r^2*log(c) - 3*b^2*d^2*n^2*r + 2
*a*b*d^2*n*r^2)*log(x))*log((x^r*e + d)/d) + 12*(2*b^2*d*n^2*x^r*e + b^2*d^
2*n^2 + b^2*n^2*x^(2*r)*e^2)*polylog(3, -x^r*e/d))/(2*d^4*r^3*x^r*e + d^5*r
^3 + d^3*r^3*x^(2*r)*e^2)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r)**3,x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^2/((x^r*e + d)^3*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(a + b\,\ln(c\,x^n))^2}{x\,(d + e\,x^r)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^3),x)
```

```
[Out] int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^3), x)
```

3.433 $\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=327

$$-\frac{92bd^2n\sqrt{d+ex^r}}{15r^2}-\frac{32bdn(d+ex^r)^{3/2}}{45r^2}-\frac{4bn(d+ex^r)^{5/2}}{25r^2}+\frac{92bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15r^2}+\frac{2bd^{5/2}n\tanh^{-}}{}$$

```
[Out] -32/45*b*d*n*(d+e*x^r)^(3/2)/r^2-4/25*b*n*(d+e*x^r)^(5/2)/r^2+92/15*b*d^(5/
2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/r^2+2*b*d^(5/2)*n*arctanh((d+e*x^r)^(
1/2)/d^(1/2))^2/r^2-4*b*d^(5/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(
1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-2*b*d^(5/2)*n*polylog(2,1-2*d^(1/2)/(d^
(1/2)-(d+e*x^r)^(1/2)))/r^2-92/15*b*d^2*n*(d+e*x^r)^(1/2)/r^2+2/15*(a+b*ln(
c*x^n))*(5*d*(d+e*x^r)^(3/2)/r+3*(d+e*x^r)^(5/2)/r-15*d^(5/2)*arctanh((d+e*
x^r)^(1/2)/d^(1/2))/r+15*d^2*(d+e*x^r)^(1/2)/r)
```

Rubi [A]
time = 0.34, antiderivative size = 327, normalized size of antiderivative = 1.00, number of steps used = 23, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 52, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{2bd^{5/2}n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2}{15}\left(-\frac{15d^{5/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{15d^2\sqrt{d+ex^r}}{r}+\frac{5d(d+ex^r)^{3/2}}{r}+\frac{3(d+ex^r)^{5/2}}{r}\right)(a+b\log(cx^n))+\frac{2bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}+\frac{92bd^{5/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15r^2}-\frac{4bd^{5/2}n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}-\frac{92bd^2n\sqrt{d+ex^r}}{15r^2}-\frac{32bdn(d+ex^r)^{3/2}}{45r^2}-\frac{4bn(d+ex^r)^{5/2}}{25r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-92*b*d^2*n*Sqrt[d + e*x^r])/(15*r^2) - (32*b*d*n*(d + e*x^r)^(3/2))/(45*r
^2) - (4*b*n*(d + e*x^r)^(5/2))/(25*r^2) + (92*b*d^(5/2)*n*ArcTanh[Sqrt[d +
 e*x^r]/Sqrt[d]])/(15*r^2) + (2*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]
]^2)/r^2 + (2*((15*d^2*Sqrt[d + e*x^r])/r + (5*d*(d + e*x^r)^(3/2))/r + (3*
(d + e*x^r)^(5/2))/r - (15*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a
+ b*Log[c*x^n]))/15 - (4*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(
2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/r^2 - (2*b*d^(5/2)*n*PolyLog[2, 1
- (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/r^2
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \frac{2}{15}\left(\frac{15d^2\sqrt{d+ex^r}}{r} + \frac{5d(d+ex^r)^{3/2}}{r} + \frac{3(d+ex^r)^{5/2}}{r} - \frac{15d^{5/2}\tanh^{-1}}{}\right.$$

$$= \frac{2}{15}\left(\frac{15d^2\sqrt{d+ex^r}}{r} + \frac{5d(d+ex^r)^{3/2}}{r} + \frac{3(d+ex^r)^{5/2}}{r} - \frac{15d^{5/2}\tanh^{-}}{}\right.$$

$$= \frac{2}{15}\left(\frac{15d^2\sqrt{d+ex^r}}{r} + \frac{5d(d+ex^r)^{3/2}}{r} + \frac{3(d+ex^r)^{5/2}}{r} - \frac{15d^{5/2}\tanh^{-}}{}\right.$$

$$= -\frac{4bd^2n\sqrt{d+ex^r}}{r^2} - \frac{4bdn(d+ex^r)^{3/2}}{9r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2} + \frac{2}{15}\left(\frac{15d^2}{}\right.$$

$$= -\frac{16bd^2n\sqrt{d+ex^r}}{3r^2} - \frac{32bdn(d+ex^r)^{3/2}}{45r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2} + \frac{2bd^{5/2}n}{}$$

$$= -\frac{92bd^2n\sqrt{d+ex^r}}{15r^2} - \frac{32bdn(d+ex^r)^{3/2}}{45r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2} + \frac{4bd^{5/2}n}{}$$

$$= -\frac{92bd^2n\sqrt{d+ex^r}}{15r^2} - \frac{32bdn(d+ex^r)^{3/2}}{45r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2} + \frac{16bd^{5/2}}{}$$

$$= -\frac{92bd^2n\sqrt{d+ex^r}}{15r^2} - \frac{32bdn(d+ex^r)^{3/2}}{45r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2} + \frac{92bd^{5/2}}{}$$

Mathematica [F]
time = 0.33, size = 0, normalized size = 0.00

$$\int \frac{(d+ex^r)^{5/2}\,(a+b\log{(cx^n)})}{x}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] Integrate[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x, x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{(d+e\,x^r)^{\frac{5}{2}}\,(a+b\ln{(c\,x^n)})}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^(5/2)*(a+b*ln(c*x^n))/x,x)
```

```
[Out] int((d+e*x^r)^(5/2)*(a+b*ln(c*x^n))/x,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/15*(15*d^(5/2)*log((sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)
))/r + 2*(3*(x^r*e + d)^(5/2) + 5*(x^r*e + d)^(3/2)*d + 15*sqrt(x^r*e + d)*
d^2)/r)*a + b*integrate((d^2*log(c) + 2*d*e^(r*log(x) + 1)*log(c) + e^(2*r*
log(x) + 2)*log(c) + (d^2 + 2*d*e^(r*log(x) + 1) + e^(2*r*log(x) + 2))*log(
x^n))*sqrt(d + e^(r*log(x) + 1))/x, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**(5/2)*(a+b*ln(c*x**n))/x,x)
[Out] Exception raised: SystemError >> excessive stack use: stack is 6189 deep
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
[Out] integrate((x^r*e + d)^(5/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(d+e\,x^r)^{5/2}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^(5/2)*(a + b*log(c*x^n)))/x,x)
[Out] int(((d + e*x^r)^(5/2)*(a + b*log(c*x^n)))/x, x)
```

3.434 $\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x} dx$

Optimal. Leaf size=284

$$-\frac{16bdn\sqrt{d+ex^r}}{3r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}+\frac{2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}+\frac{2}{3}$$

```
[Out] -4/9*b*n*(d+e*x^r)^(3/2)/r^2+16/3*b*d^(3/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/
2))/r^2+2*b*d^(3/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/r^2-4*b*d^(3/2)*n*
arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^
2-2*b*d^(3/2)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-16/3*b
*d*n*(d+e*x^r)^(1/2)/r^2+2/3*(a+b*ln(c*x^n))*((d+e*x^r)^(3/2)/r-3*d^(3/2)*a
rctanh((d+e*x^r)^(1/2)/d^(1/2))/r+3*d*(d+e*x^r)^(1/2)/r)
```

Rubi [A]
time = 0.28, antiderivative size = 284, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 52, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{2bd^{3/2}n\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2}{3}\left(-\frac{3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}\right)(a+b\log(cx^n))+\frac{2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}+\frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}-\frac{4bd^{3/2}n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}-\frac{16bdn\sqrt{d+ex^r}}{3r^2}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-16*b*d*n*Sqrt[d + e*x^r])/(3*r^2) - (4*b*n*(d + e*x^r)^(3/2))/(9*r^2) + (
16*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(3*r^2) + (2*b*d^(3/2)*n*A
rcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/r^2 + (2*((3*d*Sqrt[d + e*x^r])/r + (d +
 e*x^r)^(3/2)/r - (3*d^(3/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a + b*Lo
g[c*x^n]))/3 - (4*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[
d])/(Sqrt[d] - Sqrt[d + e*x^r])])/r^2 - (2*b*d^(3/2)*n*PolyLog[2, 1 - (2*Sq
rt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/r^2
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
```

```
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{(d+ex^r)^{3/2}\,(a+b\log(cx^n))}{x}\,dx = \frac{2}{3}\left(\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}-\frac{3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+$$

$$=\frac{2}{3}\left(\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}-\frac{3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+$$

$$=\frac{2}{3}\left(\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}-\frac{3d^{3/2}\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+$$

$$=-\frac{4bdn\sqrt{d+ex^r}}{r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{2}{3}\left(\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/}}{r}\right.$$

$$=-\frac{16bdn\sqrt{d+ex^r}}{3r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{2bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}$$

$$=-\frac{16bdn\sqrt{d+ex^r}}{3r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{4bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}$$

$$=-\frac{16bdn\sqrt{d+ex^r}}{3r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}$$

$$=-\frac{16bdn\sqrt{d+ex^r}}{3r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{16bd^{3/2}n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}$$

Mathematica [F]
time = 0.25, size = 0, normalized size = 0.00

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] Integrate[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x, x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{(d+e\,x^r)^{\frac{3}{2}}(a+b\ln(c\,x^n))}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

```
[Out] int((d+e*x^r)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] 1/3*(3*d^(3/2)*log((sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)))
/r + 2*((x^r*e + d)^(3/2) + 3*sqrt(x^r*e + d)*d)/r)*a + b*integrate((d*log(
c) + e^(r*log(x) + 1)*log(c) + (d + e^(r*log(x) + 1))*log(x^n))*sqrt(d + e^
(r*log(x) + 1))/x, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx^n)})\,(d + ex^r)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Integral((a + b*log(c*x**n))*(d + e*x**r)**(3/2)/x, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(d + e\,x^r)^{3/2}\,(a + b\,\ln{(c\,x^n)})}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^(3/2)*(a + b*log(c*x^n)))/x,x)
```

```
[Out] int(((d + e*x^r)^(3/2)*(a + b*log(c*x^n)))/x, x)
```

3.435 $\int \frac{\sqrt{d+ex^r}\,(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=240

$$-\frac{4bn\sqrt{d+ex^r}}{r^2}+\frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}+\frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}+2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\ \mathrm{ta}\ldots}{\ldots}\right.$$

```
[Out] 4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*d^(1/2)/r^2+2*b*n*arctanh((d+e*x^r)^
(1/2)/d^(1/2))^2*d^(1/2)/r^2-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^
(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))*d^(1/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)/(d
^(1/2)-(d+e*x^r)^(1/2)))*d^(1/2)/r^2-4*b*n*(d+e*x^r)^(1/2)/r^2+2*(a+b*ln(c*
x^n))*(-arctanh((d+e*x^r)^(1/2)/d^(1/2))*d^(1/2)/r+(d+e*x^r)^(1/2)/r)
```

Rubi [A]
time = 0.23, antiderivative size = 240, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 52, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{2b\sqrt{d}\,n\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\ \tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-\frac{4bn\sqrt{d+ex^r}}{r^2}+\frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}+\frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}-\frac{4b\sqrt{d}\,n\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] (-4*b*n*Sqrt[d + e*x^r])/r^2 + (4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[
d]])/r^2 + (2*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/r^2 + 2*(Sqrt
[d + e*x^r]/r - (Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a + b*Log[c*
x^n]) - (4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^r])])/r^2 - (2*b*Sqrt[d]*n*PolyLog[2, 1 - (2*Sqrt[d])/
(Sqrt[d] - Sqrt[d + e*x^r])])/r^2
```

Rule 52

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Dist[n*((b*c - a*d)/(
b*(m + n + 1))), Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
c, d}, x] && NeQ[b*c - a*d, 0] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ
[m, 0] && ( !IntegerQ[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n
+ 2, 0] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
```

```
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{\sqrt{d+ex^r}\,(a+b\log(cx^n))}{x}\,dx = 2\left(\frac{\sqrt{d+ex^r}}{r} - \frac{\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) - (bn)\int$$

$$= 2\left(\frac{\sqrt{d+ex^r}}{r} - \frac{\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) - \frac{(2bn)\int}{}$$

$$= 2\left(\frac{\sqrt{d+ex^r}}{r} - \frac{\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) - \frac{(2bn)\mathrm{S}}{}$$

$$= -\frac{4bn\sqrt{d+ex^r}}{r^2} + 2\left(\frac{\sqrt{d+ex^r}}{r} - \frac{\sqrt{d}\,\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\,\mathrm{l}$$

$$= -\frac{4bn\sqrt{d+ex^r}}{r^2} + \frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2} + 2\left(\frac{\sqrt{d+ex^r}}{r} - \frac{\sqrt{}}{}\right.$$

$$= -\frac{4bn\sqrt{d+ex^r}}{r^2} + \frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2} + \frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{}}{}\right.}{r^2}$$

$$= -\frac{4bn\sqrt{d+ex^r}}{r^2} + \frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2} + \frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{}}{}\right.}{r^2}$$

$$= -\frac{4bn\sqrt{d+ex^r}}{r^2} + \frac{4b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2} + \frac{2b\sqrt{d}\,n\tanh^{-1}\left(\frac{\sqrt{}}{}\right.}{r^2}$$

Mathematica [F]
time = 0.19, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{d+ex^r}\,(a+b\log(cx^n))}{x}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x,x]
```

```
[Out] Integrate[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x, x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{d+e\,x^r}\,\left(a+b\ln\left(c\,x^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e*x^r)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

```
[Out] int((d+e*x^r)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] a*(sqrt(d)*log((sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)))/r +
 2*sqrt(x^r*e + d)/r) + b*integrate(sqrt(d + e^(r*log(x) + 1))*(log(c) + lo
g(x^n))/x, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))\sqrt{d + ex^r}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x**r)**(1/2)*(a+b*ln(c*x**n))/x,x)
```

```
[Out] Integral((a + b*log(c*x**n))*sqrt(d + e*x**r)/x, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(x^r*e + d)*(b*log(c*x^n) + a)/x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sqrt{d + e\,x^r}\,\left(a + b\,\ln(c\,x^n)\right)}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^(1/2)*(a + b*log(c*x^n)))/x,x)
```

```
[Out] int(((d + e*x^r)^(1/2)*(a + b*log(c*x^n)))/x, x)
```

3.436 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$

Optimal. Leaf size=174

$$\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}\,r^2}-\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r}-\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{\ldots}{\sqrt{d}\ldots}\right)}{\sqrt{d}\,r^2}$$

```
[Out] 2*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/r^2/d^(1/2)-2*arctanh((d+e*x^r)^(1
/2)/d^(1/2))*(a+b*ln(c*x^n))/r/d^(1/2)-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2
))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2/d^(1/2)-2*b*n*polylog(2,1-2*
d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2/d^(1/2)
```

Rubi [A]
time = 0.19, antiderivative size = 174, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 65, 214, 2390, 12, 6131, 6055, 2449, 2352}

$$-\frac{2bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{\sqrt{d}\,r^2}-\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}\,r^2}-\frac{4bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{\sqrt{d}\,r^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]),x]
```

```
[Out] (2*b*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(Sqrt[d]*r^2) - (2*ArcTanh[Sqrt[
d + e*x^r]/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*r) - (4*b*n*ArcTanh[Sqrt[d
 + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(Sqrt[d]*r
^2) - (2*b*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(Sqrt
[d]*r^2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} - (bn)\int -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{\sqrt{d}\,rx}\,dx$$

$$= -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} + \frac{(2bn)\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{x}\,dx}{\sqrt{d}\,r}$$

$$= -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} + \frac{(2bn)\text{Subst}\left(\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}\,dx, \ldots\right.}{\sqrt{d}\,r^2}$$

$$= -\frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} + \frac{(4bn)\text{Subst}\left(\int \frac{x\tanh^{-1}\left(\frac{x}{\sqrt{d}}\right)}{-d+x^2}\,dx, x, \sqrt{\ldots}\right.}{\sqrt{d}\,r^2}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}\,r^2} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} - \frac{(4bn)\text{Subs}\ldots}{\ldots}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}\,r^2} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} - \frac{4bn\tanh^{-}\ldots}{\ldots}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}\,r^2} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} - \frac{4bn\tanh^{-}\ldots}{\ldots}$$

$$= \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}\,r^2} - \frac{2\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\,r} - \frac{4bn\tanh^{-}\ldots}{\ldots}$$

Mathematica [F]

time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{a + b\log{(cx^n)}}{x\sqrt{d + ex^r}}\, dx$$

Verification is not applicable to the result.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]),x]
```

```
[Out] Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]), x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a + b\ln{(c\,x^n)}}{x\sqrt{d + e\,x^r}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="maxima")
```

```
[Out] b*integrate((log(c) + log(x^n))/(sqrt(d + e^(r*log(x) + 1))*x), x) + a*log(
(sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)))/(sqrt(d)*r)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{a + b\log{(cx^n)}}{x\sqrt{d + ex^r}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(1/2),x)
```

```
[Out] Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x**r)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)/(sqrt(x^r*e + d)*x), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\sqrt{d+e\,x^r}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(1/2)),x)
```

```
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(1/2)), x)
```

3.437 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$

Optimal. Leaf size=225

$$\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2}+2\left(\frac{1}{dr\sqrt{d+ex^r}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\text{l}$$

```
[Out] 4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(3/2)/r^2+2*b*n*arctanh((d+e*x^r)^
(1/2)/d^(1/2))^2/d^(3/2)/r^2-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^
(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(3/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)/(d
^(1/2)-(d+e*x^r)^(1/2)))/d^(3/2)/r^2+2*(a+b*ln(c*x^n))*(-arctanh((d+e*x^r)^
(1/2)/d^(1/2))/d^(3/2)/r+1/d/r/(d+e*x^r)^(1/2))
```

Rubi [A]
time = 0.24, antiderivative size = 225, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 53, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{2bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{3/2}r^2}+2\left(\frac{1}{dr\sqrt{d+ex^r}}-\frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n))+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2}-\frac{4bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)),x]
```

```
[Out] (4*b*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(3/2)*r^2) + (2*b*n*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]]^2)/(d^(3/2)*r^2) + 2*(1/(d*r*Sqrt[d + e*x^r]) - ArcTa
nh[Sqrt[d + e*x^r]/Sqrt[d]]/(d^(3/2)*r))*(a + b*Log[c*x^n]) - (4*b*n*ArcTan
h[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d
^(3/2)*r^2) - (2*b*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])
])/(d^(3/2)*r^2)
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
```

```
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
```

```
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n)) - (bn)\int\left(\frac{2}{drx\sqrt{d+e\ldots}}\right.$$

$$= 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n)) + \frac{(2bn)\int \frac{\tanh^{-1}\left(\frac{\sqrt{d+\ldots}}{\sqrt{\ldots}}\right)}{x}}{d^{3/2}r}\ldots$$

$$= 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n)) + \frac{(2bn)\text{Subst}\left(\int \frac{\tanh^{-}\ldots}{\ldots}\right.}{d\ldots}$$

$$= 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n)) + \frac{(4bn)\text{Subst}\left(\int \frac{x\tanh\ldots}{\ldots}\right.}{\ldots}$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2} + 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh\ldots}{\ldots}\right.$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2} + 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh\ldots}{\ldots}\right.$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2} + 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh\ldots}{\ldots}\right.$$

$$= \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2} + \frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2} + 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\tanh\ldots}{\ldots}\right.$$

Mathematica [F]
time = 0.17, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{3/2}}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)),x]
```

```
[Out] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)), x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x\left(d+e\,x^r\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="maxima")
```

```
[Out] a*(log((sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)))/(d^(3/2)*r)
 + 2/(sqrt(x^r*e + d)*d*r)) + b*integrate((log(c) + log(x^n))/((d*x + x*e^(
r*log(x) + 1))*sqrt(d + e^(r*log(x) + 1))), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(3/2),x)
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^(3/2)*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x^r\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(3/2)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(3/2)), x)
```

3.438 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$

Optimal. Leaf size=271

$$-\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{16bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{2}{3}\left(\frac{1}{dr\left(d+ex^r\right)^{3/2}}+\frac{3}{d^2r\sqrt{d+ex^r}}\right.$$

```
[Out] 16/3*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(5/2)/r^2+2*b*n*arctanh((d+e*x^
r)^(1/2)/d^(1/2))^2/d^(5/2)/r^2-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2
*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(5/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)
/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(5/2)/r^2+2/3*(a+b*ln(c*x^n))*(1/d/r/(d+e*x^r
)^(3/2)-3*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(5/2)/r+3/d^2/r/(d+e*x^r)^(1/2
))-4/3*b*n/d^2/r^2/(d+e*x^r)^(1/2)
```

Rubi [A]

time = 0.29, antiderivative size = 271, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 53, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{2bn\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{5/2}r^2}+\frac{2}{3}\left(-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}+\frac{3}{d^2r\sqrt{d+ex^r}}+\frac{1}{dr\left(d+ex^r\right)^{3/2}}\right)(a+b\log(cx^n))+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{16bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}-\frac{4bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r^2}-\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)),x]
```

```
[Out] (-4*b*n)/(3*d^2*r^2*Sqrt[d + e*x^r]) + (16*b*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt
[d]])/(3*d^(5/2)*r^2) + (2*b*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(5/2)
*r^2) + (2*(1/(d*r*(d + e*x^r)^(3/2)) + 3/(d^2*r*Sqrt[d + e*x^r]) - (3*ArcT
anh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(5/2)*r))*(a + b*Log[c*x^n]))/3 - (4*b*n*A
rcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])
])/(d^(5/2)*r^2) - (2*b*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*
x^r])])/(d^(5/2)*r^2)
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
```

```
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{5/2}}\,dx = \frac{2}{3}\left(\frac{1}{dr\left(d+ex^r\right)^{3/2}}+\frac{3}{d^2r\sqrt{d+ex^r}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}\right)\left(a+b\log\left(cx^n\right)\right) -$$

$$= \frac{2}{3}\left(\frac{1}{dr\left(d+ex^r\right)^{3/2}}+\frac{3}{d^2r\sqrt{d+ex^r}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}\right)\left(a+b\log\left(cx^n\right)\right) +$$

$$= \frac{2}{3}\left(\frac{1}{dr\left(d+ex^r\right)^{3/2}}+\frac{3}{d^2r\sqrt{d+ex^r}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}\right)\left(a+b\log\left(cx^n\right)\right) +$$

$$= -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{2}{3}\left(\frac{1}{dr\left(d+ex^r\right)^{3/2}}+\frac{3}{d^2r\sqrt{d+ex^r}}-\frac{3\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}\right.$$

$$= -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{2}{3}\left(\right.$$

$$= -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{16bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{2}{3}$$

$$= -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{16bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{2}{3}$$

$$= -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{16bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{2}{3}$$

Mathematica [F]
time = 0.20, size = 0, normalized size = 0.00

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^{5/2}}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)),x]
```

```
[Out] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)), x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a+b\ln\left(c\,x^n\right)}{x\left(d+e\,x^r\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="maxima")
```

```
[Out] 1/3*a*(3*log((sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)))/(d^(5
/2)*r) + 2*(3*x^r*e + 4*d)/((x^r*e + d)^(3/2)*d^2*r)) + b*integrate((log(c)
 + log(x^n))/((d^2*x + 2*d*x*e^(r*log(x) + 1) + x*e^(2*r*log(x) + 2))*sqrt(
d + e^(r*log(x) + 1))), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(5/2),x)
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^(5/2)*x), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x^r\right)}^{5/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(5/2)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(5/2)), x)
```

3.439 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$

Optimal. Leaf size=314

$$-\frac{4bn}{15d^2r^2\left(d+ex^r\right)^{3/2}}-\frac{32bn}{15d^3r^2\sqrt{d+ex^r}}+\frac{92bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2}+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{7/2}r^2}+\frac{2}{15}\left(\frac{}{dr}\right.$$

```
[Out] -4/15*b*n/d^2/r^2/(d+e*x^r)^(3/2)+92/15*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2)
)/d^(7/2)/r^2+2*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/d^(7/2)/r^2-4*b*n*ar
ctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(7
/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(7/2)/r^2+
2/15*(a+b*ln(c*x^n))*(3/d/r/(d+e*x^r)^(5/2)+5/d^2/r/(d+e*x^r)^(3/2)-15*arct
anh((d+e*x^r)^(1/2)/d^(1/2))/d^(7/2)/r+15/d^3/r/(d+e*x^r)^(1/2))-32/15*b*n/
d^3/r^2/(d+e*x^r)^(1/2)
```

Rubi [A]
time = 0.33, antiderivative size = 314, normalized size of antiderivative = 1.00, number of steps used = 20, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {272, 53, 65, 214, 2390, 6131, 6055, 2449, 2352}

$$-\frac{2bn\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{7/2}r^2}+\frac{2}{15}\left(-\frac{15\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}+\frac{15}{d^3r\sqrt{d+ex^r}}+\frac{5}{d^2r\left(d+ex^r\right)^{3/2}}+\frac{3}{dr\left(d+ex^r\right)^{5/2}}\right)\left(a+b\log\left(cx^n\right)\right)+\frac{2bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{7/2}r^2}+\frac{92bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2}-\frac{4bn\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r^2}-\frac{32bn}{15d^3r^2\sqrt{d+ex^r}}-\frac{4bn}{15d^2r^2\left(d+ex^r\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)),x]
```

```
[Out] (-4*b*n)/(15*d^2*r^2*(d + e*x^r)^(3/2)) - (32*b*n)/(15*d^3*r^2*Sqrt[d + e*x
^r]) + (92*b*n*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(15*d^(7/2)*r^2) + (2*b*n*
ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(7/2)*r^2) + (2*(3/(d*r*(d + e*x^r)^
(5/2)) + 5/(d^2*r*(d + e*x^r)^(3/2)) + 15/(d^3*r*Sqrt[d + e*x^r]) - (15*Arc
Tanh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(7/2)*r))*(a + b*Log[c*x^n]))/15 - (4*b*n
*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r
])])/(d^(7/2)*r^2) - (2*b*n*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d +
e*x^r])])/(d^(7/2)*r^2)
```

Rule 53

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Dist[d*((
m + n + 2)/((b*c - a*d)*(m + 1))), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 65

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 214

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

Rule 272

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 2352

```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

Rule 2390

```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Dist[b*n, Int[Dist[1/x, u, x], x], x]] /; FreeQ[{a, b, c,
d, e, n, r}, x] && IntegerQ[q - 1/2]
```

Rule 2449

```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Dist
[-e/g, Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[{
c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

Rule 6055

```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Dist[b*c
*(p/e), Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^2
)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2,
 0]
```

Rule 6131

```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Dist[1/
(c*d), Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d, e
}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \frac{2}{15}\left(\frac{3}{dr(d+ex^r)^{5/2}} + \frac{5}{d^2r(d+ex^r)^{3/2}} + \frac{15}{d^3r\sqrt{d+ex^r}} - \frac{15\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}\right.$$

$$= \frac{2}{15}\left(\frac{3}{dr(d+ex^r)^{5/2}} + \frac{5}{d^2r(d+ex^r)^{3/2}} + \frac{15}{d^3r\sqrt{d+ex^r}} - \frac{15\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}\right.$$

$$= \frac{2}{15}\left(\frac{3}{dr(d+ex^r)^{5/2}} + \frac{5}{d^2r(d+ex^r)^{3/2}} + \frac{15}{d^3r\sqrt{d+ex^r}} - \frac{15\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}\right.$$

$$= -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}} - \frac{4bn}{3d^3r^2\sqrt{d+ex^r}} + \frac{2}{15}\left(\frac{3}{dr(d+ex^r)^{5/2}} + \frac{5}{d^2r(d+ex^r)^{3/2}}\right.$$

$$= -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}} - \frac{32bn}{15d^3r^2\sqrt{d+ex^r}} + \frac{4bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r^2} + \frac{2bn\tanh^{-1}}{}$$

$$= -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}} - \frac{32bn}{15d^3r^2\sqrt{d+ex^r}} + \frac{16bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{7/2}r^2} + \frac{2bn\tanh}{}$$

$$= -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}} - \frac{32bn}{15d^3r^2\sqrt{d+ex^r}} + \frac{92bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2} + \frac{2bn\tanh}{}$$

$$= -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}} - \frac{32bn}{15d^3r^2\sqrt{d+ex^r}} + \frac{92bn\tanh^{-1}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2} + \frac{2bn\tanh}{}$$

Mathematica [F]
time = 0.23, size = 0, normalized size = 0.00

$$\int \frac{a + b\log(cx^n)}{x(d + ex^r)^{7/2}}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)),x]
```

```
[Out] Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)), x]
```

Maple [F]
time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{a + b\ln(c\,x^n)}{x(d + e\,x^r)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

```
[Out] int((a+b*ln(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="maxima")
```

```
[Out] 1/15*a*(15*log((sqrt(x^r*e + d) - sqrt(d))/(sqrt(x^r*e + d) + sqrt(d)))/(d^
(7/2)*r) + 2*(15*(x^r*e + d)^2 + 5*(x^r*e + d)*d + 3*d^2)/((x^r*e + d)^(5/2
)*d^3*r)) + b*integrate((log(c) + log(x^n))/((d^3*x + 3*d^2*x*e^(r*log(x) +
 1) + 3*d*x*e^(2*r*log(x) + 2) + x*e^(3*r*log(x) + 3))*sqrt(d + e^(r*log(x)
 + 1))), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

<u>**Sympy**</u> [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(7/2),x)
[Out] Timed out
```

<u>**Giac**</u> [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="giac")
[Out] integrate((b*log(c*x^n) + a)/((x^r*e + d)^(7/2)*x), x)
```

<u>**Mupad**</u> [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x^r\right)}^{7/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(7/2)),x)
[Out] int((a + b*log(c*x^n))/(x*(d + e*x^r)^(7/2)), x)
```

3.440 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\, dx$

Optimal. Leaf size=233

$$-\frac{3bd^2enx^{1+r}(fx)^m}{(1+m+r)^2}-\frac{3bde^2nx^{1+2r}(fx)^m}{(1+m+2r)^2}-\frac{be^3nx^{1+3r}(fx)^m}{(1+m+3r)^2}-\frac{bd^3n(fx)^{1+m}}{f(1+m)^2}+\frac{3d^2ex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r}$$

```
[Out] -3*b*d^2*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-3*b*d*e^2*n*x^(1+2*r)*(f*x)^m/(1+m+2
*r)^2-b*e^3*n*x^(1+3*r)*(f*x)^m/(1+m+3*r)^2-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2+3
*d^2*e*x^(1+r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+r)+3*d*e^2*x^(1+2*r)*(f*x)^m*(a
+b*ln(c*x^n))/(1+m+2*r)+e^3*x^(1+3*r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+3*r)+d^3
*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Rubi [A]
time = 1.89, antiderivative size = 233, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {276, 20, 30, 2392, 14}

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}-\frac{bd^3n(fx)^{m+1}}{f(m+1)^2}-\frac{3bd^2enx^{r+1}(fx)^m}{(m+r+1)^2}-\frac{3bde^2nx^{2r+1}(fx)^m}{(m+2r+1)^2}-\frac{be^3nx^{3r+1}(fx)^m}{(m+3r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] (-3*b*d^2*e*n*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 - (3*b*d*e^2*n*x^(1 + 2*r)*(
f*x)^m)/(1 + m + 2*r)^2 - (b*e^3*n*x^(1 + 3*r)*(f*x)^m)/(1 + m + 3*r)^2 - (
b*d^3*n*(f*x)^(1 + m))/(f*(1 + m)^2) + (3*d^2*e*x^(1 + r)*(f*x)^m*(a + b*Lo
g[c*x^n]))/(1 + m + r) + (3*d*e^2*x^(1 + 2*r)*(f*x)^m*(a + b*Log[c*x^n]))/(
1 + m + 2*r) + (e^3*x^(1 + 3*r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + 3*r) +
 (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m))
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 20

```
Int[(u_.)*((a_.)*(v_))^(m_)*((b_.)*(v_))^(n_), x_Symbol] :> Dist[b^IntPart[
n]*((b*v)^FracPart[n]/(a^IntPart[n]*(a*v)^FracPart[n])), Int[u*(a*v)^(m + n
), x], x] /; FreeQ[{a, b, m, n}, x] &&  !IntegerQ[m] &&  !IntegerQ[n] &&  !
IntegerQ[m + n]
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{3d^2ex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r} + \frac{3de^2x^{1+2r}(fx)^m(a+b\log(cx\cdots}{1+m+2r}$$

$$= \frac{3d^2ex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r} + \frac{3de^2x^{1+2r}(fx)^m(a+b\log(cx\cdots}{1+m+2r}$$

$$= -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} + \frac{3d^2ex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r} + \frac{3de^2x^{1+2r}(\cdots}{1\cdots}$$

$$= -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} + \frac{3d^2ex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r} + \frac{3de^2x^{1+2r}(\cdots}{1\cdots}$$

$$= -\frac{3bd^2enx^{1+r}(fx)^m}{(1+m+r)^2} - \frac{3bde^2nx^{1+2r}(fx)^m}{(1+m+2r)^2} - \frac{be^3nx^{1+3r}(fx)^m}{(1+m+3r)^2} - \cdots$$

Mathematica [A]
time = 0.35, size = 187, normalized size = 0.80

$$x(fx)^m\left(\frac{bd^3n\log(x)}{1+m}+\frac{d^3(a+am-bn-b(1+m)n\log(x)+b(1+m)\log(cx^n))}{(1+m)^2}+\frac{3d^2ex^r(-bn+a(1+m+r)+b(1+m+r)\log(cx^n))}{(1+m+r)^2}+\frac{3de^2x^{2r}(-bn+a(1+m+2r)+b(1+m+2r)\log(cx^n))}{(1+m+2r)^2}+\frac{e^3x^{3r}(-bn+a(1+m+3r)+b(1+m+3r)\log(cx^n))}{(1+m+3r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(f*x)^m*((b*d^3*n*Log[x])/(1 + m) + (d^3*(a + a*m - b*n - b*(1 + m)*n*Log
[x] + b*(1 + m)*Log[c*x^n]))/(1 + m)^2 + (3*d^2*e*x^r*(-(b*n) + a*(1 + m +
r) + b*(1 + m + r)*Log[c*x^n]))/(1 + m + r)^2 + (3*d*e^2*x^(2*r)*(-(b*n) +
a*(1 + m + 2*r) + b*(1 + m + 2*r)*Log[c*x^n]))/(1 + m + 2*r)^2 + (e^3*x^(3*
r)*(-(b*n) + a*(1 + m + 3*r) + b*(1 + m + 3*r)*Log[c*x^n]))/(1 + m + 3*r)^2
)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 1.37, size = 22706, normalized size = 97.45

method	result	size
risch	Expression too large to display	22706

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [A]
time = 0.32, size = 331, normalized size = 1.42

$$-\frac{bd^3f^m nxx^m}{(m+1)^2}+\frac{3\,bd^2f^m xe^{(m\log(x)+r\log(x)+1)}\log\left(cx^n\right)}{m+r+1}+\frac{3\,ad^2f^m xe^{(m\log(x)+r\log(x)+1)}}{m+r+1}-\frac{3\,bd^2f^m nxe^{(m\log(x)+r\log(x)+1)}}{(m+r+1)^2}+\frac{3\,bdf^m xe^{(m\log(x)+2\,r\log(x)+2)}\log\left(cx^n\right)}{m+2\,r+1}+\frac{3\,adf^m xe^{(m\log(x)+2\,r\log(x)+2)}}{m+2\,r+1}-\frac{3\,bdf^m nxe^{(m\log(x)+2\,r\log(x)+2)}}{(m+2\,r+1)^2}+\frac{(fx)^{m+1}bd^3\log\left(cx^n\right)}{f(m+1)}+\frac{bf^m xe^{(m\log(x)+3\,r\log(x)+3)}\log\left(cx^n\right)}{m+3\,r+1}+\frac{(fx)^{m+1}ad^3}{f(m+1)}+\frac{af^m xe^{(m\log(x)+3\,r\log(x)+3)}}{m+3\,r+1}-\frac{bf^m nxe^{(m\log(x)+3\,r\log(x)+3)}}{(m+3\,r+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d^3*f^m*n*x*x^m/(m + 1)^2 + 3*b*d^2*f^m*x*e^(m*log(x) + r*log(x) + 1)*lo
g(c*x^n)/(m + r + 1) + 3*a*d^2*f^m*x*e^(m*log(x) + r*log(x) + 1)/(m + r + 1
) - 3*b*d^2*f^m*n*x*e^(m*log(x) + r*log(x) + 1)/(m + r + 1)^2 + 3*b*d*f^m*x
*e^(m*log(x) + 2*r*log(x) + 2)*log(c*x^n)/(m + 2*r + 1) + 3*a*d*f^m*x*e^(m*
log(x) + 2*r*log(x) + 2)/(m + 2*r + 1) - 3*b*d*f^m*n*x*e^(m*log(x) + 2*r*lo
g(x) + 2)/(m + 2*r + 1)^2 + (f*x)^(m + 1)*b*d^3*log(c*x^n)/(f*(m + 1)) + b*
f^m*x*e^(m*log(x) + 3*r*log(x) + 3)*log(c*x^n)/(m + 3*r + 1) + (f*x)^(m + 1
)*a*d^3/(f*(m + 1)) + a*f^m*x*e^(m*log(x) + 3*r*log(x) + 3)/(m + 3*r + 1) -
 b*f^m*n*x*e^(m*log(x) + 3*r*log(x) + 3)/(m + 3*r + 1)^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 4049 vs. 2(231) = 462.
time = 0.44, size = 4049, normalized size = 17.38

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] (((b*m^7 + 7*b*m^6 + 21*b*m^5 + 12*(b*m^2 + 2*b*m + b)*r^5 + 35*b*m^4 + 40*
(b*m^3 + 3*b*m^2 + 3*b*m + b)*r^4 + 35*b*m^3 + 51*(b*m^4 + 4*b*m^3 + 6*b*m^
2 + 4*b*m + b)*r^3 + 21*b*m^2 + 31*(b*m^5 + 5*b*m^4 + 10*b*m^3 + 10*b*m^2 +
 5*b*m + b)*r^2 + 7*b*m + 9*(b*m^6 + 6*b*m^5 + 15*b*m^4 + 20*b*m^3 + 15*b*m
^2 + 6*b*m + b)*r + b)*x*e^3*log(c) + (12*(b*m^2 + 2*b*m + b)*n*r^5 + 40*(b
*m^3 + 3*b*m^2 + 3*b*m + b)*n*r^4 + 51*(b*m^4 + 4*b*m^3 + 6*b*m^2 + 4*b*m +
 b)*n*r^3 + 31*(b*m^5 + 5*b*m^4 + 10*b*m^3 + 10*b*m^2 + 5*b*m + b)*n*r^2 +
```

9*(b*m^6 + 6*b*m^5 + 15*b*m^4 + 20*b*m^3 + 15*b*m^2 + 6*b*m + b)*n*r + (b*m^7 + 7*b*m^6 + 21*b*m^5 + 35*b*m^4 + 35*b*m^3 + 21*b*m^2 + 7*b*m + b)*n)*x*e^3*log(x) + (a*m^7 + 7*a*m^6 + 21*a*m^5 + 12*(a*m^2 + 2*a*m + a)*r^5 + 35*a*m^4 + 4*(10*a*m^3 + 30*a*m^2 + 30*a*m - (b*m^2 + 2*b*m + b)*n + 10*a)*r^4 + 35*a*m^3 + 3*(17*a*m^4 + 68*a*m^3 + 102*a*m^2 + 68*a*m - 4*(b*m^3 + 3*b*m^2 + 3*b*m + b)*n + 17*a)*r^3 + 21*a*m^2 + (31*a*m^5 + 155*a*m^4 + 310*a*m^3 + 310*a*m^2 + 155*a*m - 13*(b*m^4 + 4*b*m^3 + 6*b*m^2 + 4*b*m + b)*n + 31*a)*r^2 + 7*a*m - (b*m^6 + 6*b*m^5 + 15*b*m^4 + 20*b*m^3 + 15*b*m^2 + 6*b*m + b)*n + 3*(3*a*m^6 + 18*a*m^5 + 45*a*m^4 + 60*a*m^3 + 45*a*m^2 + 18*a*m - 2*(b*m^5 + 5*b*m^4 + 10*b*m^3 + 10*b*m^2 + 5*b*m + b)*n + 3*a)*r + a)*x*e^3)*x^(3*r)*e^(m*log(f) + m*log(x)) + 3*((b*d*m^7 + 7*b*d*m^6 + 21*b*d*m^5 + 35*b*d*m^4 + 18*(b*d*m^2 + 2*b*d*m + b*d)*r^5 + 35*b*d*m^3 + 57*(b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*r^4 + 21*b*d*m^2 + 68*(b*d*m^4 + 4*b*d*m^3 + 6*b*d*m^2 + 4*b*d*m + b*d)*r^3 + 7*b*d*m + 38*(b*d*m^5 + 5*b*d*m^4 + 10*b*d*m^3 + 10*b*d*m^2 + 5*b*d*m + b*d)*r^2 + b*d + 10*(b*d*m^6 + 6*b*d*m^5 + 15*b*d*m^4 + 20*b*d*m^3 + 15*b*d*m^2 + 6*b*d*m + b*d)*r)*x*e^2*log(c) + (18*(b*d*m^2 + 2*b*d*m + b*d)*n*r^5 + 57*(b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n*r^4 + 68*(b*d*m^4 + 4*b*d*m^3 + 6*b*d*m^2 + 4*b*d*m + b*d)*n*r^3 + 38*(b*d*m^5 + 5*b*d*m^4 + 10*b*d*m^3 + 10*b*d*m^2 + 5*b*d*m + b*d)*n*r^2 + 10*(b*d*m^6 + 6*b*d*m^5 + 15*b*d*m^4 + 20*b*d*m^3 + 15*b*d*m^2 + 6*b*d*m + b*d)*n*r + (b*d*m^7 + 7*b*d*m^6 + 21*b*d*m^5 + 35*b*d*m^4 + 35*b*d*m^3 + 21*b*d*m^2 + 7*b*d*m + b*d)*n)*x*e^2*log(x) + (a*d*m^7 + 7*a*d*m^6 + 21*a*d*m^5 + 35*a*d*m^4 + 18*(a*d*m^2 + 2*a*d*m + a*d)*r^5 + 35*a*d*m^3 + 3*(19*a*d*m^3 + 57*a*d*m^2 + 57*a*d*m + 19*a*d - 3*(b*d*m^2 + 2*b*d*m + b*d)*n)*r^4 + 21*a*d*m^2 + 4*(17*a*d*m^4 + 68*a*d*m^3 + 102*a*d*m^2 + 68*a*d*m + 17*a*d - 6*(b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n)*r^3 + 7*a*d*m + 2*(19*a*d*m^5 + 95*a*d*m^4 + 190*a*d*m^3 + 190*a*d*m^2 + 95*a*d*m + 19*a*d - 11*(b*d*m^4 + 4*b*d*m^3 + 6*b*d*m^2 + 4*b*d*m + b*d)*n)*r^2 + a*d - (b*d*m^6 + 6*b*d*m^5 + 15*b*d*m^4 + 20*b*d*m^3 + 15*b*d*m^2 + 6*b*d*m + b*d)*n + 2*(5*a*d*m^6 + 30*a*d*m^5 + 75*a*d*m^4 + 100*a*d*m^3 + 75*a*d*m^2 + 30*a*d*m + 5*a*d - 4*(b*d*m^5 + 5*b*d*m^4 + 10*b*d*m^3 + 10*b*d*m^2 + 5*b*d*m + b*d)*n)*r)*x*e^2)*x^(2*r)*e^(m*log(f) + m*log(x)) + 3*((b*d^2*m^7 + 7*b*d^2*m^6 + 21*b*d^2*m^5 + 35*b*d^2*m^4 + 35*b*d^2*m^3 + 36*(b*d^2*m^2 + 2*b*d^2*m + b*d^2)*r^5 + 21*b*d^2*m^2 + 96*(b*d^2*m^3 + 3*b*d^2*m^2 + 3*b*d^2*m + b*d^2)*r^4 + 7*b*d^2*m + 97*(b*d^2*m^4 + 4*b*d^2*m^3 + 6*b*d^2*m^2 + 4*b*d^2*m + b*d^2)*r^3 + b*d^2 + 47*(b*d^2*m^5 + 5*b*d^2*m^4 + 10*b*d^2*m^3 + 10*b*d^2*m^2 + 5*b*d^2*m + b*d^2)*r^2 + 11*(b*d^2*m^6 + 6*b*d^2*m^5 + 15*b*d^2*m^4 + 20*b*d^2*m^3 + 15*b*d^2*m^2 + 6*b*d^2*m + b*d^2)*r)*x*e*log(c) + (36*(b*d^2*m^2 + 2*b*d^2*m + b*d^2)*n*r^5 + 96*(b*d^2*m^3 + 3*b*d^2*m^2 + 3*b*d^2*m + b*d^2)*n*r^4 + 97*(b*d^2*m^4 + 4*b*d^2*m^3 + 6*b*d^2*m^2 + 4*b*d^2*m + b*d^2)*n*r^3 + 47*(b*d^2*m^5 + 5*b*d^2*m^4 + 10*b*d^2*m^3 + 10*b*d^2*m^2 + 5*b*d^2*m + b*d^2)*n*r^2 + 11*(b*d^2*m^6 + 6*b*d^2*m^5 + 15*b*d^2*m^4 + 20*b*d^2*m^3 + 15*b*d^2*m^2 + 6*b*d^2*m + b*d^2)*n*r + (b*d^2*m^7 + 7*b*d^2*m^6 + 21*b*d^2*m^5 + 35*b*d^2*m^4 + 35*b*d^2*m^3 + 21*b*d^2*m^2 + 7*b*d^2*m + b*d^2)*n)*x*e*log(x) + (a*d^2*m^7 + 7*a*d^2*m^6 + 21*a*d^2*m^5 + 35*a*d^2*m^4 + 35*a*d^2*m^3

```
 + 36*(a*d^2*m^2 + 2*a*d^2*m + a*d^2)*r^5 + 21*a*d^2*m^2 + 12*(8*a*d^2*m^3
+ 24*a*d^2*m^2 + 24*a*d^2*m + 8*a*d^2 - 3*(b*d^2*m^2 + 2*b*d^2*m + b*d^2)*n
)*r^4 + 7*a*d^2*m + (97*a*d^2*m^4 + 388*a*d^2*m^3 + 582*a*d^2*m^2 + 388*a*d
^2*m + 97*a*d^2 - 60*(b*d^2*m^3 + 3*b*d^2*m^2 + 3*b*d^2*m + b*d^2)*n)*r^3 +
 a*d^2 + (47*a*d^2*m^5 + 235*a*d^2*m^4 + 470*a*d^2*m^3 + 470*a*d^2*m^2 + 23
5*a*d^2*m + 47*a*d^2 - 37*(b*d^2*m^4 + 4*b*d^2*m^3 + 6*b*d^2*m^2 + 4*b*d^2*
m + b*d^2)*n)*r^2 - (b*d^2*m^6 + 6*b*d^2*m^5 + 15*b*d^2*m^4 + 20*b*d^2*m^3
+ 15*b*d^2*m^2 + 6*b*d^2*m + b*d^2)*n + (11*a*d^2*m^6 + 66*a*d^2*m^5 + 165*
a*d^2*m^4 + 220*a*d^2*m^3 + 165*a*d^2*m^2 + 66*a*d^2*m + 11*a*d^2 - 10*(b*d
^2*m^5 + 5*b*d^2*m^4 + 10*b*d^2*m^3 + 10*b*d^2*m^2 + 5*b*d^2*m + b*d^2)*n)*
r)*x*e)*x^r*e^(m*log(f) + m*log(x)) + ((b*d^3*m^7 + 7*b*d^3*m^6 + 21*b*d^3*
m^5 + 35*b*d^3*m^4 + 35*b*d^3*m^3 + 36*(b*d^3*m + b*d^3)*r^6 + 21*b*d^3*m^2
 + 132*(b*d^3*m^2 + 2*b*d^3*m + b*d^3)*r^5 + 7*b*d^3*m + 193*(b*d^3*m^3 + 3
*b*d^3*m^2 + 3*b*d^3*m + b*d^3)*r^4 + b*d^3 + 144*(b*d^3*m^4 + 4*b*d^3*m^3
+ 6*b*d^3*m^2 + 4*b*d^3*m + b*d^3)*r^3 + 58*(b*...
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3004 deep
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 766 vs. 2(231) = 462.
time = 4.59, size = 766, normalized size = 3.29

$$\frac{3bd^2f^m mnxx^m x^r e\log(x)}{m^2+2mr+r^2+2m+2r+1}+\frac{3bd^2f^m nrxx^m x^r e\log(x)}{m^2+2mr+r^2+2m+2r+1}+\frac{bd^3f^m mnxx^m\log(x)}{m^2+2m+1}+\frac{3bdf^m mnxx^m x^{2r}e^2\log(x)}{m^2+4mr+4r^2+2m+4r+1}+\frac{6bdf^m nrxx^m x^{2r}e^2\log(x)}{m^2+4mr+4r^2+2m+4r+1}+\frac{3bd^2f^m nxx^m x^r e\log(x)}{m^2+2mr+r^2+2m+2r+1}-\frac{3bd^2f^m nxx^m x^r e}{m^2+2mr+r^2+2m+2r+1}+\frac{3bd^2f^m xx^m x^r e\log(c)}{m+r+1}+\frac{bd^3f^m nxx^m\log(x)}{m^2+2m+1}+\frac{bf^m mnxx^m x^{3r}e^3\log(x)}{m^2+6mr+9r^2+2m+6r+1}+\frac{3bf^m nrxx^m x^{3r}e^3\log(x)}{m^2+6mr+9r^2+2m+6r+1}+\frac{3bdf^m nxx^m x^{2r}e^2\log(x)}{m^2+4mr+4r^2+2m+4r+1}-\frac{bd^3f^m nxx^m}{m^2+2m+1}-\frac{3bdf^m nxx^m x^{2r}e^2}{m^2+4mr+4r^2+2m+4r+1}+\frac{3ad^2f^m xx^m x^r e}{m+r+1}+\frac{3bdf^m xx^m x^{2r}e^2\log(c)}{m+2r+1}+\frac{bf^m nxx^m x^{3r}e^3\log(x)}{m^2+6mr+9r^2+2m+6r+1}-\frac{bf^m nxx^m x^{3r}e^3}{m^2+6mr+9r^2+2m+6r+1}+\frac{3adf^m xx^m x^{2r}e^2}{m+2r+1}+\frac{(fx)^m bd^3x\log(c)}{m+1}+\frac{bf^m xx^m x^{3r}e^3\log(c)}{m+3r+1}+\frac{(fx)^m ad^3x}{m+1}+\frac{af^m xx^m x^{3r}e^3}{m+3r+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 3*b*d^2*f^m*m*n*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + 3*
b*d^2*f^m*n*r*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*d^
3*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + 3*b*d*f^m*m*n*x*x^m*x^(2*r)*e^2*lo
g(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 6*b*d*f^m*n*r*x*x^m*x^(2*r)*e^
2*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 3*b*d^2*f^m*n*x*x^m*x^r*e*
log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) - 3*b*d^2*f^m*n*x*x^m*x^r*e/(m^2
 + 2*m*r + r^2 + 2*m + 2*r + 1) + 3*b*d^2*f^m*x*x^m*x^r*e*log(c)/(m + r + 1
) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*m*n*x*x^m*x^(3*r)*e^3*
log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) + 3*b*f^m*n*r*x*x^m*x^(3*r)*e^
3*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) + 3*b*d*f^m*n*x*x^m*x^(2*r)*
e^2*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) - b*d^3*f^m*n*x*x^m/(m^2 +
```

```
 2*m + 1) - 3*b*d*f^m*n*x*x^m*x^(2*r)*e^2/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r
+ 1) + 3*a*d^2*f^m*x*x^m*x^r*e/(m + r + 1) + 3*b*d*f^m*x*x^m*x^(2*r)*e^2*lo
g(c)/(m + 2*r + 1) + b*f^m*n*x*x^m*x^(3*r)*e^3*log(x)/(m^2 + 6*m*r + 9*r^2
+ 2*m + 6*r + 1) - b*f^m*n*x*x^m*x^(3*r)*e^3/(m^2 + 6*m*r + 9*r^2 + 2*m + 6
*r + 1) + 3*a*d*f^m*x*x^m*x^(2*r)*e^2/(m + 2*r + 1) + (f*x)^m*b*d^3*x*log(c
)/(m + 1) + b*f^m*x*x^m*x^(3*r)*e^3*log(c)/(m + 3*r + 1) + (f*x)^m*a*d^3*x/
(m + 1) + a*f^m*x*x^m*x^(3*r)*e^3/(m + 3*r + 1)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^m\,{\left(d+e\,x^r\right)}^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.441 $\int (fx)^m \left(d+ex^r\right)^2 (a+b\log(cx^n))\,dx$

Optimal. Leaf size=165

$$-\frac{2bdenx^{1+r}(fx)^m}{(1+m+r)^2}-\frac{be^2nx^{1+2r}(fx)^m}{(1+m+2r)^2}-\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}+\frac{2dex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r}+\frac{e^2x^{1+2r}(fx)^m(a+b\log(cx^n))}{1+m+2r}$$

```
[Out] -2*b*d*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-b*e^2*n*x^(1+2*r)*(f*x)^m/(1+m+2*r)^2-
b*d^2*n*(f*x)^(1+m)/f/(1+m)^2+2*d*e*x^(1+r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+r)
+e^2*x^(1+2*r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+2*r)+d^2*(f*x)^(1+m)*(a+b*ln(c*
x^n))/f/(1+m)
```

Rubi [A]
time = 0.13, antiderivative size = 165, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {276, 20, 30, 2392, 14}

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2dex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}-\frac{bd^2n(fx)^{m+1}}{f(m+1)^2}-\frac{2bdenx^{r+1}(fx)^m}{(m+r+1)^2}-\frac{be^2nx^{2r+1}(fx)^m}{(m+2r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] (-2*b*d*e*n*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 - (b*e^2*n*x^(1 + 2*r)*(f*x)^m
)/(1 + m + 2*r)^2 - (b*d^2*n*(f*x)^(1 + m))/(f*(1 + m)^2) + (2*d*e*x^(1 + r
)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + r) + (e^2*x^(1 + 2*r)*(f*x)^m*(a + b
*Log[c*x^n]))/(1 + m + 2*r) + (d^2*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1
+ m))
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 20

```
Int[(u_.)*((a_.)*(v_))^(m_)*((b_.)*(v_))^(n_), x_Symbol] :> Dist[b^IntPart[
n]*((b*v)^FracPart[n]/(a^IntPart[n]*(a*v)^FracPart[n])), Int[u*(a*v)^(m + n
), x], x] /; FreeQ[{a, b, m, n}, x] &&  !IntegerQ[m] &&  !IntegerQ[n] &&  !
IntegerQ[m + n]
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 276

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{2dex^{1+r}(fx)^m (a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{1+2r}(fx)^m (a+b\log(cx^n))}{1+m+2r}$$

$$= \frac{2dex^{1+r}(fx)^m (a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{1+2r}(fx)^m (a+b\log(cx^n))}{1+m+2r}$$

$$= -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2} + \frac{2dex^{1+r}(fx)^m (a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{1+2r}(fx)^{}}{1+}$$

$$= -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2} + \frac{2dex^{1+r}(fx)^m (a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{1+2r}(fx)^{}}{1+}$$

$$= -\frac{2bdenx^{1+r}(fx)^m}{(1+m+r)^2} - \frac{be^2nx^{1+2r}(fx)^m}{(1+m+2r)^2} - \frac{bd^2n(fx)^{1+m}}{f(1+m)^2} + \frac{2dex^{1+}}{}$$

Mathematica [A]
time = 0.18, size = 139, normalized size = 0.84

$$x(fx)^m\left(\frac{bd^2n\log(x)}{1+m}+\frac{d^2(a+am-bn-b(1+m)n\log(x)+b(1+m)\log(cx^n))}{(1+m)^2}+\frac{2dex^r(-bn+a(1+m+r)+b(1+m+r)\log(cx^n))}{(1+m+r)^2}+\frac{e^2x^{2r}(-bn+a(1+m+2r)+b(1+m+2r)\log(cx^n))}{(1+m+2r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(f*x)^m*((b*d^2*n*Log[x])/(1 + m) + (d^2*(a + a*m - b*n - b*(1 + m)*n*Log
[x] + b*(1 + m)*Log[c*x^n]))/(1 + m)^2 + (2*d*e*x^r*(-(b*n) + a*(1 + m + r)
 + b*(1 + m + r)*Log[c*x^n]))/(1 + m + r)^2 + (e^2*x^(2*r)*(-(b*n) + a*(1 +
 m + 2*r) + b*(1 + m + 2*r)*Log[c*x^n]))/(1 + m + 2*r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.61, size = 8737, normalized size = 52.95

method	result	size
risch	Expression too large to display	8737

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [A]
time = 0.30, size = 234, normalized size = 1.42

$$-\frac{bd^2f^mnxx^m}{(m+1)^2}+\frac{2\,bdf^mxe^{(m\log(x)+r\log(x)+1)}\log(cx^n)}{m+r+1}+\frac{2\,adf^mxe^{(m\log(x)+r\log(x)+1)}}{m+r+1}-\frac{2\,bdf^mnxe^{(m\log(x)+r\log(x)+1)}}{(m+r+1)^2}+\frac{bf^mxe^{(m\log(x)+2\,r\log(x)+2)}\log(cx^n)}{m+2\,r+1}+\frac{af^mxe^{(m\log(x)+2\,r\log(x)+2)}}{m+2\,r+1}-\frac{bf^mnxe^{(m\log(x)+2\,r\log(x)+2)}}{(m+2\,r+1)^2}+\frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)}+\frac{(fx)^{m+1}ad^2}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d^2*f^m*n*x*x^m/(m + 1)^2 + 2*b*d*f^m*x*e^(m*log(x) + r*log(x) + 1)*log(
c*x^n)/(m + r + 1) + 2*a*d*f^m*x*e^(m*log(x) + r*log(x) + 1)/(m + r + 1) -
2*b*d*f^m*n*x*e^(m*log(x) + r*log(x) + 1)/(m + r + 1)^2 + b*f^m*x*e^(m*log(
x) + 2*r*log(x) + 2)*log(c*x^n)/(m + 2*r + 1) + a*f^m*x*e^(m*log(x) + 2*r*l
og(x) + 2)/(m + 2*r + 1) - b*f^m*n*x*e^(m*log(x) + 2*r*log(x) + 2)/(m + 2*r
 + 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^2/
(f*(m + 1))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 1610 vs. 2(165) = 330.
time = 0.39, size = 1610, normalized size = 9.76

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] (((b*m^5 + 5*b*m^4 + 10*b*m^3 + 2*(b*m^2 + 2*b*m + b)*r^3 + 10*b*m^2 + 5*(b
*m^3 + 3*b*m^2 + 3*b*m + b)*r^2 + 5*b*m + 4*(b*m^4 + 4*b*m^3 + 6*b*m^2 + 4*
b*m + b)*r + b)*x*e^2*log(c) + (2*(b*m^2 + 2*b*m + b)*n*r^3 + 5*(b*m^3 + 3*
b*m^2 + 3*b*m + b)*n*r^2 + 4*(b*m^4 + 4*b*m^3 + 6*b*m^2 + 4*b*m + b)*n*r +
(b*m^5 + 5*b*m^4 + 10*b*m^3 + 10*b*m^2 + 5*b*m + b)*n)*x*e^2*log(x) + (a*m^
5 + 5*a*m^4 + 10*a*m^3 + 2*(a*m^2 + 2*a*m + a)*r^3 + 10*a*m^2 + (5*a*m^3 +
15*a*m^2 + 15*a*m - (b*m^2 + 2*b*m + b)*n + 5*a)*r^2 + 5*a*m - (b*m^4 + 4*b
*m^3 + 6*b*m^2 + 4*b*m + b)*n + 2*(2*a*m^4 + 8*a*m^3 + 12*a*m^2 + 8*a*m - (
b*m^3 + 3*b*m^2 + 3*b*m + b)*n + 2*a)*r + a)*x*e^2)*x^(2*r)*e^(m*log(f) + m
*log(x)) + 2*((b*d*m^5 + 5*b*d*m^4 + 10*b*d*m^3 + 10*b*d*m^2 + 4*(b*d*m^2 +
 2*b*d*m + b*d)*r^3 + 5*b*d*m + 8*(b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*r^2
```

```
 + b*d + 5*(b*d*m^4 + 4*b*d*m^3 + 6*b*d*m^2 + 4*b*d*m + b*d)*r)*x*e*log(c)
+ (4*(b*d*m^2 + 2*b*d*m + b*d)*n*r^3 + 8*(b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b
*d)*n*r^2 + 5*(b*d*m^4 + 4*b*d*m^3 + 6*b*d*m^2 + 4*b*d*m + b*d)*n*r + (b*d*
m^5 + 5*b*d*m^4 + 10*b*d*m^3 + 10*b*d*m^2 + 5*b*d*m + b*d)*n)*x*e*log(x) +
(a*d*m^5 + 5*a*d*m^4 + 10*a*d*m^3 + 10*a*d*m^2 + 4*(a*d*m^2 + 2*a*d*m + a*d
)*r^3 + 5*a*d*m + 4*(2*a*d*m^3 + 6*a*d*m^2 + 6*a*d*m + 2*a*d - (b*d*m^2 + 2
*b*d*m + b*d)*n)*r^2 + a*d - (b*d*m^4 + 4*b*d*m^3 + 6*b*d*m^2 + 4*b*d*m + b
*d)*n + (5*a*d*m^4 + 20*a*d*m^3 + 30*a*d*m^2 + 20*a*d*m + 5*a*d - 4*(b*d*m^
3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n)*r)*x*e)*x^r*e^(m*log(f) + m*log(x)) + ((b
*d^2*m^5 + 5*b*d^2*m^4 + 10*b*d^2*m^3 + 10*b*d^2*m^2 + 4*(b*d^2*m + b*d^2)*
r^4 + 5*b*d^2*m + 12*(b*d^2*m^2 + 2*b*d^2*m + b*d^2)*r^3 + b*d^2 + 13*(b*d^
2*m^3 + 3*b*d^2*m^2 + 3*b*d^2*m + b*d^2)*r^2 + 6*(b*d^2*m^4 + 4*b*d^2*m^3 +
 6*b*d^2*m^2 + 4*b*d^2*m + b*d^2)*r)*x*log(c) + (4*(b*d^2*m + b*d^2)*n*r^4
+ 12*(b*d^2*m^2 + 2*b*d^2*m + b*d^2)*n*r^3 + 13*(b*d^2*m^3 + 3*b*d^2*m^2 +
3*b*d^2*m + b*d^2)*n*r^2 + 6*(b*d^2*m^4 + 4*b*d^2*m^3 + 6*b*d^2*m^2 + 4*b*d
^2*m + b*d^2)*n*r + (b*d^2*m^5 + 5*b*d^2*m^4 + 10*b*d^2*m^3 + 10*b*d^2*m^2
+ 5*b*d^2*m + b*d^2)*n)*x*log(x) + (a*d^2*m^5 + 5*a*d^2*m^4 + 10*a*d^2*m^3
+ 10*a*d^2*m^2 + 4*(a*d^2*m - b*d^2*n + a*d^2)*r^4 + 5*a*d^2*m + 12*(a*d^2*
m^2 + 2*a*d^2*m + a*d^2 - (b*d^2*m + b*d^2)*n)*r^3 + a*d^2 + 13*(a*d^2*m^3
+ 3*a*d^2*m^2 + 3*a*d^2*m + a*d^2 - (b*d^2*m^2 + 2*b*d^2*m + b*d^2)*n)*r^2
- (b*d^2*m^4 + 4*b*d^2*m^3 + 6*b*d^2*m^2 + 4*b*d^2*m + b*d^2)*n + 6*(a*d^2*
m^4 + 4*a*d^2*m^3 + 6*a*d^2*m^2 + 4*a*d^2*m + a*d^2 - (b*d^2*m^3 + 3*b*d^2*
m^2 + 3*b*d^2*m + b*d^2)*n)*r)*x)*e^(m*log(f) + m*log(x)))/(m^6 + 6*m^5 + 4
*(m^2 + 2*m + 1)*r^4 + 15*m^4 + 12*(m^3 + 3*m^2 + 3*m + 1)*r^3 + 20*m^3 + 1
3*(m^4 + 4*m^3 + 6*m^2 + 4*m + 1)*r^2 + 15*m^2 + 6*(m^5 + 5*m^4 + 10*m^3 +
10*m^2 + 5*m + 1)*r + 6*m + 1)
```

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 29667 vs. $2(160) = 320$.
time = 56.39, size = 29667, normalized size = 179.80

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log
(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, Eq(m, -1) & Eq(
r, 0)), ((a*d**2*log(c*x**n)/n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b
*d**2*log(c*x**n)**2/(2*n) - 2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)
/r - b*e**2*n*x**(2*r)/(4*r**2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r))/f, Eq(
m, -1)), (-8*a*d**2*n*r**3/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(
2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 8*a*d**2*n*r**2/(16*f*n*r**4*(f*x)**(2*r)
 + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 2*a*d**2*n*r/(16*f
*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r))
```

- 32*a*d*e*n*r**3*x**r/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r)
 + 4*f*n*r**2*(f*x)**(2*r)) - 32*a*d*e*n*r**2*x**r/(16*f*n*r**4*(f*x)**(2*r
) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 8*a*d*e*n*r*x**r/
(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2
*r)) + 8*a*e**2*n*r**3*x**(2*r)/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*
x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) + 4*a*e**2*n*r**2*x**(2*r)/(16*f*n*r**
4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) + 16*a
*e**2*r**4*x**(2*r)*log(c*x**n)/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*
x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) + 16*a*e**2*r**3*x**(2*r)*log(c*x**n)/
(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2
*r)) + 4*a*e**2*r**2*x**(2*r)*log(c*x**n)/(16*f*n*r**4*(f*x)**(2*r) + 16*f*
n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 4*b*d**2*n**2*r**2/(16*f*n
*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) -
4*b*d**2*n**2*r/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*
n*r**2*(f*x)**(2*r)) - b*d**2*n**2/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*
(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 8*b*d**2*n*r**3*log(c*x**n)/(16*f
*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r))
- 8*b*d**2*n*r**2*log(c*x**n)/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)
(2*r) + 4*f*n*r2*(f*x)**(2*r)) - 2*b*d**2*n*r*log(c*x**n)/(16*f*n*r**4*
(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 32*b*d
*e*n**2*r**2*x**r/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*
f*n*r**2*(f*x)**(2*r)) - 32*b*d*e*n**2*r*x**r/(16*f*n*r**4*(f*x)**(2*r) + 1
6*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 8*b*d*e*n**2*x**r/(16*
f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r))
 - 32*b*d*e*n*r**3*x**r*log(c*x**n)/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3
*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 32*b*d*e*n*r**2*x**r*log(c*x**n)
/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(
2*r)) - 8*b*d*e*n*r*x**r*log(c*x**n)/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**
3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) - 4*b*e**2*n**2*r**2*x**(2*r)/(16
*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)
) + 8*b*e**2*r**4*x**(2*r)*log(c*x**n)**2/(16*f*n*r**4*(f*x)**(2*r) + 16*f*
n*r**3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)) + 8*b*e**2*r**3*x**(2*r)*log
(c*x**n)**2/(16*f*n*r**4*(f*x)**(2*r) + 16*f*n*r**3*(f*x)**(2*r) + 4*f*n*r*
2(f*x)**(2*r)) + 2*b*e**2*r**2*x**(2*r)*log(c*x**n)**2/(16*f*n*r**4*(f*x)
(2*r) + 16*f*n*r3*(f*x)**(2*r) + 4*f*n*r**2*(f*x)**(2*r)), Eq(m, -2*r -
 1)), (-a*d**2*n*r**3/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(
f*x)**r) - 2*a*d**2*n*r**2/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r
2*(f*x)r) - a*d**2*n*r/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r
2*(f*x)r) + 2*a*d*e*n*r**3*x**r/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**
r + f*n*r**2*(f*x)**r) + 2*a*d*e*n*r**2*x**r/(f*n*r**4*(f*x)**r + 2*f*n*r**
3*(f*x)**r + f*n*r**2*(f*x)**r) + 2*a*d*e*r**4*x**r*log(c*x**n)/(f*n*r**4*(
f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) + 4*a*d*e*r**3*x**r*log(
c*x**n)/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) + 2*a
*d*e*r**2*x**r*log(c*x**n)/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r
2*(f*x)r) + a*e**2*n*r**3*x**(2*r)/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x

```
)**r + f*n*r**2*(f*x)**r) + 2*a*e**2*n*r**2*x**(2*r)/(f*n*r**4*(f*x)**r + 2
*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) + a*e**2*n*r*x**(2*r)/(f*n*r**4*(f*
x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) - b*d**2*n**2*r**2/(f*n*r*
*4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) - 2*b*d**2*n**2*r/(f
*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) - b*d**2*n**2/(
f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) - b*d**2*n*r**
3*log(c*x**n)/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r)
 - 2*b*d**2*n*r**2*log(c*x**n)/(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f
*n*r**2*(f*x)**r) - b*d**2*n*r*log(c*x**n)/(f*n*r**4*(f*x)**r + 2*f*n*r**3*
(f*x)**r + f*n*r**2*(f*x)**r) - 2*b*d*e*n**2*r**2*x**r/(f*n*r**4*(f*x)**r +
 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) + b*d*e*r**4*x**r*log(c*x**n)**2/
(f*n*r**4*(f*x)**r + 2*f*n*r**3*(f*x)**r + f*n*r**2*(f*x)**r) + 2*b*d*e*r**
3*x**r*log(c*x**n)**2/(f*n*r**4*(f*x)**r + 2*f*...
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 528 vs. 2(165) = 330.
time = 2.74, size = 528, normalized size = 3.20

$$\frac{2\,bdf^{m}mnxx^{m}x^{r}e\log\left(x\right)}{m^{2}+2\,mr+r^{2}+2\,m+2\,r+1}+\frac{2\,bdf^{m}nrxx^{m}x^{r}e\log\left(x\right)}{m^{2}+2\,mr+r^{2}+2\,m+2\,r+1}+\frac{bd^{2}f^{m}mnxx^{m}\log\left(x\right)}{m^{2}+2\,m+1}+\frac{bf^{m}mnxx^{m}x^{2\,r}e^{2}\log\left(x\right)}{m^{2}+4\,mr+4\,r^{2}+2\,m+4\,r+1}+\frac{2\,bf^{m}nrxx^{m}x^{2\,r}e^{2}\log\left(x\right)}{m^{2}+4\,mr+4\,r^{2}+2\,m+4\,r+1}+\frac{2\,bdf^{m}nxx^{m}x^{r}e\log\left(x\right)}{m^{2}+2\,mr+r^{2}+2\,m+2\,r+1}-\frac{2\,bdf^{m}nxx^{m}x^{r}e}{m^{2}+2\,mr+r^{2}+2\,m+2\,r+1}+\frac{2\,bdf^{m}xx^{m}x^{r}e\log\left(c\right)}{m+r+1}+\frac{bd^{2}f^{m}nxx^{m}\log\left(x\right)}{m^{2}+2\,m+1}+\frac{bf^{m}nxx^{m}x^{2\,r}e^{2}\log\left(x\right)}{m^{2}+4\,mr+4\,r^{2}+2\,m+4\,r+1}-\frac{bd^{2}f^{m}nxx^{m}}{m^{2}+2\,m+1}-\frac{bf^{m}nxx^{m}x^{2\,r}e^{2}}{m^{2}+4\,mr+4\,r^{2}+2\,m+4\,r+1}+\frac{2\,adf^{m}xx^{m}x^{r}e}{m+r+1}+\frac{bf^{m}xx^{m}x^{2\,r}e^{2}\log\left(c\right)}{m+2\,r+1}+\frac{af^{m}xx^{m}x^{2\,r}e^{2}}{m+2\,r+1}+\frac{\left(fx\right)^{m}bd^{2}x\log\left(c\right)}{m+1}+\frac{\left(fx\right)^{m}ad^{2}x}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] 2*b*d*f^m*m*n*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + 2*b*
d*f^m*n*r*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*d^2*f^
m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*m*n*x*x^m*x^(2*r)*e^2*log(x)/(m^
2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 2*b*f^m*n*r*x*x^m*x^(2*r)*e^2*log(x)/(
m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 2*b*d*f^m*n*x*x^m*x^r*e*log(x)/(m^2
+ 2*m*r + r^2 + 2*m + 2*r + 1) - 2*b*d*f^m*n*x*x^m*x^r*e/(m^2 + 2*m*r + r^2
 + 2*m + 2*r + 1) + 2*b*d*f^m*x*x^m*x^r*e*log(c)/(m + r + 1) + b*d^2*f^m*n*
x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*x^(2*r)*e^2*log(x)/(m^2 + 4*m*
r + 4*r^2 + 2*m + 4*r + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) - b*f^m*n*x*
x^m*x^(2*r)*e^2/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 2*a*d*f^m*x*x^m*x^r
*e/(m + r + 1) + b*f^m*x*x^m*x^(2*r)*e^2*log(c)/(m + 2*r + 1) + a*f^m*x*x^m
*x^(2*r)*e^2/(m + 2*r + 1) + (f*x)^m*b*d^2*x*log(c)/(m + 1) + (f*x)^m*a*d^2
*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^m\,\left(d+e\,x^r\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.442 $\int (fx)^m (d + ex^r) (a + b \log (cx^n)) \, dx$

Optimal. Leaf size=97

$$-\frac{benx^{1+r}(fx)^m}{(1+m+r)^2} - \frac{bdn(fx)^{1+m}}{f(1+m)^2} + \frac{ex^{1+r}(fx)^m (a + b \log (cx^n))}{1+m+r} + \frac{d(fx)^{1+m} (a + b \log (cx^n))}{f(1+m)}$$

```
[Out] -b*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-b*d*n*(f*x)^(1+m)/f/(1+m)^2+e*x^(1+r)*(f*x
)^m*(a+b*ln(c*x^n))/(1+m+r)+d*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Rubi [A]
time = 0.07, antiderivative size = 97, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {14, 20, 30, 2392}

$$\frac{d(fx)^{m+1} (a + b \log (cx^n))}{f(m+1)} + \frac{ex^{r+1}(fx)^m (a + b \log (cx^n))}{m+r+1} - \frac{bdn(fx)^{m+1}}{f(m+1)^2} - \frac{benx^{r+1}(fx)^m}{(m+r+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*e*n*x^(1 + r)*(f*x)^m)/(1 + m + r)^2) - (b*d*n*(f*x)^(1 + m))/(f*(1 +
m)^2) + (e*x^(1 + r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + r) + (d*(f*x)^(1
+ m)*(a + b*Log[c*x^n]))/(f*(1 + m))
```

Rule 14

```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

Rule 20

```
Int[(u_.)*((a_.)*(v_))^(m_)*((b_.)*(v_))^(n_), x_Symbol] :> Dist[b^IntPart[
n]*((b*v)^FracPart[n]/(a^IntPart[n]*(a*v)^FracPart[n])), Int[u*(a*v)^(m + n
), x], x] /; FreeQ[{a, b, m, n}, x] &&  !IntegerQ[m] &&  !IntegerQ[n] &&  !
IntegerQ[m + n]
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2392

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
```

```
}, Dist[a + b*Log[c*x^n], u, x] - Dist[b*n, Int[SimplifyIntegrand[u/x, x],
x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]) ||
 InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] &&
 IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

Rubi steps

$$\begin{aligned}\int (fx)^m\left(d+ex^r\right)(a+b\log\left(cx^n\right))\,dx &= \frac{ex^{1+r}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{1+m+r}+\frac{d(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)}-(bn)\\ &= \frac{ex^{1+r}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{1+m+r}+\frac{d(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)}-(bn)\\ &= -\frac{bdn(fx)^{1+m}}{f(1+m)^2}+\frac{ex^{1+r}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{1+m+r}+\frac{d(fx)^{1+m}(a+b}{f(1+m}\\ &= -\frac{bdn(fx)^{1+m}}{f(1+m)^2}+\frac{ex^{1+r}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{1+m+r}+\frac{d(fx)^{1+m}(a+b}{f(1+m}\\ &= -\frac{benx^{1+r}(fx)^m}{(1+m+r)^2}-\frac{bdn(fx)^{1+m}}{f(1+m)^2}+\frac{ex^{1+r}(fx)^m\left(a+b\log\left(cx^n\right)\right)}{1+m+r}+\end{aligned}$$

Mathematica [A]
time = 0.10, size = 89, normalized size = 0.92

$$x(fx)^m\left(\frac{bdn\log(x)}{1+m}+\frac{d(a+am-bn-b(1+m)n\log(x)+b(1+m)\log\left(cx^n\right))}{(1+m)^2}+\frac{ex^r(-bn+a(1+m+r)+b(1+m+r)\log\left(cx^n\right))}{(1+m+r)^2}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

```
[Out] x*(f*x)^m*((b*d*n*Log[x])/(1 + m) + (d*(a + a*m - b*n - b*(1 + m)*n*Log[x]
+ b*(1 + m)*Log[c*x^n]))/(1 + m)^2 + (e*x^r*(-(b*n) + a*(1 + m + r) + b*(1
+ m + r)*Log[c*x^n]))/(1 + m + r)^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.22, size = 2152, normalized size = 22.19

method	result	size
risch	Expression too large to display	2152

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] b*x*(m*e*x^r+m*d+d*r+e*x^r+d)/(1+m)/(1+m+r)*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+
I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*
```

csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)-1/2*x*(-6*a*d*m-2*x^r*a*e+2*b
*d*n-2*I*Pi*b*d*m^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2+2*x^r*b*e*n-6*x^r*a*e*m-2
*x^r*a*e*r-2*a*d+4*b*d*n*r-4*ln(c)*b*d*r-2*ln(c)*b*d*r^2+I*Pi*b*e*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)*x^r*r-2*a*d*m^3-2*a*d*r^2-2*d*b*ln(c)-2*ln(c)*b*
e*x^r*r-4*a*d*r-6*ln(c)*b*d*m^2-6*ln(c)*b*d*m-2*ln(c)*b*d*m^3-2*a*e*m^3*x^r
-6*a*e*m^2*x^r+I*Pi*b*d*csgn(I*c*x^n)^3+3*I*Pi*b*d*m^2*csgn(I*c*x^n)^3-4*a*
d*m^2*r-2*a*d*m*r^2+2*b*d*n*r^2+2*b*d*m^2*n-8*a*d*m*r-2*ln(c)*b*e*x^r-6*a*d
*m^2+4*b*d*m*n-6*ln(c)*b*e*m*x^r-2*ln(c)*b*e*m^3*x^r+4*b*e*m*n*x^r+3*I*Pi*b
*e*m*csgn(I*c*x^n)^3*x^r-3*I*Pi*b*d*m^2*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b*
e*m*r*csgn(I*c)*csgn(I*c*x^n)^2*x^r-2*I*Pi*b*e*m*r*csgn(I*x^n)*csgn(I*c*x^n
)^2*x^r+3*I*Pi*b*e*m*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+I*Pi*b*e*m^3*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+4*I*Pi*b*d*m*r*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)-I*Pi*b*e*m^2*r*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+I*Pi*b*d*m*r^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*a*e*m*r*x^r-2*a*e*m^2*r*x^r+2*b*e*m
^2*n*x^r-6*ln(c)*b*e*m^2*x^r-I*Pi*b*d*m^3*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*
b*d*m^3*csgn(I*c)*csgn(I*c*x^n)^2-3*I*Pi*b*d*m*csgn(I*x^n)*csgn(I*c*x^n)^2+
I*Pi*b*d*m*r^2*csgn(I*c*x^n)^3+I*Pi*b*e*m^3*csgn(I*c*x^n)^3*x^r+I*Pi*b*d*r^
2*csgn(I*c*x^n)^3+I*Pi*b*e*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+2*I*Pi*b
*d*m^2*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi*b*e*m^2*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)*x^r-3*I*Pi*b*e*m*csgn(I*c)*csgn(I*c*x^n)^2*x^r-3*I*Pi*
b*e*m*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r-I*Pi*b*e*m^2*r*csgn(I*c)*csgn(I*c*x^n
)^2*x^r-2*I*Pi*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2*r+I*Pi*b*e*csgn(I*c*x^n)^3*x
^r*r+I*Pi*b*d*r^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*b*d*m*n*r-8*ln(c)*b
*d*m*r-4*ln(c)*b*d*m^2*r-2*ln(c)*b*d*m*r^2+2*I*Pi*b*d*csgn(I*c*x^n)^3*r-I*P
i*b*d*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*e*csgn(I*c*x^n)^3*x^r-3*I*Pi*b*d*m
^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b*d*m*r*csgn(I*c*x^n)^3-3*I*Pi*b*d*m*
csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d*r^2*csgn(I*c)*csgn(I*c*x^n)^2-I*Pi*b*d*r
^2*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*Pi*b*d*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)+I*Pi*b*d*m^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*d*m^3*csgn(I*c
*x^n)^3+2*I*Pi*b*e*m*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r+I*Pi*b*e*m^2
*r*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*x^r-I*Pi*b*e*csgn(I*c)*csgn(I*c*x^n)
^2*x^r*r-I*Pi*b*e*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r*r+2*I*Pi*b*d*m^2*r*csgn(I
*c*x^n)^3+3*I*Pi*b*e*m^2*csgn(I*c*x^n)^3*x^r-I*Pi*b*d*csgn(I*c)*csgn(I*c*x^
n)^2-4*ln(c)*b*e*m*r*x^r-2*ln(c)*b*e*m^2*r*x^r+3*I*Pi*b*d*m*csgn(I*c*x^n)^3
+I*Pi*b*d*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*e*csgn(I*x^n)*csgn(I*c
*x^n)^2*x^r-2*I*Pi*b*d*csgn(I*c)*csgn(I*c*x^n)^2*r-I*Pi*b*e*csgn(I*c)*csgn(
I*c*x^n)^2*x^r-3*I*Pi*b*e*m^2*csgn(I*c)*csgn(I*c*x^n)^2*x^r-3*I*Pi*b*e*m^2*
csgn(I*x^n)*csgn(I*c*x^n)^2*x^r+2*I*Pi*b*e*m*r*csgn(I*c*x^n)^3*x^r+3*I*Pi*b
*d*m*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*I*Pi*b*d*m^2*r*csgn(I*c)*csgn(I*
c*x^n)^2+I*Pi*b*e*m^2*r*csgn(I*c*x^n)^3*x^r-4*I*Pi*b*d*m*r*csgn(I*c)*csgn(I
*c*x^n)^2-4*I*Pi*b*d*m*r*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*d*m*r^2*csgn(I*
c)*csgn(I*c*x^n)^2-I*Pi*b*d*m*r^2*csgn(I*x^n)*csgn(I*c*x^n)^2+3*I*Pi*b*d*m^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*e*m^3*csgn(I*c)*csgn(I*c*x^n)^
2*x^r-I*Pi*b*e*m^3*csgn(I*x^n)*csgn(I*c*x^n)^2*x^r)/(1+m)^2/(1+m+r)^2*exp(1
/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*c

```
sgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))
```

Maxima [A]
time = 0.31, size = 137, normalized size = 1.41

$$-\frac{bdf^m nxx^m}{(m+1)^2} + \frac{bf^m xe^{(m\log(x)+r\log(x)+1)}\log(cx^n)}{m+r+1} + \frac{af^m xe^{(m\log(x)+r\log(x)+1)}}{m+r+1} - \frac{bf^m nxe^{(m\log(x)+r\log(x)+1)}}{(m+r+1)^2} + \frac{(fx)^{m+1}bd\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -b*d*f^m*n*x*x^m/(m + 1)^2 + b*f^m*x*e^(m*log(x) + r*log(x) + 1)*log(c*x^n)
/(m + r + 1) + a*f^m*x*e^(m*log(x) + r*log(x) + 1)/(m + r + 1) - b*f^m*n*x*
e^(m*log(x) + r*log(x) + 1)/(m + r + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n)/(f
*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 406 vs. $2(99) = 198$.
time = 0.35, size = 406, normalized size = 4.19

$$\frac{((bm^3+3bm^2+3bm+(bm^2+2bm+b)r+b)xe\log(c)+((bm^2+2bm+b)nr+(bm^3+3bm^2+3bm+b)n)xe\log(x)+(am^3+3am^2+3am-(bm^2+2bm+b)n+(am^2+2am+a)r+a)xe)x^r e^{(m\log(f)+m\log(x))}+((bdm^3+3bdm^2+3bdm+(bdm+bd)r^2+bd+2(bdm^2+2bdm+bd)r)x\log(c)+((bdm+bd)nr^2+2(bdm^2+2bdm+bd)nr+(bdm^3+3bdm^2+3bdm+bd)n)x\log(x)+(adm^3+3adm^2+3adm+(adm-bdn+ad)r^2+ad-(bdm^2+2bdm+bd)n+2(adm^2+2adm+ad-(bdm+bd)n)r)x)e^{(m\log(f)+m\log(x))}}{m^4+4m^3+(m^2+2m+1)r^2+6m^2+2(m^3+3m^2+3m+1)r+4m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] (((b*m^3 + 3*b*m^2 + 3*b*m + (b*m^2 + 2*b*m + b)*r + b)*x*e*log(c) + ((b*m^
2 + 2*b*m + b)*n*r + (b*m^3 + 3*b*m^2 + 3*b*m + b)*n)*x*e*log(x) + (a*m^3 +
 3*a*m^2 + 3*a*m - (b*m^2 + 2*b*m + b)*n + (a*m^2 + 2*a*m + a)*r + a)*x*e)*
x^r*e^(m*log(f) + m*log(x)) + ((b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + (b*d*m + b*
d)*r^2 + b*d + 2*(b*d*m^2 + 2*b*d*m + b*d)*r)*x*log(c) + ((b*d*m + b*d)*n*r
^2 + 2*(b*d*m^2 + 2*b*d*m + b*d)*n*r + (b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d
)*n)*x*log(x) + (a*d*m^3 + 3*a*d*m^2 + 3*a*d*m + (a*d*m - b*d*n + a*d)*r^2
+ a*d - (b*d*m^2 + 2*b*d*m + b*d)*n + 2*(a*d*m^2 + 2*a*d*m + a*d - (b*d*m +
 b*d)*n)*r)*x)*e^(m*log(f) + m*log(x)))/(m^4 + 4*m^3 + (m^2 + 2*m + 1)*r^2
+ 6*m^2 + 2*(m^3 + 3*m^2 + 3*m + 1)*r + 4*m + 1)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 4223 vs. $2(90) = 180$.
time = 17.94, size = 4223, normalized size = 43.54

Too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise(((d + e)*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x)
, Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, Eq(m, -1) & Eq(r,
```

```
0)), ((a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**2/(2*n) - b*e*n*x*
*r/r**2 + b*e*x**r*log(c*x**n)/r)/f, Eq(m, -1)), (-2*a*d*n*r**3/(2*f*n*r**4
*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) - 4*a*d*n*r**2/(2*f*
n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) - 2*a*d*n*r/(2
*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) + 2*a*e*n*r
**3*x**r/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r)
+ 2*a*e*n*r**2*x**r/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2
*(f*x)**r) + 2*a*e*r**4*x**r*log(c*x**n)/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*
(f*x)**r + 2*f*n*r**2*(f*x)**r) + 4*a*e*r**3*x**r*log(c*x**n)/(2*f*n*r**4*(
f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) + 2*a*e*r**2*x**r*log(
c*x**n)/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) -
 2*b*d*n**2*r**2/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f
*x)**r) - 4*b*d*n**2*r/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r
**2*(f*x)**r) - 2*b*d*n**2/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f
*n*r**2*(f*x)**r) - 2*b*d*n*r**3*log(c*x**n)/(2*f*n*r**4*(f*x)**r + 4*f*n*r
**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) - 4*b*d*n*r**2*log(c*x**n)/(2*f*n*r**4*
(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) - 2*b*d*n*r*log(c*x**
n)/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) - 2*b*
e*n**2*r**2*x**r/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f
*x)**r) + b*e*r**4*x**r*log(c*x**n)**2/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f
*x)**r + 2*f*n*r**2*(f*x)**r) + 2*b*e*r**3*x**r*log(c*x**n)**2/(2*f*n*r**4*
(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r) + b*e*r**2*x**r*log(c
*x**n)**2/(2*f*n*r**4*(f*x)**r + 4*f*n*r**3*(f*x)**r + 2*f*n*r**2*(f*x)**r)
, Eq(m, -r - 1)), (a*d*m**3*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**
2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 2*a*d*m*
*2*r*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 +
 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 3*a*d*m**2*x*(f*x)**m/(m**4 + 2
*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m +
 r**2 + 2*r + 1) + a*d*m*r**2*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r
**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 4*a*d*
m*r*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 +
2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 3*a*d*m*x*(f*x)**m/(m**4 + 2*m**
3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**
2 + 2*r + 1) + a*d*r**2*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 +
6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 2*a*d*r*x*(f
*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2
 + 6*m*r + 4*m + r**2 + 2*r + 1) + a*d*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3
 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1)
 + a*e*m**3*x*x**r*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*
r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + a*e*m**2*r*x*x**r*(
f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**
2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 3*a*e*m**2*x*x**r*(f*x)**m/(m**4 + 2*m*
*3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r*
*2 + 2*r + 1) + 2*a*e*m*r*x*x**r*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*
r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + 3*a*e
```

```
*m*x*x**r*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**
2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + a*e*r*x*x**r*(f*x)**m/(m**4
+ 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*
m + r**2 + 2*r + 1) + a*e*x*x**r*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*
r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) + b*d*m
**3*x*(f*x)**m*log(c*x**n)/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r
 + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) - b*d*m**2*n*x*(f*x)**
m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*
m*r + 4*m + r**2 + 2*r + 1) + 2*b*d*m**2*r*x*(f*x)**m*log(c*x**n)/(m**4 + 2
*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m +
 r**2 + 2*r + 1) + 3*b*d*m**2*x*(f*x)**m*log(c*x**n)/(m**4 + 2*m**3*r + 4*m
**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r +
 1) - 2*b*d*m*n*r*x*(f*x)**m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2
*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1) - 2*b*d*m*n*x*(f*x)*
*m/(m**4 + 2*m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6
*m*r + 4*m + r**2 + 2*r + 1) + b*d*m*r**2*x*(f*x)**m*log(c*x**n)/(m**4 + 2*
m**3*r + 4*m**3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m +
r**2 + 2*r + 1) + 4*b*d*m*r*x*(f*x)**m*log(c*x**n)/(m**4 + 2*m**3*r + 4*m**
3 + m**2*r**2 + 6*m**2*r + 6*m**2 + 2*m*r**2 + 6*m*r + 4*m + r**2 + 2*r + 1
) + 3*b*d*m*x*(f*x)**m*log(c*x**n)/(m**4 + 2*m*...
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 291 vs. 2(99) = 198.
time = 2.96, size = 291, normalized size = 3.00

$$\frac{bf^{m}mnxx^{m}x^{r}e\log(x)}{m^{2}+2mr+r^{2}+2m+2r+1}+\frac{bf^{m}nrxx^{m}x^{r}e\log(x)}{m^{2}+2mr+r^{2}+2m+2r+1}+\frac{bdf^{m}mnxx^{m}\log(x)}{m^{2}+2m+1}+\frac{bf^{m}nxx^{m}x^{r}e\log(x)}{m^{2}+2mr+r^{2}+2m+2r+1}-\frac{bf^{m}nxx^{m}x^{r}e}{m^{2}+2mr+r^{2}+2m+2r+1}+\frac{bf^{m}xx^{m}x^{r}e\log(c)}{m+r+1}+\frac{bdf^{m}nxx^{m}\log(x)}{m^{2}+2m+1}-\frac{bdf^{m}nxx^{m}}{m^{2}+2m+1}+\frac{af^{m}xx^{m}x^{r}e}{m+r+1}+\frac{(fx)^{m}bdx\log(c)}{m+1}+\frac{(fx)^{m}adx}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^m*m*n*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*f^m*n*
r*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*d*f^m*m*n*x*x^
m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*x^r*e*log(x)/(m^2 + 2*m*r + r^2 +
2*m + 2*r + 1) - b*f^m*n*x*x^m*x^r*e/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) +
b*f^m*x*x^m*x^r*e*log(c)/(m + r + 1) + b*d*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
1) - b*d*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*f^m*x*x^m*x^r*e/(m + r + 1) + (f*x
)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(f\,x\right)}^m\,\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.443 $\int (fx)^m (a+b\log(cx^n))\,dx$

Optimal. Leaf size=46

$$-\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

```
[Out] -b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

Rubi [A]
time = 0.01, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {2341}

$$\frac{(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}-\frac{bn(fx)^{m+1}}{f(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/(
f*(1 + m))
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (fx)^m (a+b\log(cx^n))\,dx=-\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

Mathematica [A]
time = 0.01, size = 32, normalized size = 0.70

$$\frac{x(fx)^m(a+am-bn+b(1+m)\log(cx^n))}{(1+m)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

[Out] (x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.02, size = 371, normalized size = 8.07

method	result
risch	$\frac{b x \,{\mathrm e}^{\frac{m \left(-i \pi \,\mathrm{csgn}\left(i f x \right)^{3}+i \pi \,\mathrm{csgn}\left(i f x \right)^{2} \mathrm{csgn}\left(i f \right)+i \pi \,\mathrm{csgn}\left(i f x \right)^{2} \mathrm{csgn}\left(i x \right)-i \pi \,\mathrm{csgn}\left(i f x \right) \mathrm{csgn}\left(i f \right) \mathrm{csgn}\left(i x \right)+2 \ln \left(x \right)+2 \ln \left(f \right)\right)}{2}} \ln \left(x^{n}\right)}{1+m}-\frac{\left(i \pi b \,\mathrm{csgn}\left(i c \right)\mathrm{cs}\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)

[Out] b/(1+m)*x*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))*ln(x^n)-1/2*(I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m-I*Pi*b*csgn(I*c)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*c*x^n)^3*m+I*csgn(I*c*x^n)*csgn(I*x^n)*b*Pi*csgn(I*c)-I*csgn(I*c*x^n)^2*csgn(I*c)*b*Pi-I*csgn(I*c*x^n)^2*csgn(I*x^n)*b*Pi+I*csgn(I*c*x^n)^3*b*Pi-2*b*ln(c)*m-2*b*ln(c)-2*a*m+2*b*n-2*a)/(1+m)^2*x*exp(1/2*m*(-I*Pi*csgn(I*f*x)^3+I*Pi*csgn(I*f*x)^2*csgn(I*f)+I*Pi*csgn(I*f*x)^2*csgn(I*x)-I*Pi*csgn(I*f*x)*csgn(I*f)*csgn(I*x)+2*ln(x)+2*ln(f)))

Maxima [A]
time = 0.30, size = 57, normalized size = 1.24

$$-\frac{b f^{m} n x x^{m}}{(m+1)^{2}}+\frac{(f x)^{m+1} b \log\left(c x^{n}\right)}{f(m+1)}+\frac{(f x)^{m+1} a}{f(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")

[Out] -b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a/(f*(m + 1))

Fricas [A]
time = 0.37, size = 52, normalized size = 1.13

$$\frac{((bm+b)nx\log(x)+(bm+b)x\log(c)+(am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^{2}+2\,m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")

[Out] ((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f) + m*log(x))/(m^2 + 2*m + 1)

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(37) = 74$.
time = 5.07, size = 141, normalized size = 3.07

$$\begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m\log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
+ b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*m
+ 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise((a
*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**
n))**2/(2*b*n), True))/f, True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(46) = 92$.
time = 2.53, size = 95, normalized size = 2.07

$$\frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log(c)}{m + 1} + \frac{(fx)^m ax}{m + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m*a
*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n)),x)
```

```
[Out] int((f*x)^m*(a + b*log(c*x^n)), x)
```

3.444 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^r}\,dx$

Optimal. Leaf size=28

$$\text{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r},x\right)$$

[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)

Rubi [A]
time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r}\,dx$$

Verification is not applicable to the result.

[In] Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r),x]

[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r), x]

Rubi steps

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r}\,dx=\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{d+ex^r}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 111 vs. 2(28) = 56.
time = 0.09, size = 111, normalized size = 3.96

$$\frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,\frac{1}{r}+\frac{m}{r},\frac{1}{r}+\frac{m}{r};1+\frac{1}{r}+\frac{m}{r},1+\frac{1}{r}+\frac{m}{r};-\frac{ex^r}{d}\right)+(1+m)\,{}_2F_1\left(1,\frac{1+m}{r};\frac{1+m+r}{r};-\frac{ex^r}{d}\right)\left(a+b\log\left(cx^n\right)\right)\right)}{d(1+m)^2}$$

Antiderivative was successfully verified.

[In] Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r),x]

[Out] (x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, r^(-1) + m/r, r^(-1) + m/r}, {1 + r
^(-1) + m/r, 1 + r^(-1) + m/r}, -((e*x^r)/d)]) + (1 + m)*Hypergeometric2F1[
1, (1 + m)/r, (1 + m + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^n])))/(d*(1 + m)^
2)

Maple [A]
time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\ln\left(c\,x^n\right)\right)}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^r*e + d), x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(x^r*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**r), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^r*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r),x)
[Out] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.445 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

Optimal. Leaf size=28

$$\text{Int}\left(\frac{(fx)^m\,(a+b\log\left(cx^n\right))}{\left(d+ex^r\right)^2},x\right)$$

```
[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{\left(d+ex^r\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2, x]
```

Rubi steps

$$\int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{\left(d+ex^r\right)^2}\,dx = \int \frac{(fx)^m\,(a+b\log\left(cx^n\right))}{\left(d+ex^r\right)^2}\,dx$$

Mathematica [A] Leaf count is larger than twice the leaf count of optimal. 177 vs. 2(28) = 56.
time = 0.25, size = 177, normalized size = 6.32

$$\frac{x(fx)^m\left(bn(1+m-r)\left(d+ex^r\right){}_3F_2\left(1,\frac{1}{r}+\frac{m}{r},\frac{1}{r}+\frac{m}{r};1+\frac{1}{r}+\frac{m}{r},1+\frac{1}{r}+\frac{m}{r};-\frac{ex^r}{d}\right)-(1+m)\left(-d(1+m)\left(a+b\log\left(cx^n\right)\right)+\left(d+ex^r\right){}_2F_1\left(1,\frac{1+m}{r};\frac{1+m+r}{r};-\frac{ex^r}{d}\right)\left(bn+a(1+m-r)+b(1+m-r)\log\left(cx^n\right)\right)\right)\right)}{d^2(1+m)^2r\left(d+ex^r\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
[Out] (x*(f*x)^m*(b*n*(1 + m - r)*(d + e*x^r)*HypergeometricPFQ[{1, r^(-1) + m/r,
 r^(-1) + m/r}, {1 + r^(-1) + m/r, 1 + r^(-1) + m/r}, -((e*x^r)/d)] - (1 +
m)*(-(d*(1 + m)*(a + b*Log[c*x^n])) + (d + e*x^r)*Hypergeometric2F1[1, (1 +
 m)/r, (1 + m + r)/r, -((e*x^r)/d)]*(b*n + a*(1 + m - r) + b*(1 + m - r)*Lo
g[c*x^n]))))/(d^2*(1 + m)^2*r*(d + e*x^r))
```

Maple [A]
time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\,(a+b\ln\left(c\,x^n\right))}{\left(d+e\,x^r\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

Maxima [A]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^r*e + d)^2, x)
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(2*d*x^r*e + d^2 + x^(2*r)*e^2)
, x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m \left(a + b\log\left(cx^n\right)\right)}{\left(d + ex^r\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^m/(x^r*e + d)^2, x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(f\,x)^m\,(a+b\,\ln\left(c\,x^n\right))}{(d+e\,x^r)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
[Out] int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.446 $\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$

Optimal. Leaf size=102

$$-bnx\left(d+ex^{-\frac{1}{1+q}}\right)^q\left(1+\frac{ex^{-\frac{1}{1+q}}}{d}\right)^{-q}{}_2F_1\left(-1-q,-1-q;-q;-\frac{ex^{-\frac{1}{1+q}}}{d}\right)+\frac{x\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}(a+b\log($$

```
[Out] -b*n*x*(d+e/(x^(1/(1+q))))^q*hypergeom([-1-q, -1-q],[-q],-e/d/(x^(1/(1+q)))
)/((1+e/d/(x^(1/(1+q))))^q)+x*(d+e/(x^(1/(1+q))))^(1+q)*(a+b*ln(c*x^n))/d
```

Rubi [A]
time = 0.03, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115, Rules used = {2351, 252, 251}

$$\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}-bnx\left(d+ex^{-\frac{1}{q+1}}\right)^q\left(\frac{ex^{-\frac{1}{q+1}}}{d}+1\right)^{-q}{}_2F_1\left(-q-1,-q-1;-q;-\frac{ex^{-\frac{1}{q+1}}}{d}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e/x^(1 + q)^(-1))^q*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*n*x*(d + e/x^(1 + q)^(-1))^q*Hypergeometric2F1[-1 - q, -1 - q, -q, -(e
/(d*x^(1 + q)^(-1)))])/(1 + e/(d*x^(1 + q)^(-1)))^q) + (x*(d + e/x^(1 + q)^
(-1))^(1 + q)*(a + b*Log[c*x^n]))/d
```

Rule 251

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[a^p*x*Hypergeometric2F
1[-p, 1/n, 1/n + 1, (-b)*(x^n/a)], x] /; FreeQ[{a, b, n, p}, x] && !IGtQ[p
, 0] && !IntegerQ[1/n] && !ILtQ[Simplify[1/n + p], 0] && (IntegerQ[p] ||
GtQ[a, 0])
```

Rule 252

```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[a^IntPart[p]*((a + b*x
^n)^FracPart[p]/(1 + b*(x^n/a))^FracPart[p]), Int[(1 + b*(x^n/a))^p, x], x]
 /; FreeQ[{a, b, n, p}, x] && !IGtQ[p, 0] && !IntegerQ[1/n] && !ILtQ[Sim
plify[1/n + p], 0] && !(IntegerQ[p] || GtQ[a, 0])
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
```

```
] && EqQ[r*(q + 1) + 1, 0]
```

Rubi steps

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \frac{x\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}(a+b\log(cx^n))}{d} - \frac{(bn)\int\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}dx}{d}$$
$$= \frac{x\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}(a+b\log(cx^n))}{d} - \left(bn\left(d+ex^{-\frac{1}{1+q}}\right)^q\left(1+\frac{ex^{-}}{d}\right.\right.$$
$$= -bnx\left(d+ex^{-\frac{1}{1+q}}\right)^q\left(1+\frac{ex^{-\frac{1}{1+q}}}{d}\right)^{-q} {}_2F_1\left(-1-q,-1-q;-q;-\frac{e}{}\right.$$

Mathematica [A]
time = 0.43, size = 143, normalized size = 1.40

$$\frac{x^{-\frac{1}{1+q}}\left(d+ex^{-\frac{1}{1+q}}\right)^q\left(1+\frac{dx^{\frac{1}{1+q}}}{e}\right)^{-q}\left(-bdn(1+q)^2x^{\frac{2+q}{1+q}}\,{}_3F_2\left(1,1,-q;2,2;-\frac{dx^{\frac{1}{1+q}}}{e}\right)-benx\log(x)+\left(1+\frac{dx^{\frac{1}{1+q}}}{e}\right)^q\left(ex+dx^{\frac{2+q}{1+q}}\right)(a+b\log(cx^n))\right)}{d}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e/x^(1 + q)^(-1))^q*(a + b*Log[c*x^n]),x]
```

```
[Out] ((d + e/x^(1 + q)^(-1))^q*(-(b*d*n*(1 + q)^2*x^((2 + q)/(1 + q))*Hypergeome
tricPFQ[{1, 1, -q}, {2, 2}, -((d*x^(1 + q)^(-1))/e)]) - b*e*n*x*Log[x] + (1
 + (d*x^(1 + q)^(-1))/e)^q*(e*x + d*x^((2 + q)/(1 + q)))*(a + b*Log[c*x^n])
))/(d*x^(1 + q)^(-1)*(1 + (d*x^(1 + q)^(-1))/e)^q)
```

Maple [F]
time = 0.09, size = 0, normalized size = 0.00

$$\int \left(d+e\,x^{-\frac{1}{1+q}}\right)^q (a+b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d+e/(x^(1/(1+q))))^q*(a+b*ln(c*x^n)),x)
```

```
[Out] int((d+e/(x^(1/(1+q))))^q*(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(d + e/x^(1/(q + 1)))^q, x)
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x^n) + a)*((d*x^(1/(q + 1)) + e)/x^(1/(q + 1)))^q, x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e/(x**(1/(1+q))))**q*(a+b*ln(c*x**n)),x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)*(d + e/x^(1/(q + 1)))^q, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \left(d+\frac{e}{x^{\frac{1}{q+1}}}\right)^q\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e/x^(1/(q + 1)))^q*(a + b*log(c*x^n)),x)
```

```
[Out] int((d + e/x^(1/(q + 1)))^q*(a + b*log(c*x^n)), x)
```

3.447 $\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n))\, dx$

Optimal. Leaf size=119

$$-\frac{bn(fx)^{-((1+q)r)}(d+ex^r)^q\left(1+\frac{ex^r}{d}\right)^{-q}{}_2F_1\left(-1-q,-1-q;-q;-\frac{ex^r}{d}\right)}{f(1+q)^2r^2}-\frac{(fx)^{-((1+q)r)}(d+ex^r)^{1+q}(a+b\log$$

```
[Out] -b*n*(d+e*x^r)^q*hypergeom([-1-q, -1-q],[-q],-e*x^r/d)/f/(1+q)^2/r^2/((f*x)
^((1+q)*r))/((1+e*x^r/d)^q)-(d+e*x^r)^(1+q)*(a+b*ln(c*x^n))/d/f/(1+q)/r/((f
*x)^((1+q)*r))
```

Rubi [A]
time = 0.10, antiderivative size = 119, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.094$, Rules used = {2373, 372, 371}

$$-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}-\frac{bn(fx)^{-((q+1)r)}(d+ex^r)^q\left(\frac{ex^r}{d}+1\right)^{-q}{}_2F_1\left(-q-1,-q-1;-q;-\frac{ex^r}{d}\right)}{f(q+1)^2r^2}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^(-1 - (1 + q)*r)*(d + e*x^r)^q*(a + b*Log[c*x^n]),x]
```

```
[Out] -((b*n*(d + e*x^r)^q*Hypergeometric2F1[-1 - q, -1 - q, -q, -((e*x^r)/d)])/(
f*(1 + q)^2*r^2*(f*x)^((1 + q)*r)*(1 + (e*x^r)/d)^q)) - ((d + e*x^r)^(1 + q
)*(a + b*Log[c*x^n]))/(d*f*(1 + q)*r*(f*x)^((1 + q)*r))
```

Rule 371

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[a^p
*((c*x)^(m + 1)/(c*(m + 1)))*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1
, (-b)*(x^n/a)], x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 372

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[a^I
ntPart[p]*((a + b*x^n)^FracPart[p]/(1 + b*(x^n/a))^FracPart[p]), Int[(c*x)^
m*(1 + b*(x^n/a))^p, x], x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0]
 &&  !(ILtQ[p, 0] || GtQ[a, 0])
```

Rule 2373

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Dist[b*(n/(d*(m + 1))), Int[(f*x)^m*(d
+ e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && EqQ
```

```
[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

Rubi steps

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n))\,dx = -\frac{(fx)^{-(1+q)r} (d+ex^r)^{1+q} (a+b\log(cx^n))}{df(1+q)r} + \frac{(bn)\int (fx)^-}{}$$
$$= -\frac{(fx)^{-(1+q)r} (d+ex^r)^{1+q} (a+b\log(cx^n))}{df(1+q)r} + \frac{\Big(bn(d+ex^r}{}$$
$$= -\frac{bn(fx)^{-(1+q)r} (d+ex^r)^q \left(1+\frac{ex^r}{d}\right)^{-q} {}_2F_1\big(-1-q,-1-}{f(1+q)^2r^2}$$

Mathematica [A]
time = 0.21, size = 98, normalized size = 0.82

$$-\frac{(fx)^{-((1+q)r)} (d+ex^r)^q \left(bn\left(1+\frac{ex^r}{d}\right)^{-q} {}_2F_1\left(-1-q,-1-q;-q;-\frac{ex^r}{d}\right)+\frac{(1+q)r(d+ex^r)(a+b\log(cx^n))}{d}\right)}{f(1+q)^2r^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^(-1 - (1 + q)*r)*(d + e*x^r)^q*(a + b*Log[c*x^n]),x]
[Out] -(((d + e*x^r)^q*((b*n*Hypergeometric2F1[-1 - q, -1 - q, -q, -((e*x^r)/d)])
/(1 + (e*x^r)/d)^q + ((1 + q)*r*(d + e*x^r)*(a + b*Log[c*x^n]))/d))/(f*(1 +
 q)^2*r^2*(f*x)^((1 + q)*r)))
```

Maple [F]
time = 0.13, size = 0, normalized size = 0.00

$$\int (fx)^{-1-(1+q)r} (d+e\,x^r)^q (a+b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*ln(c*x^n)),x)
[Out] int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="max
ima")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^(-(q + 1)*r - 1)*(x^r*e + d)^q, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="fri
cas")
```

```
[Out] integral(((f*x)^(-(q + 1)*r - 1)*b*log(c*x^n) + (f*x)^(-(q + 1)*r - 1)*a)*(
x^r*e + d)^q, x)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**(-1-(1+q)*r)*(d+e*x**r)**q*(a+b*ln(c*x**n)),x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 6437 deep
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="gia
c")
```

```
[Out] integrate((b*log(c*x^n) + a)*(f*x)^(-(q + 1)*r - 1)*(x^r*e + d)^q, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d+e\,x^r)^q\,(a+b\,\ln(c\,x^n))}{(f\,x)^{r\,(q+1)+1}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x^r)^q*(a + b*log(c*x^n)))/(f*x)^(r*(q + 1) + 1),x)
```

```
[Out] int(((d + e*x^r)^q*(a + b*log(c*x^n)))/(f*x)^(r*(q + 1) + 1), x)
```

3.448 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=480

$$\frac{d^3 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)} + \frac{3d^2 e}{}$$

```
[Out] d^3*(f*x)^(1+m)*GAMMA(1+p,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp
(a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)+
3*d^2*e*x^(1+r)*(f*x)^m*GAMMA(1+p,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x
^n))^p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*ln(
c*x^n))/b/n)^p)+3*d*e^2*x^(1+2*r)*(f*x)^m*GAMMA(1+p,-(1+m+2*r)*(a+b*ln(c*x^
n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+2*r)/b/n)/(1+m+2*r)/((c*x^n)^((1+m+2*
r)/n))/((-(1+m+2*r)*(a+b*ln(c*x^n))/b/n)^p)+e^3*x^(1+3*r)*(f*x)^m*GAMMA(1+p
,-(1+m+3*r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+3*r)/b/n)/(1+
m+3*r)/((c*x^n)^((1+m+3*r)/n))/((-(1+m+3*r)*(a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]

time = 0.45, antiderivative size = 480, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$, Rules used = {2395, 2347, 2212, 20}

$$\frac{d^3 (fx)^{m+1} e^{-\frac{a(m+1)}{bn}} (cx^n)^{-\frac{m+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p} \text{Gamma}\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)} + \frac{3d^2 e x^{r+1} (fx)^m e^{-\frac{a(m+r+1)}{bn}} (cx^n)^{-\frac{m+r+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p} \text{Gamma}\left(p+1,-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)}{m+r+1} + \frac{3de^2 x^{2r+1} (fx)^m e^{-\frac{a(m+2r+1)}{bn}} (cx^n)^{-\frac{m+2r+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)^{-p} \text{Gamma}\left(p+1,-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)}{m+2r+1} + \frac{e^3 x^{3r+1} (fx)^m e^{-\frac{a(m+3r+1)}{bn}} (cx^n)^{-\frac{m+3r+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+3r+1)(a+b\log(cx^n))}{bn}\right)^{-p} \text{Gamma}\left(p+1,-\frac{(m+3r+1)(a+b\log(cx^n))}{bn}\right)}{m+3r+1}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n])^p,x]
```

```
[Out] (d^3*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a +
 b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-((
(1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (3*d^2*e*x^(1 + r)*(f*x)^m*Gamma[1
 + p, -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^(
(a*(1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m + r)*
(a + b*Log[c*x^n]))/(b*n)))^p) + (3*d*e^2*x^(1 + 2*r)*(f*x)^m*Gamma[1 + p,
-(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(
1 + m + 2*r))/(b*n))*(1 + m + 2*r)*(c*x^n)^((1 + m + 2*r)/n)*(-(((1 + m + 2
*r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e^3*x^(1 + 3*r)*(f*x)^m*Gamma[1 + p,
-(((1 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(
1 + m + 3*r))/(b*n))*(1 + m + 3*r)*(c*x^n)^((1 + m + 3*r)/n)*(-(((1 + m + 3
*r)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Rule 20

```
Int[(u_.)*((a_.)*(v_))^(m_)*((b_.)*(v_))^(n_), x_Symbol] :> Dist[b^IntPart[
n]*((b*v)^FracPart[n]/(a^IntPart[n]*(a*v)^FracPart[n])), Int[u*(a*v)^(m + n
), x], x] /; FreeQ[{a, b, m, n}, x] && !IntegerQ[m] && !IntegerQ[n] && !
```

```
IntegerQ[m + n]
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$
\begin{aligned}
\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx &= \int \left(d^3 (fx)^m (a+b\log(cx^n))^p + 3d^2ex^r(fx)^m (a+b\log(cx^n))^p + \right. \\
&= d^3 \int (fx)^m (a+b\log(cx^n))^p \, dx + \left(3d^2e\right) \int x^r (fx)^m (a+b\log(c \\
&= \left(3d^2ex^{-m}(fx)^m\right) \int x^{m+r}(a+b\log(cx^n))^p \, dx + \left(3de^2x^{-m}(fx)^m\right) \\
&= \frac{d^3 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b}{f(1+m)} \\
&= \frac{d^3 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b}{f(1+m)}
\end{aligned}
$$

Mathematica [A]
time = 1.52, size = 408, normalized size = 0.85

$$
x^{-m}(fx)^m (a+b\log(cx^n))^p \left(\frac{d^3 e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} + e\left(\frac{3d^2 e^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} + e\left(\frac{3de^{-\frac{(1+m+2r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+2r} + \frac{ee^{-\frac{(1+m+3r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m+3r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+3r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+3r}\right)\right)\right)
$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n])^p,x]
```

```
[Out] ((f*x)^m*(a + b*Log[c*x^n])^p*((d^3*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^
n]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m)*
(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + e*((3*d^2*Gamma[1 + p, -(((1 +
 m + r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b*L
og[c*x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)))^
p) + e*((3*d*Gamma[1 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^
(((1 + m + 2*r)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m + 2*r)*(-(((
1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*Gamma[1 + p, -(((1 + m + 3
*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + 3*r)*(a - b*n*Log[x] + b*Log
[c*x^n]))/(b*n))*(1 + m + 3*r)*(-(((1 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n))
)^p)))))/x^m
```

Maple [F]
time = 0.10, size = 0, normalized size = 0.00

$$\int (fx)^m (d + e\,x^r)^3 (a + b\ln(c\,x^n))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral((3*d^2*x^r*e + d^3 + 3*d*x^(2*r)*e^2 + x^(3*r)*e^3)*(f*x)^m*(b*log
(c*x^n) + a)^p, x)
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(d+e*x**r)**3*(a+b*ln(c*x**n))**p,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3005 deep
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^3*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^m\,{\left(d+e\,x^r\right)}^3\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n))^p, x)
```

3.449 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=350

$$\frac{d^2 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)} + \frac{2dee}{}$$

```
[Out] d^2*(f*x)^(1+m)*GAMMA(1+p,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp
(a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)+
2*d*e*x^(1+r)*(f*x)^m*GAMMA(1+p,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n
))^p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*ln(c*
x^n))/b/n)^p)+e^2*x^(1+2*r)*(f*x)^m*GAMMA(1+p,-(1+m+2*r)*(a+b*ln(c*x^n))/b/
n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+2*r)/b/n)/(1+m+2*r)/((c*x^n)^((1+m+2*r)/n))
/((-(1+m+2*r)*(a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]

time = 0.29, antiderivative size = 350, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$, Rules used = {2395, 2347, 2212, 20}

$$\frac{d^2(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+\frac{2dex^{r+1}(fx)^m e^{-\frac{a(m+r+1)}{bn}}(cx^n)^{-\frac{m+r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m e^{-\frac{a(m+2r+1)}{bn}}(cx^n)^{-\frac{m+2r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)}{m+2r+1}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n])^p,x]
```

```
[Out] (d^2*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a +
 b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-((
(1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (2*d*e*x^(1 + r)*(f*x)^m*Gamma[1 +
 p, -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a
*(1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m + r)*(a
 + b*Log[c*x^n]))/(b*n)))^p) + (e^2*x^(1 + 2*r)*(f*x)^m*Gamma[1 + p, -(((1
+ m + 2*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(1 + m
+ 2*r))/(b*n))*(1 + m + 2*r)*(c*x^n)^((1 + m + 2*r)/n)*(-(((1 + m + 2*r)*(a
 + b*Log[c*x^n]))/(b*n)))^p)
```

Rule 20

```
Int[(u_.)*((a_.)*(v_))^(m_)*((b_.)*(v_))^(n_), x_Symbol] :> Dist[b^IntPart[
n]*((b*v)^FracPart[n]/(a^IntPart[n]*(a*v)^FracPart[n])), Int[u*(a*v)^(m + n
), x], x] /; FreeQ[{a, b, m, n}, x] && !IntegerQ[m] && !IntegerQ[n] && !
IntegerQ[m + n]
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
```

```
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \int \left(d^2(fx)^m (a+b\log(cx^n))^p + 2dex^r(fx)^m (a+b\log(cx^n))^p + e$$

$$= d^2 \int (fx)^m (a+b\log(cx^n))^p \, dx + (2de) \int x^r (fx)^m (a+b\log(cx$$

$$= \left(2dex^{-m}(fx)^m\right) \int x^{m+r}(a+b\log(cx^n))^p \, dx + \left(e^2x^{-m}(fx)^m\right) \int$$

$$= \frac{d^2 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b}{f(1+m)}$$

$$= \frac{d^2 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b}{f(1+m)}$$

Mathematica [A]
time = 0.77, size = 304, normalized size = 0.87

$$x^{-m}(fx)^m (a+b\log(cx^n))^p \left(\frac{d^2 e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} + e\left(\frac{2de^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} + \frac{ee^{-\frac{(1+m+2r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p, -\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+2r}\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n])^p,x]
```

```
[Out] ((f*x)^m*(a + b*Log[c*x^n])^p*((d^2*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^
n]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m)*
(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + e*((2*d*Gamma[1 + p, -(((1 + m
 + r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b*Log
[c*x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)))^p)
 + (e*Gamma[1 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 +
m + 2*r)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m + 2*r)*(-(((1 + m +
 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p))))/x^m
```

Maple [**F**]
time = 0.10, size = 0, normalized size = 0.00

$$\int (fx)^m (d + e\,x^r)^2 (a + b\ln (c\,x^n))^p \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n))^p,x)
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral((2*d*x^r*e + d^2 + x^(2*r)*e^2)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(d+e*x**r)**2*(a+b*ln(c*x**n))**p,x)
```

```
[Out] Timed out
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)^2*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^m\,{\left(d+e\,x^r\right)}^2\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n))^p, x)
```

3.450 $\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=220

$$\frac{de^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}+\frac{ee^{-\frac{a(1}{}}}{}$$

```
[Out] d*(f*x)^(1+m)*GAMMA(1+p,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a
*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)+e*
x^(1+r)*(f*x)^m*GAMMA(1+p,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/e
xp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*ln(c*x^n))/
b/n)^p)
```

Rubi [A]
time = 0.17, antiderivative size = 220, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2395, 2347, 2212, 20}

$$\frac{d(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+\frac{ex^{r+1}(fx)^m e^{-\frac{a(m+r+1)}{bn}}(cx^n)^{-\frac{m+r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)}{m+r+1}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n])^p,x]
```

```
[Out] (d*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b
*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-(((1
 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*x^(1 + r)*(f*x)^m*Gamma[1 + p, -(
((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(1 +
m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m + r)*(a + b*L
og[c*x^n]))/(b*n)))^p)
```

Rule 20

```
Int[(u_.)*((a_.)*(v_))^(m_)*((b_.)*(v_))^(n_), x_Symbol] :> Dist[b^IntPart[
n]*((b*v)^FracPart[n]/(a^IntPart[n]*(a*v)^FracPart[n])), Int[u*(a*v)^(m + n
), x], x] /; FreeQ[{a, b, m, n}, x] &&  !IntegerQ[m] &&  !IntegerQ[n] &&  !
IntegerQ[m + n]
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rule 2395

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

Rubi steps

$$\int (fx)^m (d+ex^r)(a+b\log(cx^n))^p\,dx = \int \left(d(fx)^m(a+b\log(cx^n))^p + ex^r(fx)^m(a+b\log(cx^n))^p\right)dx$$

$$= d\int (fx)^m(a+b\log(cx^n))^p\,dx + e\int x^r(fx)^m(a+b\log(cx^n))^p\,d$$

$$= \left(ex^{-m}(fx)^m\right)\int x^{m+r}(a+b\log(cx^n))^p\,dx + \frac{\left(d(fx)^{1+m}(cx^n)^{-\frac{1+r}{n}}\right.}{}$$

$$= \frac{de^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\,\mathrm{lo}}{f(1+m)}$$

$$= \frac{de^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\,\mathrm{lo}}{f(1+m)}$$

Mathematica [A]
time = 0.33, size = 200, normalized size = 0.91

$$x^{-m}(fx)^m(a+b\log(cx^n))^p\left(\frac{de^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m}+\frac{ee^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n])^p,x]
```

```
[Out] ((f*x)^m*(a + b*Log[c*x^n])^p*((d*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]
))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m)*(-
(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*Gamma[1 + p, -(((1 + m + r)*(
a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b*Log[c*x^n]
))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)))^p)))/x^m
```

Maple [F]
time = 0.09, size = 0, normalized size = 0.00

$$\int (fx)^m (d + e\,x^r) (a + b\ln (c\,x^n))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral((x^r*e + d)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (fx)^m (a + b\log (cx^n))^p (d + ex^r) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(d+e*x**r)*(a+b*ln(c*x**n))**p,x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))**p*(d + e*x**r), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate((x^r*e + d)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int (f\,x)^m\,\left(d+e\,x^r\right)\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^p \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n))^p, x)
```

3.451 $\int (fx)^m (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=106

$$\frac{e^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$

```
[Out] (f*x)^(1+m)*GAMMA(1+p,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(
1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]
time = 0.05, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$\frac{(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(f*x)^m*(a + b*Log[c*x^n])^p,x]
```

```
[Out] ((f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*L
og[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-(((1 +
 m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int (fx)^m\left(a+b\log\left(cx^n\right)\right)^p\,dx=\frac{\left((fx)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int e^{\frac{(1+m)x}{n}}(a+bx)^p\,dx,x,\log\left(cx^n\right)\right)}{fn}$$
$$=\frac{e^{-\frac{a(1+m)}{bn}}(fx)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(a+b\log\left(cx^n\right)\right)^p\left(\right.}{f(1+m)}$$

Mathematica [A]
time = 0.05, size = 107, normalized size = 1.01

$$\frac{e^{-\frac{(1+m)(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-m}(fx)^m\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(a+b\log\left(cx^n\right)\right)^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f*x)^m*(a + b*Log[c*x^n])^p,x]
[Out] ((f*x)^m*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x
^n])^p)/(E^(((1 + m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*x^m
*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int (fx)^m\left(a+b\ln\left(c\,x^n\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))^p,x)
[Out] int((f*x)^m*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="maxima")
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral((f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (fx)^m (a + b\log{(cx^n)})^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))**p,x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate((f*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (f\,x)^m\,(a + b\,\ln(c\,x^n))^p \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a + b*log(c*x^n))^p,x)
```

```
[Out] int((f*x)^m*(a + b*log(c*x^n))^p, x)
```

3.452 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{d+ex^r}\,dx$

Optimal. Leaf size=30

$$\text{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r},x\right)$$

```
[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

Rubi [A]
time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx$$

Verification is not applicable to the result.

```
[In] Int[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r),x]
[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r), x]
```

Rubi steps

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx = \int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx$$

Mathematica [A]
time = 2.07, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r),x]
[Out] Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r), x]
```

Maple [A]
time = 0.12, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\ln\left(c\,x^n\right)\right)^p}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="fricas")
```

```
[Out] integral((f*x)^m*(b*log(c*x^n) + a)^p/(x^r*e + d), x)
```

Sympy [A]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r),x)
```

```
[Out] Integral((f*x)**m*(a + b*log(c*x**n))**p/(d + e*x**r), x)
```

Giac [A]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="giac")
```

```
[Out] integrate((f*x)^m*(b*log(c*x^n) + a)^p/(x^r*e + d), x)
```

Mupad [A]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))^p}{d+e\,x^r}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r),x)
[Out] int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r), x)
```

3.453 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2} dx$

Optimal. Leaf size=30

$$\text{Int}\left(\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{\left(d+ex^r\right)^2},x\right)$$

```
[Out] Unintegrable((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

Rubi [A]
time = 0.06, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{\left(d+ex^r\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Int[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2,x]
```

```
[Out] Defer[Int][((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2, x]
```

Rubi steps

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{\left(d+ex^r\right)^2}\,dx=\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{\left(d+ex^r\right)^2}\,dx$$

Mathematica [A]
time = 2.32, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)^p}{\left(d+ex^r\right)^2}\,dx$$

Verification is not applicable to the result.

```
[In] Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2,x]
```

```
[Out] Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2, x]
```

Maple [A]
time = 0.12, size = 0, normalized size = 0.00

$$\int \frac{(fx)^m\left(a+b\ln\left(c\,x^n\right)\right)^p}{\left(d+e\,x^r\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

```
[Out] int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

Maxima [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [**A**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="fricas")
```

```
[Out] integral((f*x)^m*(b*log(c*x^n) + a)^p/(2*d*x^r*e + d^2 + x^(2*r)*e^2), x)
```

Sympy [**F(-1)**] Timed out
time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r)**2,x)
```

```
[Out] Timed out
```

Giac [**A**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="giac")
```

```
[Out] integrate((f*x)^m*(b*log(c*x^n) + a)^p/(x^r*e + d)^2, x)
```

Mupad [**A**]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{(f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)^p}{\left(d+e\,x^r\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r)^2,x)
[Out] int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r)^2, x)
```

3.454 $\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3} dx$

Optimal. Leaf size=115

$$\frac{b(ef-dg)n}{2de^2(d+ex)}+\frac{bf^2n\log(x)}{2d^2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(ef-dg)(d+ex)^2}-\frac{b(ef+dg)n\log(d+ex)}{2d^2e^2}$$

```
[Out] 1/2*b*(-d*g+e*f)*n/d/e^2/(e*x+d)+1/2*b*f^2*n*ln(x)/d^2/(-d*g+e*f)-1/2*(g*x+
f)^2*(a+b*ln(c*x^n))/(-d*g+e*f)/(e*x+d)^2-1/2*b*(d*g+e*f)*n*ln(e*x+d)/d^2/e
^2
```

Rubi [A]
time = 0.07, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2398, 90}

$$-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(d+ex)^2(ef-dg)}-\frac{bn(dg+ef)\log(d+ex)}{2d^2e^2}+\frac{bf^2n\log(x)}{2d^2(ef-dg)}+\frac{bn(ef-dg)}{2de^2(d+ex)}$$

Antiderivative was successfully verified.

```
[In] Int[((f + g*x)*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] (b*(e*f - d*g)*n)/(2*d*e^2*(d + e*x)) + (b*f^2*n*Log[x])/(2*d^2*(e*f - d*g)
) - ((f + g*x)^2*(a + b*Log[c*x^n]))/(2*(e*f - d*g)*(d + e*x)^2) - (b*(e*f
+ d*g)*n*Log[d + e*x])/(2*d^2*e^2)
```

Rule 90

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x
_))^(p_.), x_Symbol] :> Int[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n*(e + f*
x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, p}, x] && IntegersQ[m, n] && (Inte
gerQ[p] || (GtQ[m, 0] && GeQ[n, -1]))
```

Rule 2398

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Dist[b*n*(p/((q + 1)
*(e*f - d*g))), Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n])
^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
- d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rubi steps

$$\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \left(\frac{(ef-dg)(a+b\log(cx^n))}{e(d+ex)^3}+\frac{g(a+b\log(cx^n))}{e(d+ex)^2}\right)dx$$

$$= \frac{g\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx}{e}+\frac{(ef-dg)\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx}{e}$$

$$= -\frac{(ef-dg)(a+b\log(cx^n))}{2e^2(d+ex)^2}+\frac{gx(a+b\log(cx^n))}{de(d+ex)}-\frac{(bgn)\int \frac{1}{d+ex}\,dx}{de}+$$

$$= -\frac{(ef-dg)(a+b\log(cx^n))}{2e^2(d+ex)^2}+\frac{gx(a+b\log(cx^n))}{de(d+ex)}-\frac{bgn\log(d+ex)}{de^2}+$$

$$= \frac{b(ef-dg)n}{2de^2(d+ex)}+\frac{b(ef-dg)n\log(x)}{2d^2e^2}-\frac{(ef-dg)(a+b\log(cx^n))}{2e^2(d+ex)^2}+\frac{gx(a}{}$$

Mathematica [A]
time = 0.13, size = 108, normalized size = 0.94

$$\frac{-\frac{(ef-dg)(a+b\log(cx^n))}{(d+ex)^2}-\frac{2g(a+b\log(cx^n))}{d+ex}+\frac{2bgn(\log(x)-\log(d+ex))}{d}+\frac{b(ef-dg)n\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)}{d^2}}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f + g*x)*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

```
[Out] (-(((e*f - d*g)*(a + b*Log[c*x^n]))/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n]))
/(d + e*x) + (2*b*g*n*(Log[x] - Log[d + e*x]))/d + (b*(e*f - d*g)*n*(d/(d +
 e*x) + Log[x] - Log[d + e*x]))/d^2)/(2*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.17, size = 624, normalized size = 5.43

method	result
risch	$-\frac{b(2gxe+dg+ef)\ln(x^n)}{2(ex+d)^2e^2}+\frac{-2b\,d^3gn-2a\,d^2ef+i\pi b\,d^3g\mathrm{csgn}(ic\,x^n)^3-2b\,d^2egnx+2bd\,e^2fnx+i\pi b\,d^3g\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x+f)*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b*(2*e*g*x+d*g+e*f)/(e*x+d)^2/e^2*ln(x^n)+1/4*(-2*b*d^3*g*n-2*a*d^2*e*
f-I*Pi*b*d^3*g*csgn(I*x^n)*csgn(I*c*x^n)^2+I*Pi*b*d^2*e*f*csgn(I*c*x^n)^3-2
*b*d^2*e*g*n*x+2*b*d*e^2*f*n*x+I*Pi*b*d^3*g*csgn(I*c*x^n)^3+I*Pi*b*d^2*e*f*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-2*ln(c)*b*d^3*g-2*ln(e*x+d)*b*e^3*f*n*x
^2-2*ln(e*x+d)*b*d^2*e*f*n+2*ln(-x)*b*e^3*f*n*x^2+2*ln(-x)*b*d^2*e*f*n-4*ln
(c)*b*d^2*e*g*x-2*ln(e*x+d)*b*d^3*g*n+2*ln(-x)*b*d^3*g*n+I*Pi*b*d^3*g*csgn(
```

```
I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*Pi*b*d^2*e*f*csgn(I*x^n)*csgn(I*c*x^n)^2-4
*a*d^2*e*g*x+2*b*d^2*e*f*n-I*Pi*b*d^2*e*f*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*
b*d^2*e*g*x*csgn(I*c*x^n)^3-2*a*d^3*g-2*ln(c)*b*d^2*e*f-I*Pi*b*d^3*g*csgn(I
*c)*csgn(I*c*x^n)^2-2*I*Pi*b*d^2*e*g*x*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*Pi*b
*d^2*e*g*x*csgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*d^2*e*g*x*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+2*ln(-x)*b*d*e^2*g*n*x^2+4*ln(-x)*b*d^2*e*g*n*x+4*ln(-x)*b
*d*e^2*f*n*x-2*ln(e*x+d)*b*d*e^2*g*n*x^2-4*ln(e*x+d)*b*d^2*e*g*n*x-4*ln(e*x
+d)*b*d*e^2*f*n*x)/d^2/e^2/(e*x+d)^2
```

Maxima [A]
time = 0.30, size = 210, normalized size = 1.83

$$-\frac{1}{2}\,bgn\left(\frac{e^{(-2)}\log\left(xe+d\right)}{d}-\frac{e^{(-2)}\log\left(x\right)}{d}+\frac{1}{xe^3+de^2}\right)-\frac{1}{2}\,bfn\left(\frac{e^{(-1)}\log\left(xe+d\right)}{d^2}-\frac{e^{(-1)}\log\left(x\right)}{d^2}-\frac{1}{dxe^2+d^2e}\right)-\frac{(2\,xe+d)bg\log\left(cx^n\right)}{2\,(x^2e^4+2\,dxe^3+d^2e^2)}-\frac{(2\,xe+d)ag}{2\,(x^2e^4+2\,dxe^3+d^2e^2)}-\frac{bf\log\left(cx^n\right)}{2\,(x^2e^3+2\,dxe^2+d^2e)}-\frac{af}{2\,(x^2e^3+2\,dxe^2+d^2e)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -1/2*b*g*n*(e^(-2)*log(x*e + d)/d - e^(-2)*log(x)/d + 1/(x*e^3 + d*e^2)) -
1/2*b*f*n*(e^(-1)*log(x*e + d)/d^2 - e^(-1)*log(x)/d^2 - 1/(d*x*e^2 + d^2*e
)) - 1/2*(2*x*e + d)*b*g*log(c*x^n)/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 1/2*(
2*x*e + d)*a*g/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 1/2*b*f*log(c*x^n)/(x^2*e^
3 + 2*d*x*e^2 + d^2*e) - 1/2*a*f/(x^2*e^3 + 2*d*x*e^2 + d^2*e)
```

Fricas [A]
time = 0.36, size = 213, normalized size = 1.85

$$-\frac{bd^3gn-bdfnxe^2+ad^3g-(bd^2fn-ad^2f-(bd^2gn+2\,ad^2g)x)e+(bd^3gn+bfnx^2e^3+(bdgnx^2+2\,bdfnx)e^2+(2\,bd^2gnx+bd^2fn)e)\log\left(xe+d\right)+(bd^3g+(2\,bd^2gx+bd^2f)e)\log\left(c\right)-(bfnx^2e^3+(bdgnx^2+2\,bdfnx)e^2)\log\left(x\right)}{2\,(d^2x^2e^4+2\,d^3xe^3+d^4e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] -1/2*(b*d^3*g*n - b*d*f*n*x*e^2 + a*d^3*g - (b*d^2*f*n - a*d^2*f - (b*d^2*g
*n + 2*a*d^2*g)*x)*e + (b*d^3*g*n + b*f*n*x^2*e^3 + (b*d*g*n*x^2 + 2*b*d*f*
n*x)*e^2 + (2*b*d^2*g*n*x + b*d^2*f*n)*e)*log(x*e + d) + (b*d^3*g + (2*b*d^
2*g*x + b*d^2*f)*e)*log(c) - (b*f*n*x^2*e^3 + (b*d*g*n*x^2 + 2*b*d*f*n*x)*e
^2)*log(x))/(d^2*x^2*e^4 + 2*d^3*x*e^3 + d^4*e^2)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 908 vs. 2(100) = 200.
time = 3.11, size = 908, normalized size = 7.90

$$\begin{cases} \tilde{\infty}\left(-\frac{af}{2x^2}-\frac{ag}{x}-\frac{bfn}{4x^2}-\frac{bf\log\left(cx^n\right)}{2x^2}-\frac{bgn}{x}-\frac{bg\log\left(cx^n\right)}{x}\right) & \text{for}\: d=0 \wedge e=0 \\ \frac{-\frac{af}{2x^2}-\frac{ag}{x}-\frac{bfn}{4x^2}-\frac{bf\log\left(cx^n\right)}{2x^2}-\frac{bgn}{x}-\frac{bg\log\left(cx^n\right)}{x}}{e^3} & \text{for}\: d=0 \\ \frac{afx+\frac{agx^2}{2}-bfnx+bfx\log\left(cx^n\right)-\frac{bgnx^2}{4}+\frac{bgx^2\log\left(cx^n\right)}{2}}{d^3} & \text{for}\: e=0 \\ -\frac{ad^3g}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{ad^2ef}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{2ad^2egx}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{bd^3gn\log\left(\frac{d}{e}+x\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{bd^3gn}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{bd^2efn\log\left(\frac{d}{e}+x\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}+\frac{bd^2efn}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{2bd^2egnx\log\left(\frac{d}{e}+x\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{bd^2egnx}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{2bde^2fnx\log\left(\frac{d}{e}+x\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}+\frac{bde^2fnx}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}+\frac{2bde^2fx\log\left(cx^n\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{bde^2gnx^2\log\left(\frac{d}{e}+x\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}+\frac{bde^2gx^2\log\left(cx^n\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}-\frac{be^3fnx^2\log\left(\frac{d}{e}+x\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2}+\frac{be^3fx^2\log\left(cx^n\right)}{2d^4e^2+4d^3e^3x+2d^2e^4x^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

```
[Out] Piecewise((zoo*(-a*f/(2*x**2) - a*g/x - b*f*n/(4*x**2) - b*f*log(c*x**n)/(2
*x**2) - b*g*n/x - b*g*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((-a*f/(2*x**2
) - a*g/x - b*f*n/(4*x**2) - b*f*log(c*x**n)/(2*x**2) - b*g*n/x - b*g*log(c
*x**n)/x)/e**3, Eq(d, 0)), ((a*f*x + a*g*x**2/2 - b*f*n*x + b*f*x*log(c*x**
n) - b*g*n*x**2/4 + b*g*x**2*log(c*x**n)/2)/d**3, Eq(e, 0)), (-a*d**3*g/(2*
d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) - a*d**2*e*f/(2*d**4*e**2 + 4
*d**3*e**3*x + 2*d**2*e**4*x**2) - 2*a*d**2*e*g*x/(2*d**4*e**2 + 4*d**3*e**
3*x + 2*d**2*e**4*x**2) - b*d**3*g*n*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**
3*x + 2*d**2*e**4*x**2) - b*d**3*g*n/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*
e**4*x**2) - b*d**2*e*f*n*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**
2*e**4*x**2) + b*d**2*e*f*n/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2
) - 2*b*d**2*e*g*n*x*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**
4*x**2) - b*d**2*e*g*n*x/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) -
 2*b*d*e**2*f*n*x*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x
**2) + b*d*e**2*f*n*x/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) + 2*
b*d*e**2*f*x*log(c*x**n)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) -
 b*d*e**2*g*n*x**2*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*
x**2) + b*d*e**2*g*x**2*log(c*x**n)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e
**4*x**2) - b*e**3*f*n*x**2*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d
**2*e**4*x**2) + b*e**3*f*x**2*log(c*x**n)/(2*d**4*e**2 + 4*d**3*e**3*x + 2
*d**2*e**4*x**2), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 252 vs. 2(112) = 224.
time = 3.48, size = 252, normalized size = 2.19

$$-\frac{bdgnx^2e^2\log(xe+d)+2\,bd^2gnxe\log(xe+d)-bdgnx^2e^2\log(x)+bd^2gnxe+bd^3gn\log(xe+d)+bfnx^2e^3\log(xe+d)+2\,bdfnxe^2\log(xe+d)+bd^2fne\log(xe+d)+2\,bd^2gxe\log(c)-bfnx^2e^3\log(x)-2\,bdfnxe^2\log(x)+bd^3gn-bdfnxe^2-bd^2fne+2\,ad^2gxe+bd^3g\log(c)+bd^2fe\log(c)+ad^3g+ad^2fe}{2\,(d^2x^2e^4+2\,d^3xe^3+d^4e^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] -1/2*(b*d*g*n*x^2*e^2*log(x*e + d) + 2*b*d^2*g*n*x*e*log(x*e + d) - b*d*g*n
*x^2*e^2*log(x) + b*d^2*g*n*x*e + b*d^3*g*n*log(x*e + d) + b*f*n*x^2*e^3*lo
g(x*e + d) + 2*b*d*f*n*x*e^2*log(x*e + d) + b*d^2*f*n*e*log(x*e + d) + 2*b*
d^2*g*x*e*log(c) - b*f*n*x^2*e^3*log(x) - 2*b*d*f*n*x*e^2*log(x) + b*d^3*g*
n - b*d*f*n*x*e^2 - b*d^2*f*n*e + 2*a*d^2*g*x*e + b*d^3*g*log(c) + b*d^2*f*
e*log(c) + a*d^3*g + a*d^2*f*e)/(d^2*x^2*e^4 + 2*d^3*x*e^3 + d^4*e^2)
```

Mupad [B]
time = 4.00, size = 174, normalized size = 1.51

$$-\frac{a\,d\,g+a\,e\,f+\frac{x\,\left(2\,a\,d\,e\,g-b\,e^2\,f\,n+b\,d\,e\,g\,n\right)}{d}+b\,d\,g\,n-b\,e\,f\,n}{2\,d^2\,e^2+4\,d\,e^3\,x+2\,e^4\,x^2}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,f}{2\,e}+\frac{b\,d\,g}{2\,e^2}+\frac{b\,g\,x}{e}\right)}{d^2+2\,d\,e\,x+e^2\,x^2}-\frac{b\,n\,\mathrm{atanh}\left(\frac{b\,n\,\left(d\,g+e\,f\right)\,\left(d+2\,e\,x\right)}{d\,\left(b\,d\,g\,n+b\,e\,f\,n\right)}\right)\,\left(d\,g+e\,f\right)}{d^2\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f + g*x)*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

```
[Out] - (a*d*g + a*e*f + (x*(2*a*d*e*g - b*e^2*f*n + b*d*e*g*n))/d + b*d*g*n - b*
e*f*n)/(2*d^2*e^2 + 2*e^4*x^2 + 4*d*e^3*x) - (log(c*x^n)*((b*f)/(2*e) + (b*
d*g)/(2*e^2) + (b*g*x)/e))/(d^2 + e^2*x^2 + 2*d*e*x) - (b*n*atanh((b*n*(d*g
 + e*f)*(d + 2*e*x))/(d*(b*d*g*n + b*e*f*n)))*(d*g + e*f))/(d^2*e^2)
```

3.455 $\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

Optimal. Leaf size=202

$$-\frac{b(ef-dg)nx(a+b\log(cx^n))}{d^2e(d+ex)}+\frac{f^2(a+b\log(cx^n))^2}{2d^2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))^2}{2(ef-dg)(d+ex)^2}+\frac{b^2(ef-dg)n^2\log(d+$$

```
[Out] -b*(-d*g+e*f)*n*x*(a+b*ln(c*x^n))/d^2/e/(e*x+d)+1/2*f^2*(a+b*ln(c*x^n))^2/d
^2/(-d*g+e*f)-1/2*(g*x+f)^2*(a+b*ln(c*x^n))^2/(-d*g+e*f)/(e*x+d)^2+b^2*(-d*
g+e*f)*n^2*ln(e*x+d)/d^2/e^2-b*(d*g+e*f)*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2/
e^2-b^2*(d*g+e*f)*n^2*polylog(2,-e*x/d)/d^2/e^2
```

Rubi [A]
time = 0.22, antiderivative size = 202, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2398, 2404, 2338, 2351, 31, 2354, 2438}

$$-\frac{b^2n^2(dg+ef)\text{PolyLog}(2,-\frac{ex}{d})}{d^2e^2}-\frac{bn(dg+ef)\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^2e^2}+\frac{f^2(a+b\log(cx^n))^2}{2d^2(ef-dg)}-\frac{bnx(ef-dg)(a+b\log(cx^n))}{d^2e(d+ex)}-\frac{(f+gx)^2(a+b\log(cx^n))^2}{2(d+ex)^2(ef-dg)}+\frac{b^2n^2(ef-dg)\log(d+ex)}{d^2e^2}$$

Antiderivative was successfully verified.

```
[In] Int[((f + g*x)*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] -((b*(e*f - d*g)*n*x*(a + b*Log[c*x^n]))/(d^2*e*(d + e*x))) + (f^2*(a + b*L
og[c*x^n])^2)/(2*d^2*(e*f - d*g)) - ((f + g*x)^2*(a + b*Log[c*x^n])^2)/(2*(
e*f - d*g)*(d + e*x)^2) + (b^2*(e*f - d*g)*n^2*Log[d + e*x])/(d^2*e^2) - (b
*(e*f + d*g)*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/(d^2*e^2) - (b^2*(e*f +
 d*g)*n^2*PolyLog[2, -((e*x)/d)])/(d^2*e^2)
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 2338

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

Rule 2351

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Dist[b*
(n/d), Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r}, x
] && EqQ[r*(q + 1) + 1, 0]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2398

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Dist[b*n*(p/((q + 1)
*(e*f - d*g))), Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n])
^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
- d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2404

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(RFx_), x_Symbol] :> With[{
u = ExpandIntegrand[(a + b*Log[c*x^n])^p, RFx, x]}, Int[u, x] /; SumQ[u]] /
; FreeQ[{a, b, c, n}, x] && RationalFunctionQ[RFx, x] && IGtQ[p, 0]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \left(\frac{(ef-dg)(a+b\log(cx^n))^2}{e(d+ex)^3} + \frac{g(a+b\log(cx^n))^2}{e(d+ex)^2}\right) dx$$

$$= \frac{g\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx}{e} + \frac{(ef-dg)\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx}{e}$$

$$= -\frac{(ef-dg)(a+b\log(cx^n))^2}{2e^2(d+ex)^2} + \frac{gx(a+b\log(cx^n))^2}{de(d+ex)} - \frac{(2bgn)\int \frac{a+b\log(c}{d+ex}}{de}$$

$$= -\frac{(ef-dg)(a+b\log(cx^n))^2}{2e^2(d+ex)^2} + \frac{gx(a+b\log(cx^n))^2}{de(d+ex)} - \frac{2bgn(a+b\log(}{d}$$

$$= -\frac{b(ef-dg)nx(a+b\log(cx^n))}{d^2e(d+ex)} - \frac{(ef-dg)(a+b\log(cx^n))^2}{2e^2(d+ex)^2} + \frac{gx(a-}{d}$$

$$= -\frac{b(ef-dg)nx(a+b\log(cx^n))}{d^2e(d+ex)} + \frac{(ef-dg)(a+b\log(cx^n))^2}{2d^2e^2} - \frac{(ef-}{}$$

$$= -\frac{b(ef-dg)nx(a+b\log(cx^n))}{d^2e(d+ex)} + \frac{(ef-dg)(a+b\log(cx^n))^2}{2d^2e^2} - \frac{(ef-}{}$$

Mathematica [A]
time = 0.17, size = 244, normalized size = 1.21

$$\frac{-\frac{(ef-dg)(a+b\log(cx^n))^2}{(d+ex)^2} - \frac{2g(a+b\log(cx^n))^2}{d+ex} + \frac{2g\left((a+b\log(cx^n))(a+b\log(cx^n)-2bn\log(1+\frac{ex}{d}))-2b^2n^2\mathrm{Li}_2(-\frac{ex}{d})\right)}{d} + \frac{(ef-dg)\left(2bdn(a+b\log(cx^n))+(d+ex)(a+b\log(cx^n))^2-2b^2n^2(d+ex)(\log(x)-\log(d+ex))-2bn(d+ex)(a+b\log(cx^n))\log(1+\frac{ex}{d})-2b^2n^2(d+ex)\mathrm{Li}_2(-\frac{ex}{d})\right)}{d^2(d+ex)}}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f + g*x)*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

```
[Out] (-(((e*f - d*g)*(a + b*Log[c*x^n])^2)/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n]
)^2)/(d + e*x) + (2*g*((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 +
 (e*x)/d]) - 2*b^2*n^2*PolyLog[2, -((e*x)/d)]))/d + ((e*f - d*g)*(2*b*d*n*(
a + b*Log[c*x^n]) + (d + e*x)*(a + b*Log[c*x^n])^2 - 2*b^2*n^2*(d + e*x)*(L
og[x] - Log[d + e*x]) - 2*b*n*(d + e*x)*(a + b*Log[c*x^n])*Log[1 + (e*x)/d]
 - 2*b^2*n^2*(d + e*x)*PolyLog[2, -((e*x)/d)]))/(d^2*(d + e*x)))/(2*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 2163, normalized size = 10.71

method	result	size
risch	Expression too large to display	2163

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x+f)*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

[Out] b^2/e^2*n^2/d*dilog(-e*x/d)*g+b^2/e*n^2/d^2*dilog(-e*x/d)*f-1/2*I/e*n/d^2*l
n(e*x+d)*f*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I/e^2*n/d*ln(x)*g*b^2*Pi*
csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/e^2*n/d*ln(x)*g*b^2*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2-1/2*I/e*n/d/(e*x+d)*f*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/
2*I/e^2*n/d*ln(x)*g*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/e^2*n/
(e*x+d)*g*b^2*Pi*csgn(I*c*x^n)^3+I/e^2*ln(x^n)/(e*x+d)*g*b^2*Pi*csgn(I*c*x^
n)^3-b/e^2*n/(e*x+d)*g*a+1/2*I/e^2*n/d*ln(e*x+d)*g*b^2*Pi*csgn(I*c*x^n)^3-1
/2*I/e*n/d^2*ln(x)*f*b^2*Pi*csgn(I*c*x^n)^3-1/2*b^2*ln(x^n)^2/e/(e*x+d)^2*f
-b^2*ln(x^n)^2*g/e^2/(e*x+d)-1/2*I/e*n/d/(e*x+d)*f*b^2*Pi*csgn(I*c*x^n)^3+b
^2*n/e*ln(x^n)/d/(e*x+d)*f-b^2*n/e^2*ln(x^n)/d*ln(e*x+d)*g-b^2*n/e*ln(x^n)/
d^2*ln(e*x+d)*f+b^2*n/e^2*ln(x^n)/d*ln(x)*g+b^2*n/e*ln(x^n)/d^2*ln(x)*f+1/4
*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n
)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a
)^2*(-g/e^2/(e*x+d)-1/2*(-d*g+e*f)/e^2/(e*x+d)^2)-1/2*I/e*n/d^2*ln(x)*f*b^2
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/2*b^2/e^2*n^2/d*ln(x)^2*g-1/2*b^2
/e*n^2/d^2*ln(x)^2*f-b^2/e^2*n^2/d*ln(e*x+d)*g+b^2/e*n^2/d^2*ln(e*x+d)*f+b^
2/e^2*n^2/d*ln(x)*g-b^2/e*n^2/d^2*ln(x)*f-1/2*I/e^2*n/d*ln(x)*g*b^2*Pi*csgn
(I*c*x^n)^3+1/2*I*ln(x^n)/e/(e*x+d)^2*f*b^2*Pi*csgn(I*c*x^n)^3-1/2*I*ln(x^n
)/e^2/(e*x+d)^2*d*g*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/e^2*n/
d*ln(e*x+d)*g*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I/e*n/d^2*ln(e
*x+d)*f*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-1/e^2*n/d*ln(e*x+d)*g*b^
2*ln(c)-1/e*n/d^2*ln(e*x+d)*f*b^2*ln(c)+1/e^2*n/d*ln(x)*g*b^2*ln(c)+1/e*n/d
^2*ln(x)*f*b^2*ln(c)+1/e*n/d/(e*x+d)*f*b^2*ln(c)-1/2*I/e^2*n/d*ln(e*x+d)*g*
b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+ln(x^n)/e^2/(e*x+d)^2*d*g*b^2*ln(c)+1/2*
I/e*n/d^2*ln(x)*f*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I/e*n/d/(e*x+d)*f*b^
2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*ln(x^n)/e^2/(e*x+d)^2*d*g*b^2*Pi*csgn(
I*c)*csgn(I*c*x^n)^2-1/2*I*ln(x^n)/e^2/(e*x+d)^2*d*g*b^2*Pi*csgn(I*c*x^n)^3
-1/2*I*ln(x^n)/e/(e*x+d)^2*f*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/e^2*ln(x^n)
/(e*x+d)*g*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I/e^2*ln(x^n)/(e*x+d)*g*b^2*Pi*
csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e*n/d^2*ln(e*x+d)*f*b^2*Pi*csgn(I*c)*csgn
(I*c*x^n)^2+1/2*I*ln(x^n)/e/(e*x+d)^2*f*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)-1/2*I/e^2*n/d*ln(e*x+d)*g*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2+b*ln(x^n
)/e^2/(e*x+d)^2*d*g*a+b/e*n/d/(e*x+d)*f*a-b/e^2*n/d*ln(e*x+d)*g*a-b/e*n/d^2
*ln(e*x+d)*f*a+b/e^2*n/d*ln(x)*g*a+b/e*n/d^2*ln(x)*f*a+1/2*I*ln(x^n)/e^2/(e
*x+d)^2*d*g*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I/e^2*n/(e*x+d)*g*b^2*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2-1/e^2*n/(e*x+d)*g*b^2*ln(c)+b^2/e*n^2/d^2*ln(e
*x+d)*ln(-e*x/d)*f+I/e^2*ln(x^n)/(e*x+d)*g*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+1/2*I/e^2*n/(e*x+d)*g*b^2*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+1/2*I/e*n/d^2*ln(e*x+d)*f*b^2*Pi*csgn(I*c*x^n)^3+1/2*I/e*n/d^2*ln(x)*f*b^2
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+1/2*I/e*n/d/(e*x+d)*f*b^2*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2-1/2*I*ln(x^n)/e/(e*x+d)^2*f*b^2*Pi*csgn(I*x^n)*csgn(I*c*x^n)^
2-1/2*I/e^2*n/(e*x+d)*g*b^2*Pi*csgn(I*c)*csgn(I*c*x^n)^2-2/e^2*ln(x^n)/(e*x
+d)*g*b^2*ln(c)-ln(x^n)/e/(e*x+d)^2*f*b^2*ln(c)-b*ln(x^n)/e/(e*x+d)^2*f*a+b
^2/e^2*n^2/d*ln(e*x+d)*ln(-e*x/d)*g+1/2*b^2*ln(x^n)^2/e^2/(e*x+d)^2*d*g-b^2
*n/e^2*ln(x^n)/(e*x+d)*g-2*b/e^2*ln(x^n)/(e*x+d)*g*a

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -a*b*g*n*(e^(-2)*log(x*e + d)/d - e^(-2)*log(x)/d + 1/(x*e^3 + d*e^2)) - a*
b*f*n*(e^(-1)*log(x*e + d)/d^2 - e^(-1)*log(x)/d^2 - 1/(d*x*e^2 + d^2*e)) -
 (2*x*e + d)*a*b*g*log(c*x^n)/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 1/2*(2*x*e
+ d)*a^2*g/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - a*b*f*log(c*x^n)/(x^2*e^3 + 2*
d*x*e^2 + d^2*e) - 1/2*a^2*f/(x^2*e^3 + 2*d*x*e^2 + d^2*e) - 1/2*(2*b^2*g*x
*e + b^2*d*g + b^2*f*e)*log(x^n)^2/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) + integr
ate((b^2*g*x^2*e^2*log(c)^2 + b^2*f*x*e^2*log(c)^2 + (b^2*d^2*g*n + 2*(g*n
+ g*log(c))*b^2*x^2*e^2 + b^2*d*f*n*e + (3*b^2*d*g*n*e + (f*n + 2*f*log(c))
*b^2*e^2)*x)*log(x^n))/(x^4*e^5 + 3*d*x^3*e^4 + 3*d^2*x^2*e^3 + d^3*x*e^2),
 x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((a^2*g*x + a^2*f + (b^2*g*x + b^2*f)*log(c*x^n)^2 + 2*(a*b*g*x + a
*b*f)*log(c*x^n))/(x^3*e^3 + 3*d*x^2*e^2 + 3*d^2*x*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx^n))^2 (f + gx)}{(d + ex)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**2*(f + g*x)/(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((g*x + f)*(b*log(c*x^n) + a)^2/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(f+g\,x)\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{\left(d+e\,x\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f + g*x)*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

```
[Out] int(((f + g*x)*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.456 $\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx$

Optimal. Leaf size=295

$$-\frac{3b(ef-dg)nx(a+b\log(cx^n))^2}{2d^2e(d+ex)}+\frac{f^2(a+b\log(cx^n))^3}{2d^2(ef-dg)}-\frac{(f+gx)^2(a+b\log(cx^n))^3}{2(ef-dg)(d+ex)^2}+\frac{3b^2(ef-dg)n^2(a+$$

```
[Out] -3/2*b*(-d*g+e*f)*n*x*(a+b*ln(c*x^n))^2/d^2/e/(e*x+d)+1/2*f^2*(a+b*ln(c*x^n
))^3/d^2/(-d*g+e*f)-1/2*(g*x+f)^2*(a+b*ln(c*x^n))^3/(-d*g+e*f)/(e*x+d)^2+3*
b^2*(-d*g+e*f)*n^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2/e^2-3/2*b*(d*g+e*f)*n*(a
+b*ln(c*x^n))^2*ln(1+e*x/d)/d^2/e^2+3*b^3*(-d*g+e*f)*n^3*polylog(2,-e*x/d)/
d^2/e^2-3*b^2*(d*g+e*f)*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^2/e^2+3*b^3
*(d*g+e*f)*n^3*polylog(3,-e*x/d)/d^2/e^2
```

Rubi [A]

time = 0.33, antiderivative size = 295, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {2398, 2404, 2339, 30, 2355, 2354, 2438, 2421, 6724}

$$-\frac{3b^2n^2(dg+ef)\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{d^2e^2}+\frac{3b^3n^3(ef-dg)\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2}+\frac{3b^3n^3(dg+ef)\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^2e^2}+\frac{3b^2n^2(ef-dg)\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^2e^2}-\frac{3bn(dg+ef)\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{2d^2e^2}+\frac{f^2(a+b\log(cx^n))^3}{2d^2(ef-dg)}-\frac{3bnx(ef-dg)(a+b\log(cx^n))^2}{2d^2e(d+ex)}-\frac{(f+gx)^2(a+b\log(cx^n))^3}{2(d+ex)^2(ef-dg)}$$

Antiderivative was successfully verified.

```
[In] Int[((f + g*x)*(a + b*Log[c*x^n])^3)/(d + e*x)^3,x]
```

```
[Out] (-3*b*(e*f - d*g)*n*x*(a + b*Log[c*x^n])^2)/(2*d^2*e*(d + e*x)) + (f^2*(a +
 b*Log[c*x^n])^3)/(2*d^2*(e*f - d*g)) - ((f + g*x)^2*(a + b*Log[c*x^n])^3)/
(2*(e*f - d*g)*(d + e*x)^2) + (3*b^2*(e*f - d*g)*n^2*(a + b*Log[c*x^n])*Log
[1 + (e*x)/d])/(d^2*e^2) - (3*b*(e*f + d*g)*n*(a + b*Log[c*x^n])^2*Log[1 +
(e*x)/d])/(2*d^2*e^2) + (3*b^3*(e*f - d*g)*n^3*PolyLog[2, -((e*x)/d)])/(d^2
*e^2) - (3*b^2*(e*f + d*g)*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/(
d^2*e^2) + (3*b^3*(e*f + d*g)*n^3*PolyLog[3, -((e*x)/d)])/(d^2*e^2)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rule 2354

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Dist[b*n*(p/e),
```

```
 Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b
, c, d, e, n}, x] && IGtQ[p, 0]
```

Rule 2355

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Dist[b*n*(p/d),
Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e, n
, p}, x] && GtQ[p, 0]
```

Rule 2398

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Dist[b*n*(p/((q + 1)
*(e*f - d*g))), Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n])
^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
- d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

Rule 2404

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(RFx_), x_Symbol] :> With[{
u = ExpandIntegrand[(a + b*Log[c*x^n])^p, RFx, x]}, Int[u, x] /; SumQ[u]] /
; FreeQ[{a, b, c, n}, x] && RationalFunctionQ[RFx, x] && IGtQ[p, 0]
```

Rule 2421

```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Dist[b*n*(p/m), Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c*
x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p, 0
] && EqQ[d*e, 1]
```

Rule 2438

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 6724

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx = \int \left(\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{e(d+ex)^3}+\frac{g\left(a+b\log\left(cx^n\right)\right)^3}{e(d+ex)^2}\right)dx$$

$$= \frac{g\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}\,dx}{e}+\frac{(ef-dg)\int \frac{(a+b\log(cx^n))^3}{(d+ex)^3}\,dx}{e}$$

$$= -\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{2e^2(d+ex)^2}+\frac{gx\left(a+b\log\left(cx^n\right)\right)^3}{de(d+ex)}-\frac{(3bgn)\int \frac{(a+b\log(\cdots}{d+e\cdots}}{de}$$

$$= -\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{2e^2(d+ex)^2}+\frac{gx\left(a+b\log\left(cx^n\right)\right)^3}{de(d+ex)}-\frac{3bgn(a+b\log(\cdots}{\cdots}$$

$$= -\frac{3b(ef-dg)nx\left(a+b\log\left(cx^n\right)\right)^2}{2d^2e(d+ex)}-\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{2e^2(d+ex)^2}+\frac{gx(\cdots}{\cdots}$$

$$= -\frac{3b(ef-dg)nx\left(a+b\log\left(cx^n\right)\right)^2}{2d^2e(d+ex)}-\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{2e^2(d+ex)^2}+\frac{gx(\cdots}{\cdots}$$

$$= -\frac{3b(ef-dg)nx\left(a+b\log\left(cx^n\right)\right)^2}{2d^2e(d+ex)}+\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{2d^2e^2}-\frac{(ef\cdots}{\cdots}$$

$$= -\frac{3b(ef-dg)nx\left(a+b\log\left(cx^n\right)\right)^2}{2d^2e(d+ex)}+\frac{(ef-dg)\left(a+b\log\left(cx^n\right)\right)^3}{2d^2e^2}-\frac{(ef\cdots}{\cdots}$$

Mathematica [A]
time = 0.26, size = 339, normalized size = 1.15

$$\frac{-\frac{(ef-dg)(a+b\log(cx^n))^3}{(d+ex)^2}-\frac{2g(a+b\log(cx^n))^3}{d+ex}+\frac{2g\left((a+b\log(cx^n))^2\left(a+b\log(cx^n)-3bn\log\left(1+\frac{ex}{d}\right)\right)-6b^2n^2(a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right)+6b^3n^3\text{Li}_3\left(-\frac{ex}{d}\right)\right)}{d}+\frac{(ef-dg)\left(3bdn(a+b\log(cx^n))^2+(d+ex)(a+b\log(cx^n))^3-3bn(d+ex)(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)-3bn(d+ex)\left((a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{ex}{d}\right)\right)-2b^2n^2\text{Li}_2\left(-\frac{ex}{d}\right)\right)-6b^2n^2(d+ex)\left((a+b\log(cx^n))\text{Li}_2\left(-\frac{ex}{d}\right)-bn\text{Li}_3\left(-\frac{ex}{d}\right)\right)\right)}{d^2(d+ex)}}{2e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((f + g*x)*(a + b*Log[c*x^n])^3)/(d + e*x)^3,x]
```

```
[Out] (-(((e*f - d*g)*(a + b*Log[c*x^n])^3)/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n]
)^3)/(d + e*x) + (2*g*((a + b*Log[c*x^n])^2*(a + b*Log[c*x^n] - 3*b*n*Log[1
 + (e*x)/d]) - 6*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 6*b^3*
n^3*PolyLog[3, -((e*x)/d)]))/d + ((e*f - d*g)*(3*b*d*n*(a + b*Log[c*x^n])^2
 + (d + e*x)*(a + b*Log[c*x^n])^3 - 3*b*n*(d + e*x)*(a + b*Log[c*x^n])^2*Lo
g[1 + (e*x)/d] - 3*b*n*(d + e*x)*((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*
b*n*Log[1 + (e*x)/d]) - 2*b^2*n^2*PolyLog[2, -((e*x)/d)]) - 6*b^2*n^2*(d +
e*x)*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)
])))/(d^2*(d + e*x)))/(2*e^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.37, size = 11535, normalized size = 39.10

method	result	size
risch	Expression too large to display	11535

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x+f)*(a+b*ln(c*x^n))^3/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="maxima")
```

```
[Out] -3/2*a^2*b*g*n*(e^(-2)*log(x*e + d)/d - e^(-2)*log(x)/d + 1/(x*e^3 + d*e^2)
) - 3/2*a^2*b*f*n*(e^(-1)*log(x*e + d)/d^2 - e^(-1)*log(x)/d^2 - 1/(d*x*e^2
 + d^2*e)) - 3/2*(2*x*e + d)*a^2*b*g*log(c*x^n)/(x^2*e^4 + 2*d*x*e^3 + d^2*
e^2) - 1/2*(2*x*e + d)*a^3*g/(x^2*e^4 + 2*d*x*e^3 + d^2*e^2) - 3/2*a^2*b*f*
log(c*x^n)/(x^2*e^3 + 2*d*x*e^2 + d^2*e) - 1/2*a^3*f/(x^2*e^3 + 2*d*x*e^2 +
 d^2*e) - 1/2*(2*b^3*g*x*e + b^3*d*g + b^3*f*e)*log(x^n)^3/(x^2*e^4 + 2*d*x
*e^3 + d^2*e^2) + integrate(1/2*(2*(b^3*g*log(c)^3 + 3*a*b^2*g*log(c)^2)*x^
2*e^2 + 2*(b^3*f*log(c)^3 + 3*a*b^2*f*log(c)^2)*x*e^2 + 3*(b^3*d^2*g*n + b^
3*d*f*n*e + 2*((g*n + g*log(c))*b^3 + a*b^2*g)*x^2*e^2 + (3*b^3*d*g*n*e + (
(f*n + 2*f*log(c))*b^3 + 2*a*b^2*f)*e^2)*x)*log(x^n)^2 + 6*((b^3*g*log(c)^2
 + 2*a*b^2*g*log(c))*x^2*e^2 + (b^3*f*log(c)^2 + 2*a*b^2*f*log(c))*x*e^2)*l
og(x^n))/(x^4*e^5 + 3*d*x^3*e^4 + 3*d^2*x^2*e^3 + d^3*x*e^2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="fricas")
```

```
[Out] integral((a^3*g*x + a^3*f + (b^3*g*x + b^3*f)*log(c*x^n)^3 + 3*(a*b^2*g*x +
 a*b^2*f)*log(c*x^n)^2 + 3*(a^2*b*g*x + a^2*b*f)*log(c*x^n))/(x^3*e^3 + 3*d
*x^2*e^2 + 3*d^2*x*e + d^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b \log (cx^n))^3 (f + gx)}{(d + ex)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*ln(c*x**n))**3/(e*x+d)**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**3*(f + g*x)/(d + e*x)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="giac")
```

```
[Out] integrate((g*x + f)*(b*log(c*x^n) + a)^3/(x*e + d)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{(f+g\,x)\,\left(a+b\,\ln\left(c\,x^n\right)\right)^3}{{\left(d+e\,x\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((f + g*x)*(a + b*log(c*x^n))^3)/(d + e*x)^3,x)
```

```
[Out] int(((f + g*x)*(a + b*log(c*x^n))^3)/(d + e*x)^3, x)
```

Chapter 4

Appendix

Local contents

4.1 Download section

The following zip files contain the raw integrals used in this test.

Mathematica format Mathematica_syntax.zip

Maple and Mupad format Maple_syntax.zip

Sympy format SYMPY_syntax.zip

Sage math format SAGE_syntax.zip

4.2 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.2.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                        Small rewrite of logic in main function to make it*)
(*                        match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)


(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*           GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)
```

```
GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leafC
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A","none"}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count
                  ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
               finalresult={"A","none"}
            ,(*ELSE*)
               finalresult={"B","Leaf count is larger than twice the leaf count of optimal. $
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "<
            ,
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
```

```
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
```

```
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

4.2.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issues
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);
```

```
        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;


    if ExpnType_result<=ExpnType_optimal then
        if debug then
             print("ExpnType_result<=ExpnType_optimal");
        fi;
        if is_contains_complex(result) then
            if is_contains_complex(optimal) then
                if debug then
                        print("both result and optimal complex");
                fi;
                if leaf_count_result<=2*leaf_count_optimal then
                    return "A","";
                else
                   return "B",cat("Both result and optimal contain complex but leaf count of re
                                convert(leaf_count_result,string)," vs. $2 (",
                                convert(leaf_count_optimal,string)," ) = ",convert(2*leaf_co
                end if
            else #result contains complex but optimal is not
                if debug then
                        print("result contains complex but optimal is not");
                fi;
                return "C","Result contains complex when optimal does not.";
            fi;
        else # result do not contain complex
```

```
             # this assumes optimal do not as well. No check is needed here.
            if debug then
                   print("result do not contain complex, this assumes optimal do not as well"
            fi;
            if leaf_count_result<=2*leaf_count_optimal then
                if debug then
                    print("leaf_count_result<=2*leaf_count_optimal");
                fi;
                return "A","";
            else
                if debug then
                    print("leaf_count_result>2*leaf_count_optimal");
                fi;
                return "B",cat("Leaf count of result is larger than twice the leaf count of o
                                convert(leaf_count_result,string),"$ vs. $2(",
                                convert(leaf_count_optimal,string),")=",convert(2*leaf_cou
            fi;
        fi;
    else #ExpnType(result) > ExpnType(optimal)
        if debug then
            print("ExpnType(result) > ExpnType(optimal)");
        fi;
        return "C",cat("Result contains higher order function than in optimal. Order ",
                    convert(ExpnType_result,string)," vs. order ",
                    convert(ExpnType_optimal,string),".");
    fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
```

```
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
```

```
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

4.2.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#              Port of original Maple grading function by
#              Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#              added 'exp_polar'
from sympy import *

def leaf_count(expr):
   #sympy do not have leaf count function. This is approximation
   return round(1.7*count_ops(expr))

def is_sqrt(expr):
   if isinstance(expr,Pow):
      if expr.args[1] == Rational(1,2):
         return True
      else:
         return False
   else:
      return False

def is_elementary_function(func):
   return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
         asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
         asinh,acosh,atanh,acoth,asech,acsch
      ]

def is_special_function(func):
   return func in [ erf,erfc,erfi,
          fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
          gamma,loggamma,digamma,zeta,polylog,LambertW,
          elliptic_f,elliptic_e,elliptic_pi,exp_polar
       ]

def is_hypergeometric_function(func):
   return func in [hyper]

def is_appell_function(func):
   return func in [appellf1]

def is_atom(expn):
   try:
      if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
        return True
      else:
        return False
```

```
    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
       return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0]))   #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow):    #type(expn,'`^`')
        if isinstance(expn.args[1],Integer):   #type(op(2,expn),'integer')
            return expnType(expn.args[0])    #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational):   #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0]))   #max(2,ExpnType(op(1,expn)))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),ExpnT
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)    #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
```

```
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
    else:
        if expnType_result <= expnType_optimal:
            if result.has(I):
                if optimal.has(I): #both result and optimal complex
                    if leaf_count_result <= 2*leaf_count_optimal:
                        grade = "A"
                        grade_annotation =""
                    else:
                        grade = "B"
                        grade_annotation ="Both result and optimal contain complex but leaf count of result is larger
                else: #result contains complex but optimal is not
                    grade = "C"
                    grade_annotation ="Result contains complex when optimal does not."
            else: # result do not contain complex, this assumes optimal do not as well
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =""
                else:
                    grade = "B"
                    grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(lea
        else:
            grade = "C"
            grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType_re
```

```
    #print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

    return grade, grade_annotation
```

4.2.4 SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#           Albert Rich to use with Sagemath. This is used to
#           grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#           'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#           issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    #print("Enter tree_size, expr is ",expr)

    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
    if expr.operator() == operator.pow:   #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
        else:
            return False
    else:
        return False
```

```
def is_elementary_function(func):
    #debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    #debug=False
    if debug:
        print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
           'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
           'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
           'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
           'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m


def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
    return func.name() in ['hypergeometric']    #[appellf1] can't find this in sagemath
```

```
def is_atom(expn):

   #debug=False
   if debug:
       print ("Enter is_atom, expn=",expn)

   if not hasattr(expn, 'parent'):
      return False


   #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic-
   try:
      if expn.parent() is SR:
         return expn.operator() is None
      if expn.parent() in (ZZ, QQ, AA, QQbar):
         return expn in expn.parent() # Should always return True
      if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
         return expn in expn.parent().base_ring() or expn in expn.parent().gens()

      return False

   except AttributeError as error:
      print("Exception,AttributeError in  is_atom")
      print ("cought exception" , type(error).__name__ )
      return False


def expnType(expn):

   if debug:
      print (">>>>>Enter expnType, expn=", expn)
      print (">>>>>is_atom(expn)=", is_atom(expn))

   if is_atom(expn):
      return 1
   elif type(expn)==list:   #isinstance(expn,list):
      return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
   elif  is_sqrt(expn):
      if  type(expn.operands()[0])==Rational:  #type(isinstance(expn.args[0],Rational):
         return 1
      else:
         return max(2,expnType(expn.operands()[0]))   #max(2,expnType(expn.args[0]))
   elif expn.operator() == operator.pow:    #isinstance(expn,Pow)
      if type(expn.operands()[1])==Integer:   #isinstance(expn.args[1],Integer)
         return expnType(expn.operands()[0])    #expnType(expn.args[0])
      elif type(expn.operands()[1])==Rational:   #isinstance(expn.args[1],Rational)
         if type(expn.operands()[0])==Rational:  #isinstance(expn.args[0],Rational)
```

```
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    else:
        return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1])) #max(3,expnType(expn.op
elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isinstan
    m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
    m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
    return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
    return max(3,expnType(expn.operands()[0]))
elif is_special_function(expn.operator()): #is_special_function(expn.func)
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(4,m1)   #max(4,m1)
elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(5,m1)   #max(5,m1)
elif is_appell_function(expn.operator()):
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(6,m1)   #max(6,m1)
elif str(expn).find("Integral") != -1: #this will never happen, since it
        #is checked before calling the grading function that is passed.
        #but kept it here.
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
else:
    return 9

#main function
def grade_antiderivative(result,optimal):


    if debug:
        print ("Enter grade_antiderivative for sagemath")
        print("Enter grade_antiderivative, result=",result)
        print("Enter grade_antiderivative, optimal=",optimal)
        print("type(anti)=",type(result))
        print("type(optimal)=",type(optimal))

    leaf_count_result  = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    #if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)
```

```
if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

if expnType_result <= expnType_optimal:
    if result.has(I):
        if optimal.has(I): #both result and optimal complex
            if leaf_count_result <= 2*leaf_count_optimal:
                grade = "A"
                grade_annotation ="none"
            else:
                grade = "B"
                grade_annotation ="Both result and optimal contain complex but leaf count of result is larger t
        else: #result contains complex but optimal is not
            grade = "C"
            grade_annotation ="Result contains complex when optimal does not."
    else: # result do not contain complex, this assumes optimal do not as well
        if leaf_count_result <= 2*leaf_count_optimal:
            grade = "A"
            grade_annotation ="none"
        else:
            grade = "B"
            grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(leaf_
else:
    grade = "C"
    grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_resu


print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

return grade, grade_annotation
```