Computer algebra independent integration tests

Summer 2022 edition

3-Logarithms/56-3.1.2-d-x-^m-a+b-log-c-x^n-^p

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Contents

Chapter 1

Introduction

Local contents

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

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

The number of integrals in this report is [193]. This is test number [56].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

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

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

Sympy was called directly from Python.

1.2 Results

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

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

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

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

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

System	% solved	% Failed
Rubi	100.00 (193)	0.00 (0)
Mathematica	100.00 (193)	0.00 (0)
Fricas	63.73 (123)	36.27 (70)
Maple	62.69 (121)	37.31 (72)
Maxima	54.92 (106)	45.08 (87)
Giac	52.85 (102)	47.15 (91)
Sympy	40.93 (79)	59.07 (114)
Mupad	31.09 (60)	68.91 (133)

Table 1.1: Percentage solved for each CAS

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

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

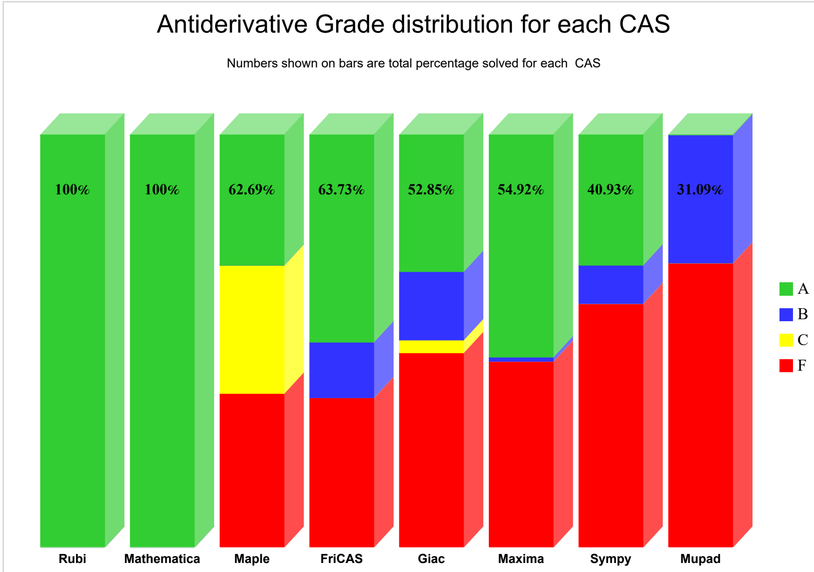
Table 1.2: Description of grading applied to integration result

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

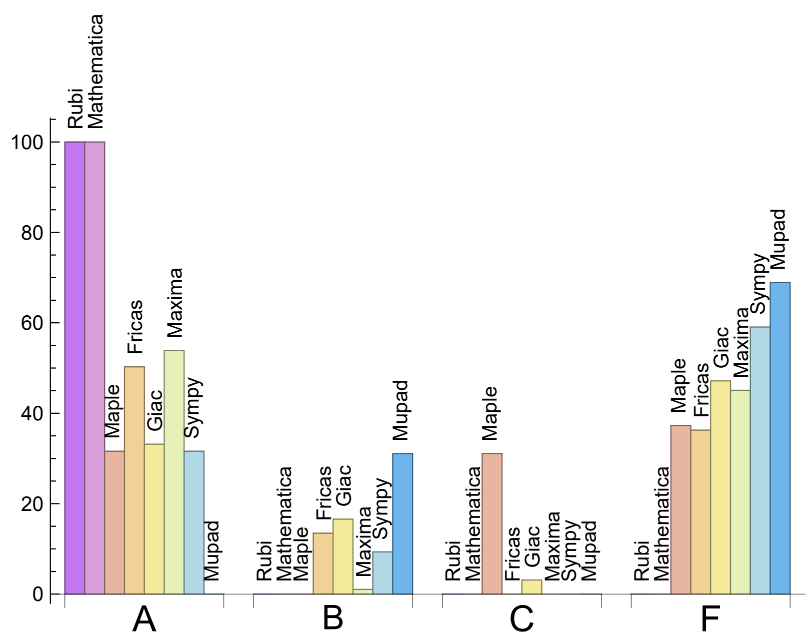
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	100.00	0.00	0.00	0.00
Maxima	53.89	1.04	0.00	45.08
Fricas	50.26	13.47	0.00	36.27
Giac	33.16	16.58	3.11	47.15
Maple	31.61	0.00	31.09	37.31
Sympy	31.61	9.33	0.00	59.07
Mupad	N/A	31.09	0.00	68.91

Table 1.3: Antiderivative Grade distribution of each CAS

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



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



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

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

The third is due to an exception generated. Assigned **F(-2)**. This most likely indicates an interface problem between sagemath and the CAS (applicable only to FriCAS, Maxima and Giac) or it could be an indication of an internal error in CAS. This type of error requires more investigations to determine the cause.

System	Number failed	Percentage normal failure	Percentage time-out failure	Percentage exception failure
Rubi	0	0.00 %	0.00 %	0.00 %
Mathematica	0	0.00 %	0.00 %	0.00 %
Maple	72	100.00 %	0.00 %	0.00 %
Fricas	70	55.71 %	0.00 %	44.29 %
Giac	91	100.00 %	0.00 %	0.00 %
Maxima	87	90.80 %	0.00 %	9.20 %
Sympy	114	98.25 %	0.00 %	1.75 %
Mupad	133	100.00 %	0.00 %	0.00 %

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

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

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

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

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

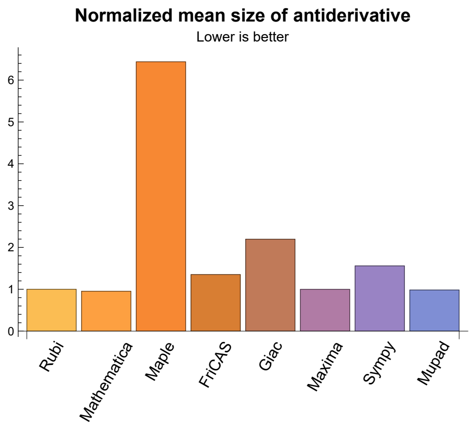
Similarly the **Normalized median** is relative to the median leaf size of the optimal.

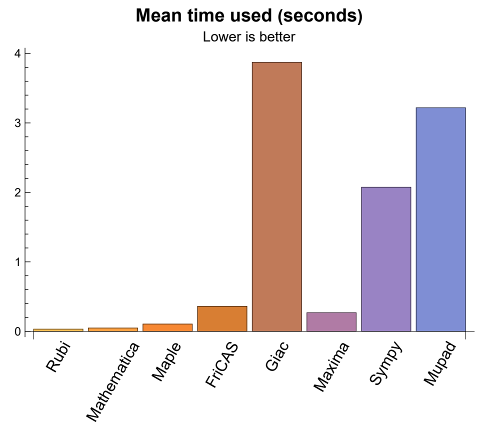
For example, if a CAS has Normalized median of 1.2, then its median is 1.2 as large as the median leaf size of the optimal.

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.03	56.56	1.00	58.00	1.00
Mathematica	0.05	53.13	0.95	54.00	1.00
Maple	0.10	445.53	6.44	92.00	1.75
Maxima	0.27	42.14	1.00	26.00	0.92
Fricas	0.36	70.10	1.35	37.00	1.11
Sympy	2.07	75.73	1.56	41.00	1.20
Giac	3.87	132.12	2.20	37.00	1.08
Mupad	3.22	33.55	0.98	22.00	0.92

Table 1.5: Time and leaf size performance for each CAS

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


Normalized mean size of antiderivative
Lower is better
0
1
2
3
4
5
6
Rubi
Mathematica
Maple
FriCAS
Giac
Maxima
Sympy
Mupad


Mean time used (seconds)
Lower is better
0
1
2
3
4
Rubi
Mathematica
Maple
FriCAS
Giac
Maxima
Sympy
Mupad

1.4 list of integrals that has no closed form antiderivative

{}

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

Rubi {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Mupad {}

1.6 list of integrals solved by CAS but failed verification

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

Rubi {}

Mathematica {}

Maple Verification phase not implemented yet.

Maxima Verification phase not implemented yet.

Fricas Verification phase not implemented yet.

Sympy Verification phase not implemented yet.

Giac Verification phase not implemented yet.

Mupad Verification phase not implemented yet.

1.7 Timing

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

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

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

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

1.8 Verification

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

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

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

1.9 Important notes about some of the results

1.9.1 Important note about Maxima results

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

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

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

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

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

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

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

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

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

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

1.9.2 Important note about FriCAS result

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

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

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

1.9.3 Important note about finding leaf size of antiderivative

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

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

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

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

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

  except Exception as ee:
        leafCount =1
```

1.9.4 Important note about Mupad results

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

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

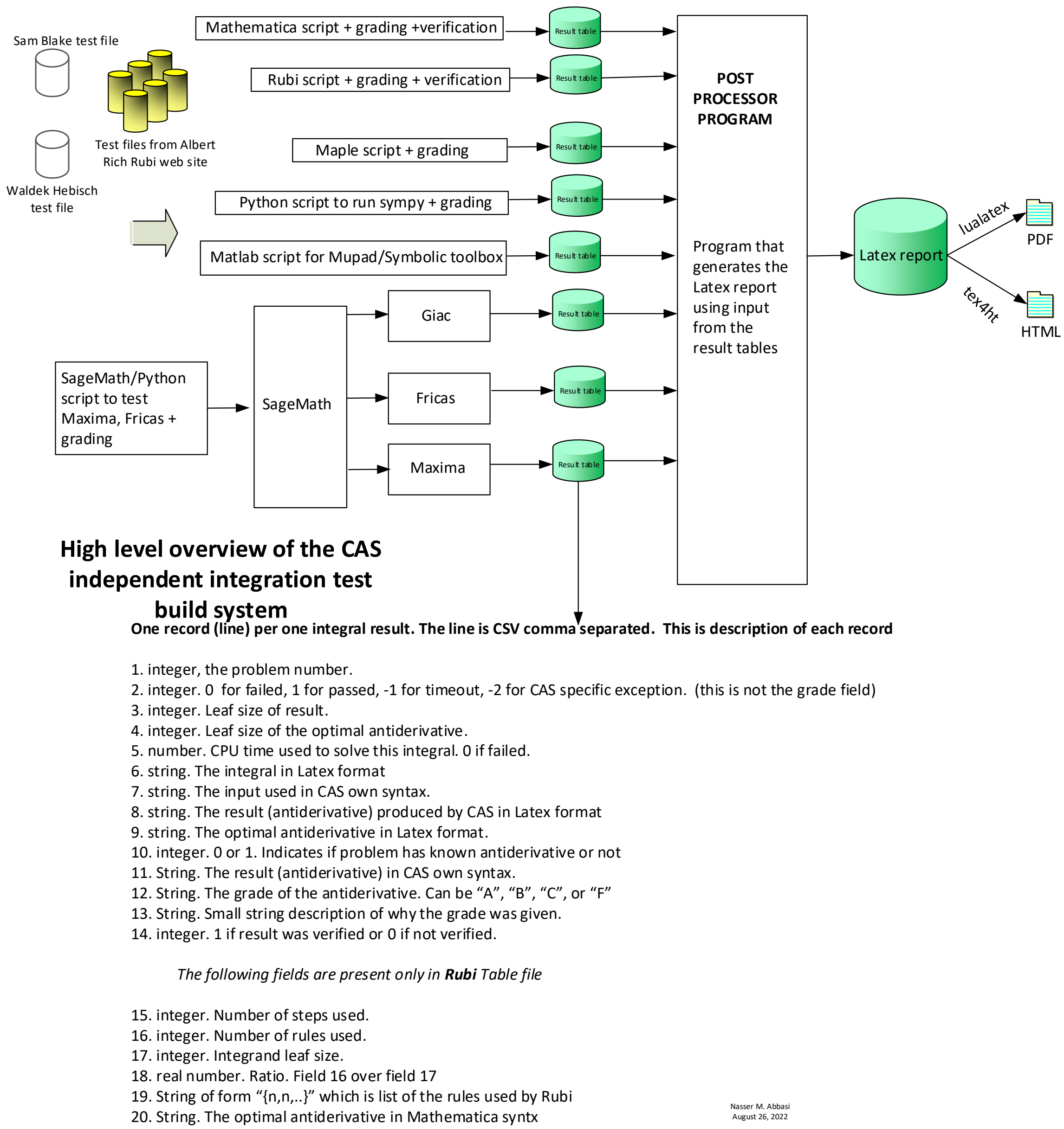
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

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

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

1.10 Design of the test system

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



Chapter 2

detailed summary tables of results

Local contents

2.1 List of integrals sorted by grade for each CAS

Local contents

2.1.1 Rubi

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193 }

B grade: { }

C grade: { }

F grade: { }

2.1.2 Mathematica

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193 }

B grade: { }

C grade: { }

F grade: { }

2.1.3 Maple

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 45, 46, 47, 53, 54, 61, 69, 77, 85, 92, 98, 118, 125, 132, 139, 146, 171, 179, 187 }

B grade: { }

C grade: { 43, 44, 48, 49, 50, 51, 52, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 91, 93, 94, 95, 96, 97, 99, 100, 107, 108, 109, 110, 111, 112, 149, 150, 151, 152, 156, 157, 158 }

F grade: { 101, 102, 103, 104, 105, 106, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147, 148, 153, 154, 155, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 172, 173, 174, 175, 176, 177, 178, 180, 181, 182, 183, 184, 185, 186, 188, 189, 190, 191, 192, 193 }

2.1.4 Maxima

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 69, 77, 85, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 118, 125, 132, 139, 146, 151, 152, 156, 157, 158, 171, 176, 177, 178, 179, 180, 181, 182, 184, 185, 186, 187, 188, 189, 190 }

B grade: { 149, 150 }

C grade: { }

F grade: { 65, 66, 67, 68, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 84, 86, 87, 88, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147, 148, 153, 154, 155, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 172, 173, 174, 175, 183, 191, 192, 193 }

2.1.5 FriCAS

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 53, 55, 56, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 89, 90, 91, 92, 93, 94, 96, 97, 98, 99, 100, 118, 132, 139, 149, 152, 153, 154, 156, 157, 158, 159, 160, 161, 170, 171, 178, 179, 187 }

B grade: { 50, 51, 52, 54, 57, 58, 59, 60, 61, 62, 63, 64, 81, 82, 83, 84, 85, 86, 87, 88, 95, 125, 146, 150, 151, 155 }

C grade: { }

F grade: { 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147, 148, 162, 163, 164, 165, 166, 167, 168, 169, 172, 173, 174, 175, 176, 177, 180, 181, 182, 183, 184, 185, 186, 188, 189, 190, 191, 192, 193 }

2.1.6 Sympy

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26, 32, 33, 39, 40, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 55, 56, 60, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 118, 125, 132, 139, 146, 149, 171, 179, 187 }

B grade: { 47, 54, 57, 58, 59, 61, 62, 63, 64, 69, 77, 85, 150, 151, 152, 156, 157, 158 }

C grade: { }

F grade: { 22, 23, 24, 27, 28, 29, 30, 31, 34, 35, 36, 37, 38, 41, 42, 65, 66, 67, 68, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 84, 86, 87, 88, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147, 148, 153, 154, 155, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 172, 173, 174, 175, 176, 177, 178, 180, 181, 182, 183, 184, 185, 186, 188, 189, 190, 191, 192, 193 }

2.1.7 Giac

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 43, 44, 45, 46, 47, 48, 49, 55, 56, 65, 66, 67, 68, 77, 85, 92, 93, 98, 105, 118, 132, 139, 146, 157, 158, 171, 179, 187 }

B grade: { 50, 51, 52, 53, 54, 57, 58, 59, 60, 61, 62, 63, 64, 69, 73, 74, 75, 76, 81, 82, 83, 84, 94, 99, 100, 111, 125, 149, 150, 151, 152, 156 }

C grade: { 89, 90, 91, 95, 96, 97 }

F grade: { 27, 28, 34, 35, 41, 42, 70, 71, 72, 78, 79, 80, 86, 87, 88, 101, 102, 103, 104, 106, 107, 108, 109, 110, 112, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147, 148, 153, 154, 155, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 172, 173, 174, 175, 176, 177, 178, 180, 181, 182, 183, 184, 185, 186, 188, 189, 190, 191, 192, 193 }

2.1.8 Mupad

A grade: { }

B grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 25, 26, 32, 33, 39, 40, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 69, 77, 85, 118, 125, 132, 139, 146, 171, 179, 187 }

C grade: { }

F grade: { 22, 23, 24, 27, 28, 29, 30, 31, 34, 35, 36, 37, 38, 41, 42, 65, 66, 67, 68, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 172, 173, 174, 175, 176, 177, 178, 180, 181, 182, 183, 184, 185, 186, 188, 189, 190, 191, 192, 193 }

2.2 Detailed conclusion table per each integral for all CAS systems

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

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

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	26	15	15	14	15	11
N.S.	1	1.00	1.00	1.37	0.79	0.79	0.74	0.79	0.58
time (sec)	N/A	0.005	0.002	0.014	0.281	0.351	0.026	3.167	0.041

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	26	15	15	14	15	11
N.S.	1	1.00	1.00	1.37	0.79	0.79	0.74	0.79	0.58
time (sec)	N/A	0.005	0.002	0.013	0.267	0.362	0.026	3.483	0.029

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	26	15	15	14	15	11
N.S.	1	1.00	1.00	1.37	0.79	0.79	0.74	0.79	0.58
time (sec)	N/A	0.003	0.002	0.012	0.265	0.345	0.025	2.838	0.032

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	17	16	10	7	16	8
N.S.	1	1.00	1.00	1.70	1.60	1.00	0.70	1.60	0.80
time (sec)	N/A	0.001	0.001	0.008	0.278	0.340	0.022	2.442	0.020

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	9	8	8	7	8	8
N.S.	1	1.00	1.00	0.90	0.80	0.80	0.70	0.80	0.80
time (sec)	N/A	0.004	0.002	0.009	0.281	0.343	0.024	4.799	3.601

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	24	15	11	10	15	11
N.S.	1	1.00	1.00	1.60	1.00	0.73	0.67	1.00	0.73
time (sec)	N/A	0.004	0.002	0.013	0.284	0.368	0.029	3.994	3.476

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	26	15	13	17	15	11
N.S.	1	1.00	1.00	1.37	0.79	0.68	0.89	0.79	0.58
time (sec)	N/A	0.005	0.002	0.013	0.267	0.340	0.033	3.481	0.024

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	32	40	21	26	26	26	21
N.S.	1	1.00	1.00	1.25	0.66	0.81	0.81	0.81	0.66
time (sec)	N/A	0.013	0.002	0.013	0.278	0.341	0.037	2.995	3.605

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	32	40	21	26	29	26	21
N.S.	1	1.00	1.00	1.25	0.66	0.81	0.91	0.81	0.66
time (sec)	N/A	0.012	0.002	0.014	0.297	0.349	0.036	3.615	3.546

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	32	40	21	26	26	26	21
N.S.	1	1.00	1.00	1.25	0.66	0.81	0.81	0.81	0.66
time (sec)	N/A	0.007	0.002	0.012	0.293	0.353	0.034	4.134	3.491

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	27	16	19	19	19	16
N.S.	1	1.00	1.00	1.42	0.84	1.00	1.00	1.00	0.84
time (sec)	N/A	0.004	0.002	0.013	0.279	0.344	0.030	3.161	3.589

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	9	8	8	7	8	8
N.S.	1	1.00	1.00	0.90	0.80	0.80	0.70	0.80	0.80
time (sec)	N/A	0.008	0.002	0.010	0.274	0.359	0.025	2.509	3.396

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	26	38	19	19	20	26	19
N.S.	1	1.00	1.00	1.46	0.73	0.73	0.77	1.00	0.73
time (sec)	N/A	0.013	0.002	0.015	0.283	0.347	0.042	2.718	3.586

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	32	40	21	21	29	26	21
N.S.	1	1.00	1.00	1.25	0.66	0.66	0.91	0.81	0.66
time (sec)	N/A	0.012	0.002	0.015	0.302	0.348	0.044	3.667	3.380

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	45	54	29	37	42	37	29
N.S.	1	1.00	1.00	1.20	0.64	0.82	0.93	0.82	0.64
time (sec)	N/A	0.022	0.002	0.014	0.288	0.336	0.047	6.792	3.289

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	45	54	29	37	41	37	29
N.S.	1	1.00	1.00	1.20	0.64	0.82	0.91	0.82	0.64
time (sec)	N/A	0.020	0.002	0.014	0.283	0.388	0.046	4.249	3.559

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	45	54	29	37	42	37	29
N.S.	1	1.00	1.00	1.20	0.64	0.82	0.93	0.82	0.64
time (sec)	N/A	0.012	0.002	0.014	0.266	0.350	0.044	2.467	3.475

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	28	28	28	37	24	28	29	28	24
N.S.	1	1.00	1.00	1.32	0.86	1.00	1.04	1.00	0.86
time (sec)	N/A	0.008	0.002	0.015	0.269	0.336	0.037	3.846	3.556

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	9	8	8	7	8	8
N.S.	1	1.00	1.00	0.90	0.80	0.80	0.70	0.80	0.80
time (sec)	N/A	0.007	0.002	0.010	0.291	0.336	0.024	4.773	3.527

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	37	52	27	27	31	37	27
N.S.	1	1.00	1.00	1.41	0.73	0.73	0.84	1.00	0.73
time (sec)	N/A	0.021	0.002	0.016	0.285	0.339	0.052	6.070	3.459

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	45	54	29	29	44	37	29
N.S.	1	1.00	1.00	1.20	0.64	0.64	0.98	0.82	0.64
time (sec)	N/A	0.021	0.002	0.015	0.277	0.362	0.059	5.766	3.600

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	11	11	11	14	11	12	0	11	-1
N.S.	1	1.00	1.00	1.27	1.00	1.09	0.00	1.00	-0.09
time (sec)	N/A	0.017	0.018	0.018	0.335	0.338	0.000	4.717	0.000

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	11	11	11	14	11	12	0	11	-1
N.S.	1	1.00	1.00	1.27	1.00	1.09	0.00	1.00	-0.09
time (sec)	N/A	0.016	0.019	0.019	0.317	0.328	0.000	2.868	0.000

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	11	11	11	14	11	12	0	11	-1
N.S.	1	1.00	1.00	1.27	1.00	1.09	0.00	1.00	-0.09
time (sec)	N/A	0.012	0.017	0.035	0.334	0.364	0.000	3.690	0.000

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	8	8	14	9	8	5	9	8
N.S.	1	1.00	1.00	1.75	1.12	1.00	0.62	1.12	1.00
time (sec)	N/A	0.002	0.006	0.020	0.329	0.351	0.228	3.583	3.428

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	5	5	5	6	5	5	5	5	5
N.S.	1	1.00	1.00	1.20	1.00	1.00	1.00	1.00	1.00
time (sec)	N/A	0.008	0.005	0.009	0.272	0.334	0.027	3.392	3.538

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	9	9	9	10	9	10	0	0	-1
N.S.	1	1.00	1.00	1.11	1.00	1.11	0.00	0.00	-0.11
time (sec)	N/A	0.015	0.017	0.019	0.332	0.365	0.000	0.000	0.000

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	11	11	11	14	11	12	0	0	-1
N.S.	1	1.00	1.00	1.27	1.00	1.09	0.00	0.00	-0.09
time (sec)	N/A	0.016	0.018	0.017	0.331	0.352	0.000	0.000	0.000

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	30	13	33	0	24	-1
N.S.	1	1.00	1.00	1.25	0.54	1.38	0.00	1.00	-0.04
time (sec)	N/A	0.024	0.019	0.021	0.326	0.349	0.000	3.504	0.000

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	30	13	33	0	24	-1
N.S.	1	1.00	1.00	1.25	0.54	1.38	0.00	1.00	-0.04
time (sec)	N/A	0.024	0.019	0.020	0.324	0.346	0.000	2.477	0.000

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	30	13	33	0	24	-1
N.S.	1	1.00	1.00	1.25	0.54	1.38	0.00	1.00	-0.04
time (sec)	N/A	0.017	0.017	0.023	0.336	0.345	0.000	3.650	0.000

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	26	12	25	12	19	18
N.S.	1	1.00	1.00	1.44	0.67	1.39	0.67	1.06	1.00
time (sec)	N/A	0.004	0.005	0.020	0.329	0.362	0.219	3.001	3.343

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	8	8	8	9	8	8	7	8	8
N.S.	1	1.00	1.00	1.12	1.00	1.00	0.88	1.00	1.00
time (sec)	N/A	0.008	0.002	0.009	0.293	0.335	0.019	2.760	3.557

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	24	9	28	0	0	-1
N.S.	1	1.00	1.00	1.09	0.41	1.27	0.00	0.00	-0.05
time (sec)	N/A	0.023	0.019	0.021	0.333	0.350	0.000	0.000	0.000

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	30	13	33	0	0	-1
N.S.	1	1.00	1.00	1.25	0.54	1.38	0.00	0.00	-0.04
time (sec)	N/A	0.024	0.019	0.021	0.330	0.355	0.000	0.000	0.000

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	37	44	13	47	0	35	-1
N.S.	1	1.00	1.00	1.19	0.35	1.27	0.00	0.95	-0.03
time (sec)	N/A	0.034	0.019	0.021	0.320	0.349	0.000	4.457	0.000

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	41	44	13	47	0	35	-1
N.S.	1	1.00	1.00	1.07	0.32	1.15	0.00	0.85	-0.02
time (sec)	N/A	0.033	0.019	0.023	0.323	0.351	0.000	4.529	0.000

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	37	44	13	47	0	35	-1
N.S.	1	1.00	1.00	1.19	0.35	1.27	0.00	0.95	-0.03
time (sec)	N/A	0.021	0.005	0.019	0.369	0.350	0.000	4.008	0.000

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	34	36	13	34	26	29	29
N.S.	1	1.00	1.00	1.06	0.38	1.00	0.76	0.85	0.85
time (sec)	N/A	0.007	0.006	0.022	0.338	0.347	0.234	3.966	3.534

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	10	10	10	9	8	8	10	8	8
N.S.	1	1.00	1.00	0.90	0.80	0.80	1.00	0.80	0.80
time (sec)	N/A	0.008	0.002	0.010	0.280	0.332	0.023	4.683	3.450

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	39	40	9	34	0	0	-1
N.S.	1	1.00	1.00	1.03	0.23	0.87	0.00	0.00	-0.03
time (sec)	N/A	0.032	0.018	0.022	0.315	0.327	0.000	0.000	0.000

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	36	36	36	43	13	41	0	0	-1
N.S.	1	1.00	1.00	1.19	0.36	1.14	0.00	0.00	-0.03
time (sec)	N/A	0.032	0.020	0.022	0.318	0.344	0.000	0.000	0.000

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	32	112	26	30	27	31	25
N.S.	1	1.00	1.19	4.15	0.96	1.11	1.00	1.15	0.93
time (sec)	N/A	0.009	0.003	0.048	0.281	0.357	0.258	3.100	3.588

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	32	112	26	30	27	31	25
N.S.	1	1.00	1.19	4.15	0.96	1.11	1.00	1.15	0.93
time (sec)	N/A	0.008	0.003	0.031	0.278	0.364	0.171	5.486	3.361

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	32	29	26	30	27	31	25
N.S.	1	1.00	1.19	1.07	0.96	1.11	1.00	1.15	0.93
time (sec)	N/A	0.005	0.003	0.045	0.287	0.341	0.114	4.295	3.264

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	19	18	22	15	20	18
N.S.	1	1.00	1.00	1.06	1.00	1.22	0.83	1.11	1.00
time (sec)	N/A	0.004	0.002	0.031	0.280	0.343	0.074	4.299	3.497

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	21	25	20	18	34	19	19
N.S.	1	1.00	0.95	1.14	0.91	0.82	1.55	0.86	0.86
time (sec)	N/A	0.008	0.003	0.059	0.278	0.393	4.147	4.468	3.407

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	23	23	26	112	26	19	19	24	23
N.S.	1	1.00	1.13	4.87	1.13	0.83	0.83	1.04	1.00
time (sec)	N/A	0.008	0.003	0.032	0.285	0.351	0.121	3.828	3.558

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	32	111	26	23	29	27	26
N.S.	1	1.00	1.19	4.11	0.96	0.85	1.07	1.00	0.96
time (sec)	N/A	0.009	0.003	0.031	0.281	0.382	0.247	3.443	3.490

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	43	691	71	102	78	111	61
N.S.	1	1.00	0.83	13.29	1.37	1.96	1.50	2.13	1.17
time (sec)	N/A	0.025	0.015	0.052	0.279	0.398	0.397	4.862	3.605

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	46	692	71	103	85	111	62
N.S.	1	1.00	0.88	13.31	1.37	1.98	1.63	2.13	1.19
time (sec)	N/A	0.026	0.016	0.051	0.276	0.379	0.270	4.565	3.562

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	41	692	70	102	76	108	60
N.S.	1	1.00	0.79	13.31	1.35	1.96	1.46	2.08	1.15
time (sec)	N/A	0.016	0.012	0.051	0.316	0.334	0.181	3.975	3.478

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	33	63	57	85	65	88	49
N.S.	1	1.00	0.77	1.47	1.33	1.98	1.51	2.05	1.14
time (sec)	N/A	0.009	0.008	0.065	0.281	0.347	0.122	4.310	3.576

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	21	20	51	60	56	37
N.S.	1	1.00	1.00	0.95	0.91	2.32	2.73	2.55	1.68
time (sec)	N/A	0.016	0.003	0.111	0.280	0.350	10.557	4.272	3.416

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	35	704	70	77	66	86	56
N.S.	1	1.00	0.76	15.30	1.52	1.67	1.43	1.87	1.22
time (sec)	N/A	0.024	0.009	0.064	0.280	0.379	0.128	2.405	3.608

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	41	703	71	83	78	90	62
N.S.	1	1.00	0.79	13.52	1.37	1.60	1.50	1.73	1.19
time (sec)	N/A	0.024	0.011	0.063	0.277	0.359	0.256	4.978	3.429

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	66	2649	135	222	167	262	110
N.S.	1	1.00	0.86	34.40	1.75	2.88	2.17	3.40	1.43
time (sec)	N/A	0.042	0.023	0.110	0.284	0.369	0.592	6.020	3.664

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	67	2650	134	224	156	256	108
N.S.	1	1.00	0.87	34.42	1.74	2.91	2.03	3.32	1.40
time (sec)	N/A	0.040	0.012	0.110	0.288	0.385	0.406	3.229	3.374

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	60	2650	135	222	167	262	110
N.S.	1	1.00	0.78	34.42	1.75	2.88	2.17	3.40	1.43
time (sec)	N/A	0.031	0.021	0.110	0.290	0.360	0.277	4.883	3.440

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	50	2641	113	198	133	219	94
N.S.	1	1.00	0.76	40.02	1.71	3.00	2.02	3.32	1.42
time (sec)	N/A	0.018	0.008	0.098	0.302	0.386	0.188	3.655	3.663

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	21	20	100	92	114	56
N.S.	1	1.00	1.00	0.95	0.91	4.55	4.18	5.18	2.55
time (sec)	N/A	0.015	0.004	0.218	0.299	0.455	14.137	4.401	3.367

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	52	2674	133	180	134	197	104
N.S.	1	1.00	0.75	38.75	1.93	2.61	1.94	2.86	1.51
time (sec)	N/A	0.043	0.014	0.129	0.297	0.356	0.196	4.548	3.375

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	60	2673	135	189	168	203	111
N.S.	1	1.00	0.78	34.71	1.75	2.45	2.18	2.64	1.44
time (sec)	N/A	0.041	0.016	0.127	0.291	0.389	0.269	4.418	3.681

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	60	2674	136	191	158	204	110
N.S.	1	1.00	0.78	34.73	1.77	2.48	2.05	2.65	1.43
time (sec)	N/A	0.041	0.018	0.136	0.292	0.358	0.357	3.653	3.590

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	242	0	42	0	48	-1
N.S.	1	1.00	1.00	4.75	0.00	0.82	0.00	0.94	-0.02
time (sec)	N/A	0.039	0.045	0.195	0.000	0.328	0.000	4.027	0.000

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	242	0	42	0	48	-1
N.S.	1	1.00	1.00	4.75	0.00	0.82	0.00	0.94	-0.02
time (sec)	N/A	0.039	0.043	0.190	0.000	0.343	0.000	5.031	0.000

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	242	0	42	0	48	-1
N.S.	1	1.00	1.00	4.75	0.00	0.82	0.00	0.94	-0.02
time (sec)	N/A	0.031	0.040	0.192	0.000	0.339	0.000	3.401	0.000

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	48	240	0	39	0	42	-1
N.S.	1	1.00	1.00	5.00	0.00	0.81	0.00	0.88	-0.02
time (sec)	N/A	0.025	0.033	0.168	0.000	0.348	0.000	5.821	0.000

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	19	18	19	32	45	18
N.S.	1	1.00	1.00	1.06	1.00	1.06	1.78	2.50	1.00
time (sec)	N/A	0.016	0.014	0.044	0.298	0.392	0.373	3.504	3.560

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	48	236	0	41	0	0	-1
N.S.	1	1.00	1.00	4.92	0.00	0.85	0.00	0.00	-0.02
time (sec)	N/A	0.034	0.040	0.186	0.000	0.341	0.000	0.000	0.000

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	241	0	42	0	0	-1
N.S.	1	1.00	1.00	4.73	0.00	0.82	0.00	0.00	-0.02
time (sec)	N/A	0.035	0.040	0.189	0.000	0.392	0.000	0.000	0.000

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	242	0	42	0	0	-1
N.S.	1	1.00	1.00	4.75	0.00	0.82	0.00	0.00	-0.02
time (sec)	N/A	0.035	0.041	0.188	0.000	0.381	0.000	0.000	0.000

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	70	354	0	101	0	261	-1
N.S.	1	1.00	0.92	4.66	0.00	1.33	0.00	3.43	-0.01
time (sec)	N/A	0.052	0.089	0.195	0.000	0.341	0.000	3.108	0.000

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	70	354	0	101	0	261	-1
N.S.	1	1.00	0.92	4.66	0.00	1.33	0.00	3.43	-0.01
time (sec)	N/A	0.054	0.089	0.190	0.000	0.360	0.000	2.014	0.000

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	70	354	0	101	0	261	-1
N.S.	1	1.00	0.92	4.66	0.00	1.33	0.00	3.43	-0.01
time (sec)	N/A	0.041	0.084	0.167	0.000	0.401	0.000	2.147	0.000

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	66	350	0	95	0	238	-1
N.S.	1	1.00	0.94	5.00	0.00	1.36	0.00	3.40	-0.01
time (sec)	N/A	0.028	0.073	0.166	0.000	0.331	0.000	4.326	0.000

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	21	20	25	39	21	20
N.S.	1	1.00	1.00	1.05	1.00	1.25	1.95	1.05	1.00
time (sec)	N/A	0.016	0.005	0.030	0.304	0.356	0.943	2.540	3.269

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	76	343	0	88	0	0	-1
N.S.	1	1.00	1.04	4.70	0.00	1.21	0.00	0.00	-0.01
time (sec)	N/A	0.049	0.068	0.180	0.000	0.361	0.000	0.000	0.000

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	80	352	0	102	0	0	-1
N.S.	1	1.00	1.05	4.63	0.00	1.34	0.00	0.00	-0.01
time (sec)	N/A	0.050	0.071	0.173	0.000	0.414	0.000	0.000	0.000

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	80	354	0	102	0	0	-1
N.S.	1	1.00	1.05	4.66	0.00	1.34	0.00	0.00	-0.01
time (sec)	N/A	0.050	0.072	0.182	0.000	0.342	0.000	0.000	0.000

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	89	476	0	211	0	1029	-1
N.S.	1	1.00	0.88	4.71	0.00	2.09	0.00	10.19	-0.01
time (sec)	N/A	0.071	0.100	0.173	0.000	0.339	0.000	5.682	0.000

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	89	477	0	211	0	1029	-1
N.S.	1	1.00	0.85	4.54	0.00	2.01	0.00	9.80	-0.01
time (sec)	N/A	0.071	0.097	0.175	0.000	0.356	0.000	4.492	0.000

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	89	476	0	211	0	1029	-1
N.S.	1	1.00	0.88	4.71	0.00	2.09	0.00	10.19	-0.01
time (sec)	N/A	0.057	0.093	0.166	0.000	0.397	0.000	5.251	0.000

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	82	459	0	198	0	982	-1
N.S.	1	1.00	0.84	4.68	0.00	2.02	0.00	10.02	-0.01
time (sec)	N/A	0.036	0.090	0.176	0.000	0.373	0.000	2.134	0.000

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	22	21	20	62	61	21	39
N.S.	1	1.00	1.00	0.95	0.91	2.82	2.77	0.95	1.77
time (sec)	N/A	0.016	0.004	0.028	0.291	0.366	2.101	5.343	3.534

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	94	449	0	192	0	0	-1
N.S.	1	1.00	0.92	4.40	0.00	1.88	0.00	0.00	-0.01
time (sec)	N/A	0.068	0.070	0.186	0.000	0.360	0.000	0.000	0.000

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	89	454	0	221	0	0	-1
N.S.	1	1.00	0.89	4.54	0.00	2.21	0.00	0.00	-0.01
time (sec)	N/A	0.068	0.086	0.193	0.000	0.364	0.000	0.000	0.000

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	B	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	89	455	0	221	0	0	-1
N.S.	1	1.00	0.85	4.33	0.00	2.10	0.00	0.00	-0.01
time (sec)	N/A	0.072	0.086	0.202	0.000	0.384	0.000	0.000	0.000

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	C	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	29	128	41	50	48	117	-1
N.S.	1	1.00	0.71	3.12	1.00	1.22	1.17	2.85	-0.02
time (sec)	N/A	0.011	0.011	0.072	0.288	0.388	18.863	2.326	0.000

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	C	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	29	128	41	42	48	108	-1
N.S.	1	1.00	0.71	3.12	1.00	1.02	1.17	2.63	-0.02
time (sec)	N/A	0.011	0.009	0.067	0.285	0.425	2.614	3.357	0.000

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	C	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	29	124	41	32	48	105	-1
N.S.	1	1.00	0.71	3.02	1.00	0.78	1.17	2.56	-0.02
time (sec)	N/A	0.010	0.006	0.060	0.285	0.441	0.228	3.361	0.000

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	24	36	41	25	42	41	-1
N.S.	1	1.00	0.65	0.97	1.11	0.68	1.14	1.11	-0.03
time (sec)	N/A	0.010	0.006	0.052	0.291	0.423	0.241	1.559	0.000

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	37	37	24	122	41	28	44	43	-1
N.S.	1	1.00	0.65	3.30	1.11	0.76	1.19	1.16	-0.03
time (sec)	N/A	0.011	0.006	0.060	0.300	0.471	0.610	3.043	0.000

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	41	29	128	41	32	49	67	-1
N.S.	1	1.00	0.71	3.12	1.00	0.78	1.20	1.63	-0.02
time (sec)	N/A	0.012	0.007	0.061	0.312	0.437	3.178	3.077	0.000

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	A	C	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	61	716	102	141	119	425	-1
N.S.	1	1.00	0.84	9.81	1.40	1.93	1.63	5.82	-0.01
time (sec)	N/A	0.030	0.016	0.097	0.275	0.393	29.840	4.067	0.000

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	C	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	61	716	102	121	119	386	-1
N.S.	1	1.00	0.84	9.81	1.40	1.66	1.63	5.29	-0.01
time (sec)	N/A	0.030	0.013	0.091	0.289	0.428	4.403	4.752	0.000

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	C	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	61	710	102	99	119	383	-1
N.S.	1	1.00	0.84	9.73	1.40	1.36	1.63	5.25	-0.01
time (sec)	N/A	0.027	0.012	0.090	0.293	0.381	0.435	3.903	0.000

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	54	92	102	87	109	118	-1
N.S.	1	1.00	0.81	1.37	1.52	1.30	1.63	1.76	-0.01
time (sec)	N/A	0.028	0.011	0.088	0.293	0.364	0.364	2.826	0.000

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	54	707	101	87	110	149	-1
N.S.	1	1.00	0.81	10.55	1.51	1.30	1.64	2.22	-0.01
time (sec)	N/A	0.030	0.011	0.089	0.300	0.364	0.622	3.547	0.000

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	61	716	102	94	121	213	-1
N.S.	1	1.00	0.84	9.81	1.40	1.29	1.66	2.92	-0.01
time (sec)	N/A	0.031	0.011	0.095	0.294	0.378	3.183	3.105	0.000

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	62	0	0	0	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.044	0.060	0.005	0.000	0.000	0.000	0.000	0.000

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	62	0	0	0	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.044	0.055	0.005	0.000	0.000	0.000	0.000	0.000

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	62	0	0	0	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.042	0.052	0.005	0.000	0.000	0.000	0.000	0.000

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	62	0	0	0	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.041	0.048	0.006	0.000	0.000	0.000	0.000	0.000

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	64	62	0	0	0	0	49	-1
N.S.	1	0.96	0.93	0.00	0.00	0.00	0.00	0.73	-0.01
time (sec)	N/A	0.041	0.054	0.005	0.000	0.000	0.000	2.888	0.000

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	62	0	0	0	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.040	0.060	0.006	0.000	0.000	0.000	0.000	0.000

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	84	432	0	0	0	0	-1
N.S.	1	1.00	0.86	4.41	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.060	0.113	0.642	0.000	0.000	0.000	0.000	0.000

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	84	432	0	0	0	0	-1
N.S.	1	1.00	0.86	4.41	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.062	0.110	0.553	0.000	0.000	0.000	0.000	0.000

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	84	430	0	0	0	0	-1
N.S.	1	1.00	0.86	4.39	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.058	0.099	0.558	0.000	0.000	0.000	0.000	0.000

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	83	427	0	0	0	0	-1
N.S.	1	1.00	0.85	4.36	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.058	0.085	0.579	0.000	0.000	0.000	0.000	0.000

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	98	93	429	0	0	0	293	-1
N.S.	1	0.97	0.92	4.25	0.00	0.00	0.00	2.90	-0.01
time (sec)	N/A	0.061	0.092	0.583	0.000	0.000	0.000	2.680	0.000

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	94	432	0	0	0	0	-1
N.S.	1	1.00	0.96	4.41	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.060	0.089	0.623	0.000	0.000	0.000	0.000	0.000

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	85	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.057	0.027	0.005	0.000	0.000	0.000	0.000	0.000

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	61	0	0	0	0	0	-1
N.S.	1	1.00	0.95	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.036	0.016	0.006	0.000	0.000	0.000	0.000	0.000

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	67	0	0	0	0	0	-1
N.S.	1	1.00	0.93	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.045	0.023	0.004	0.000	0.000	0.000	0.000	0.000

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	67	0	0	0	0	0	-1
N.S.	1	1.00	0.93	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.037	0.023	0.004	0.000	0.000	0.000	0.000	0.000

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	56	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.020	0.012	0.004	0.000	0.000	0.000	0.000	0.000

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	13	14	29	14	13
N.S.	1	1.00	1.00	0.82	0.76	0.82	1.71	0.82	0.76
time (sec)	N/A	0.010	0.002	0.117	0.289	0.351	0.533	2.794	3.541

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	65	0	0	0	0	0	-1
N.S.	1	1.00	1.10	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.034	0.036	0.004	0.000	0.000	0.000	0.000	0.000

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	73	0	0	0	0	0	-1
N.S.	1	1.00	1.01	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.038	0.036	0.004	0.000	0.000	0.000	0.000	0.000

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	73	0	0	0	0	0	-1
N.S.	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.047	0.031	0.004	0.000	0.000	0.000	0.000	0.000

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	76	0	0	0	0	0	-1
N.S.	1	1.00	0.84	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.053	0.036	0.004	0.000	0.000	0.000	0.000	0.000

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	79	0	0	0	0	0	-1
N.S.	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.037	0.041	0.004	0.000	0.000	0.000	0.000	0.000

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	72	72	72	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.023	0.028	0.004	0.000	0.000	0.000	0.000	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	13	34	24	72	13
N.S.	1	1.00	1.00	0.82	0.76	2.00	1.41	4.24	0.76
time (sec)	N/A	0.009	0.003	0.123	0.286	0.362	2.240	3.080	3.527

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	79	0	0	0	0	0	-1
N.S.	1	1.00	1.03	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.042	0.042	0.004	0.000	0.000	0.000	0.000	0.000

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	88	0	0	0	0	0	-1
N.S.	1	1.00	0.98	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.048	0.048	0.004	0.000	0.000	0.000	0.000	0.000

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	46	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.023	0.005	0.004	0.000	0.000	0.000	0.000	0.000

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.024	0.008	0.005	0.000	0.000	0.000	0.000	0.000

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	51	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.023	0.008	0.005	0.000	0.000	0.000	0.000	0.000

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	40	40	40	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.014	0.004	0.005	0.000	0.000	0.000	0.000	0.000

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	13	14	22	14	13
N.S.	1	1.00	1.00	0.93	0.87	0.93	1.47	0.93	0.87
time (sec)	N/A	0.009	0.002	0.132	0.293	0.379	0.470	3.164	3.576

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	40	40	52	0	0	0	0	0	-1
N.S.	1	1.00	1.30	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.021	0.028	0.005	0.000	0.000	0.000	0.000	0.000

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	60	0	0	0	0	0	-1
N.S.	1	1.00	1.18	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.025	0.028	0.006	0.000	0.000	0.000	0.000	0.000

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	73	0	0	0	0	0	-1
N.S.	1	1.00	1.16	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.037	0.035	0.005	0.000	0.000	0.000	0.000	0.000

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	78	0	0	0	0	0	-1
N.S.	1	1.00	1.13	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.038	0.038	0.004	0.000	0.000	0.000	0.000	0.000

Problem 137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	78	0	0	0	0	0	-1
N.S.	1	1.00	1.13	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.032	0.036	0.005	0.000	0.000	0.000	0.000	0.000

Problem 138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	58	69	0	0	0	0	0	-1
N.S.	1	1.00	1.19	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.023	0.028	0.004	0.000	0.000	0.000	0.000	0.000

Problem 139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	15	15	15	14	13	24	24	14	13
N.S.	1	1.00	1.00	0.93	0.87	1.60	1.60	0.93	0.87
time (sec)	N/A	0.009	0.003	0.116	0.353	0.331	1.471	3.582	3.450

Problem 140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	60	58	0	0	0	0	0	-1
N.S.	1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.032	0.036	0.004	0.000	0.000	0.000	0.000	0.000

Problem 141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	66	0	0	0	0	0	-1
N.S.	1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.038	0.036	0.004	0.000	0.000	0.000	0.000	0.000

Problem 142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	87	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.048	0.044	0.005	0.000	0.000	0.000	0.000	0.000

Problem 143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	92	0	0	0	0	0	-1
N.S.	1	1.00	1.03	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.052	0.047	0.004	0.000	0.000	0.000	0.000	0.000

Problem 144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	92	0	0	0	0	0	-1
N.S.	1	1.00	0.99	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.040	0.047	0.005	0.000	0.000	0.000	0.000	0.000

Problem 145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	83	0	0	0	0	0	-1
N.S.	1	1.00	1.04	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.024	0.037	0.004	0.000	0.000	0.000	0.000	0.000

Problem 146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	13	37	26	14	13
N.S.	1	1.00	1.00	0.82	0.76	2.18	1.53	0.82	0.76
time (sec)	N/A	0.009	0.003	0.118	0.304	0.336	8.081	2.648	3.434

Problem 147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	70	0	0	0	0	0	-1
N.S.	1	1.00	0.83	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.043	0.041	0.006	0.000	0.000	0.000	0.000	0.000

Problem 148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	78	0	0	0	0	0	-1
N.S.	1	1.00	0.84	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.050	0.040	0.005	0.000	0.000	0.000	0.000	0.000

Problem 149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	B	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	17	260	102	26	15	175	-1
N.S.	1	1.00	0.81	12.38	4.86	1.24	0.71	8.33	-0.05
time (sec)	N/A	0.014	0.010	0.057	0.302	0.360	0.221	3.789	0.000

Problem 150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	B	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	76	9684	247	574	1273	1133	-1
N.S.	1	1.00	0.66	83.48	2.13	4.95	10.97	9.77	-0.01
time (sec)	N/A	0.062	0.034	0.421	0.298	0.349	15.567	1.918	0.000

Problem 151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	B	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	76	2126	132	208	502	402	-1
N.S.	1	1.00	0.94	26.25	1.63	2.57	6.20	4.96	-0.01
time (sec)	N/A	0.032	0.025	0.109	0.296	0.334	11.287	4.227	0.000

Problem 152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	32	371	57	52	141	95	-1
N.S.	1	1.00	0.70	8.07	1.24	1.13	3.07	2.07	-0.02
time (sec)	N/A	0.010	0.010	0.050	0.292	0.345	4.493	3.918	0.000

Problem 153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	67	0	0	68	0	0	-1
N.S.	1	1.00	1.02	0.00	0.00	1.03	0.00	0.00	-0.02
time (sec)	N/A	0.051	0.072	0.007	0.000	0.392	0.000	0.000	0.000

Problem 154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	100	89	0	0	131	0	0	-1
N.S.	1	1.00	0.89	0.00	0.00	1.31	0.00	0.00	-0.01
time (sec)	N/A	0.064	0.155	0.007	0.000	0.382	0.000	0.000	0.000

Problem 155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	142	142	113	0	0	322	0	0	-1
N.S.	1	1.00	0.80	0.00	0.00	2.27	0.00	0.00	-0.01
time (sec)	N/A	0.095	0.240	0.007	0.000	0.368	0.000	0.000	0.000

Problem 156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	40	2008	75	73	128	162	-1
N.S.	1	1.00	0.54	27.14	1.01	0.99	1.73	2.19	-0.01
time (sec)	N/A	0.036	0.007	0.124	0.273	0.359	7.801	3.447	0.000

Problem 157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	30	750	53	42	94	91	-1
N.S.	1	1.00	0.57	14.15	1.00	0.79	1.77	1.72	-0.02
time (sec)	N/A	0.021	0.006	0.058	0.293	0.346	3.388	6.758	0.000

Problem 158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	B	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	32	32	20	263	32	20	53	42	-1
N.S.	1	1.00	0.62	8.22	1.00	0.62	1.66	1.31	-0.03
time (sec)	N/A	0.008	0.005	0.041	0.275	0.384	1.436	6.863	0.000

Problem 159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	27	27	0	0	20	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.74	0.00	0.00	-0.04
time (sec)	N/A	0.026	0.009	0.010	0.000	0.349	0.000	0.000	0.000

Problem 160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	49	0	0	50	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	1.02	0.00	0.00	-0.02
time (sec)	N/A	0.036	0.015	0.007	0.000	0.402	0.000	0.000	0.000

Problem 161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	77	61	0	0	84	0	0	-1
N.S.	1	1.00	0.79	0.00	0.00	1.09	0.00	0.00	-0.01
time (sec)	N/A	0.052	0.020	0.007	0.000	0.343	0.000	0.000	0.000

Problem 162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	101	0	0	0	0	0	-1
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.090	0.131	0.007	0.000	0.000	0.000	0.000	0.000

Problem 163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	86	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.049	0.036	0.007	0.000	0.000	0.000	0.000	0.000

Problem 164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	61	61	61	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.034	0.009	0.007	0.000	0.000	0.000	0.000	0.000

Problem 165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	83	83	86	0	0	0	0	0	-1
N.S.	1	1.00	1.04	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.050	1.299	0.008	0.000	0.000	0.000	0.000	0.000

Problem 166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	123	0	0	0	0	0	-1
N.S.	1	1.00	1.10	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.066	1.295	0.007	0.000	0.000	0.000	0.000	0.000

Problem 167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	107	0	0	0	0	0	-1
N.S.	1	1.00	1.01	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.054	0.125	0.022	0.000	0.000	0.000	0.000	0.000

Problem 168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	89	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.045	0.077	0.007	0.000	0.000	0.000	0.000	0.000

Problem 169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	89	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.036	0.071	0.007	0.000	0.000	0.000	0.000	0.000

Problem 170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	80	0	0	52	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.65	0.00	0.00	-0.01
time (sec)	N/A	0.027	0.062	0.008	0.000	0.126	0.000	0.000	0.000

Problem 171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	26	27	26	35	56	27	26
N.S.	1	1.00	1.00	1.04	1.00	1.35	2.15	1.04	1.00
time (sec)	N/A	0.022	0.007	0.293	0.287	0.352	0.864	2.498	3.671

Problem 172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	78	78	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.036	0.066	0.008	0.000	0.000	0.000	0.000	0.000

Problem 173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	89	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.041	0.070	0.008	0.000	0.000	0.000	0.000	0.000

Problem 174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	89	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.041	0.071	0.007	0.000	0.000	0.000	0.000	0.000

Problem 175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	82	0	0	0	0	0	-1
N.S.	1	1.00	0.95	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.051	0.100	0.008	0.000	0.000	0.000	0.000	0.000

Problem 176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	63	0	44	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.70	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.041	0.043	0.013	0.057	0.000	0.000	0.000	0.000

Problem 177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	63	0	44	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.70	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.034	0.040	0.010	0.052	0.000	0.000	0.000	0.000

Problem 178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	A	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	56	0	44	38	0	0	-1
N.S.	1	1.00	1.00	0.00	0.79	0.68	0.00	0.00	-0.02
time (sec)	N/A	0.025	0.043	0.010	0.048	0.182	0.000	0.000	0.000

Problem 179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	21	21	21	22	21	26	39	21	21
N.S.	1	1.00	1.00	1.05	1.00	1.24	1.86	1.00	1.00
time (sec)	N/A	0.026	0.006	0.017	0.273	0.366	0.609	3.478	3.704

Problem 180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	48	0	40	0	0	0	-1
N.S.	1	1.00	0.92	0.00	0.77	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.034	0.042	0.014	0.046	0.000	0.000	0.000	0.000

Problem 181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	63	0	44	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.70	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.038	0.043	0.004	0.047	0.000	0.000	0.000	0.000

Problem 182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	63	0	44	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.70	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.037	0.043	0.005	0.051	0.000	0.000	0.000	0.000

Problem 183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	103	0	0	0	0	0	-1
N.S.	1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.059	0.157	0.008	0.000	0.000	0.000	0.000	0.000

Problem 184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	80	0	48	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.60	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.044	0.054	0.005	0.049	0.000	0.000	0.000	0.000

Problem 185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	75	0	48	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.64	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.038	0.049	0.005	0.052	0.000	0.000	0.000	0.000

Problem 186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	73	0	48	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.66	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.023	0.020	0.006	0.050	0.000	0.000	0.000	0.000

Problem 187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	26	25	24	31	48	25	24
N.S.	1	1.00	1.00	0.96	0.92	1.19	1.85	0.96	0.92
time (sec)	N/A	0.019	0.006	0.008	0.277	0.364	2.446	10.208	3.716

Problem 188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	73	0	48	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.66	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.046	0.053	0.006	0.047	0.000	0.000	0.000	0.000

Problem 189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	75	75	0	48	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.64	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.038	0.050	0.005	0.049	0.000	0.000	0.000	0.000

Problem 190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	F	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	80	0	48	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.60	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.039	0.052	0.005	0.051	0.000	0.000	0.000	0.000

Problem 191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-2)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	65	65	65	0	0	0	0	0	-1
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.036	0.019	0.013	0.000	0.000	0.000	0.000	0.000

Problem 192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	118	0	0	0	0	0	-1
N.S.	1	1.00	1.04	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.079	0.136	0.091	0.000	0.000	0.000	0.000	0.000

Problem 193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-2)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	142	0	0	0	0	0	-1
N.S.	1	1.00	1.04	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.117	0.201	5.282	0.000	0.000	0.000	0.000	0.000

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is given. The larger this ratio is, the harder the integral was to solve. In this test, problem number [193] had the largest ratio of [27]

Table 2.1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	1	1	1.00	8	0.125
2	A	1	1	1.00	8	0.125
3	A	1	1	1.00	6	0.167
4	A	1	1	1.00	4	0.250
5	A	1	1	1.00	8	0.125
6	A	1	1	1.00	8	0.125
7	A	1	1	1.00	8	0.125
8	A	2	2	1.00	10	0.200
9	A	2	2	1.00	10	0.200
10	A	2	2	1.00	8	0.250
11	A	2	2	1.00	6	0.333
12	A	2	2	1.00	10	0.200
13	A	2	2	1.00	10	0.200
14	A	2	2	1.00	10	0.200
15	A	3	2	1.00	10	0.200
16	A	3	2	1.00	10	0.200
17	A	3	2	1.00	8	0.250
18	A	3	2	1.00	6	0.333
19	A	2	2	1.00	10	0.200
20	A	3	2	1.00	10	0.200
21	A	3	2	1.00	10	0.200
22	A	2	2	1.00	10	0.200
23	A	2	2	1.00	10	0.200
24	A	2	2	1.00	8	0.250
25	A	1	1	1.00	6	0.167

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
26	A	2	2	1.00	10	0.200
27	A	2	2	1.00	10	0.200
28	A	2	2	1.00	10	0.200
29	A	3	3	1.00	10	0.300
30	A	3	3	1.00	10	0.300
31	A	3	3	1.00	8	0.375
32	A	2	2	1.00	6	0.333
33	A	2	2	1.00	10	0.200
34	A	3	3	1.00	10	0.300
35	A	3	3	1.00	10	0.300
36	A	4	3	1.00	10	0.300
37	A	4	3	1.00	10	0.300
38	A	4	3	1.00	8	0.375
39	A	3	2	1.00	6	0.333
40	A	2	2	1.00	10	0.200
41	A	4	3	1.00	10	0.300
42	A	4	3	1.00	10	0.300
43	A	1	1	1.00	14	0.071
44	A	1	1	1.00	14	0.071
45	A	1	1	1.00	12	0.083
46	A	2	1	1.00	10	0.100
47	A	1	1	1.00	14	0.071
48	A	1	1	1.00	14	0.071
49	A	1	1	1.00	14	0.071
50	A	2	2	1.00	16	0.125
51	A	2	2	1.00	16	0.125
52	A	2	2	1.00	14	0.143
53	A	3	2	1.00	12	0.167
54	A	2	2	1.00	16	0.125
55	A	2	2	1.00	16	0.125
56	A	2	2	1.00	16	0.125
57	A	3	2	1.00	16	0.125
58	A	3	2	1.00	16	0.125
59	A	3	2	1.00	14	0.143
60	A	4	2	1.00	12	0.167

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
61	A	2	2	1.00	16	0.125
62	A	3	2	1.00	16	0.125
63	A	3	2	1.00	16	0.125
64	A	3	2	1.00	16	0.125
65	A	2	2	1.00	16	0.125
66	A	2	2	1.00	16	0.125
67	A	2	2	1.00	14	0.143
68	A	2	2	1.00	12	0.167
69	A	2	2	1.00	16	0.125
70	A	2	2	1.00	16	0.125
71	A	2	2	1.00	16	0.125
72	A	2	2	1.00	16	0.125
73	A	3	3	1.00	16	0.188
74	A	3	3	1.00	16	0.188
75	A	3	3	1.00	14	0.214
76	A	3	3	1.00	12	0.250
77	A	2	2	1.00	16	0.125
78	A	3	3	1.00	16	0.188
79	A	3	3	1.00	16	0.188
80	A	3	3	1.00	16	0.188
81	A	4	3	1.00	16	0.188
82	A	4	3	1.00	16	0.188
83	A	4	3	1.00	14	0.214
84	A	4	3	1.00	12	0.250
85	A	2	2	1.00	16	0.125
86	A	4	3	1.00	16	0.188
87	A	4	3	1.00	16	0.188
88	A	4	3	1.00	16	0.188
89	A	1	1	1.00	18	0.056
90	A	1	1	1.00	18	0.056
91	A	1	1	1.00	18	0.056
92	A	1	1	1.00	18	0.056
93	A	1	1	1.00	18	0.056
94	A	1	1	1.00	18	0.056
95	A	2	2	1.00	20	0.100

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
96	A	2	2	1.00	20	0.100
97	A	2	2	1.00	20	0.100
98	A	2	2	1.00	20	0.100
99	A	2	2	1.00	20	0.100
100	A	2	2	1.00	20	0.100
101	A	2	2	1.00	20	0.100
102	A	2	2	1.00	20	0.100
103	A	2	2	1.00	20	0.100
104	A	2	2	1.00	20	0.100
105	A	2	2	0.96	20	0.100
106	A	2	2	1.00	20	0.100
107	A	3	3	1.00	20	0.150
108	A	3	3	1.00	20	0.150
109	A	3	3	1.00	20	0.150
110	A	3	3	1.00	20	0.150
111	A	3	3	0.97	20	0.150
112	A	3	3	1.00	20	0.150
113	A	4	4	1.00	14	0.286
114	A	4	4	1.00	14	0.286
115	A	4	4	1.00	14	0.286
116	A	4	4	1.00	12	0.333
117	A	4	4	1.00	10	0.400
118	A	2	2	1.00	14	0.143
119	A	4	4	1.00	14	0.286
120	A	4	4	1.00	14	0.286
121	A	5	4	1.00	14	0.286
122	A	5	4	1.00	14	0.286
123	A	5	4	1.00	12	0.333
124	A	5	4	1.00	10	0.400
125	A	2	2	1.00	14	0.143
126	A	5	4	1.00	14	0.286
127	A	5	4	1.00	14	0.286
128	A	3	3	1.00	14	0.214
129	A	3	3	1.00	14	0.214
130	A	3	3	1.00	12	0.250

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
131	A	3	3	1.00	10	0.300
132	A	2	2	1.00	14	0.143
133	A	3	3	1.00	14	0.214
134	A	3	3	1.00	14	0.214
135	A	4	4	1.00	14	0.286
136	A	4	4	1.00	14	0.286
137	A	4	4	1.00	12	0.333
138	A	4	4	1.00	10	0.400
139	A	2	2	1.00	14	0.143
140	A	4	4	1.00	14	0.286
141	A	4	4	1.00	14	0.286
142	A	5	4	1.00	14	0.286
143	A	5	4	1.00	14	0.286
144	A	5	4	1.00	12	0.333
145	A	5	4	1.00	10	0.400
146	A	2	2	1.00	14	0.143
147	A	5	4	1.00	14	0.286
148	A	5	4	1.00	14	0.286
149	A	1	1	1.00	22	0.045
150	A	3	2	1.00	18	0.111
151	A	2	2	1.00	18	0.111
152	A	1	1	1.00	16	0.062
153	A	2	2	1.00	18	0.111
154	A	3	3	1.00	18	0.167
155	A	4	3	1.00	18	0.167
156	A	3	2	1.00	16	0.125
157	A	2	2	1.00	16	0.125
158	A	1	1	1.00	14	0.071
159	A	3	3	1.00	16	0.188
160	A	4	4	1.00	16	0.250
161	A	5	4	1.00	16	0.250
162	A	5	4	1.00	14	0.286
163	A	4	4	1.00	14	0.286
164	A	3	3	1.00	14	0.214
165	A	4	4	1.00	14	0.286

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
166	A	5	4	1.00	14	0.286
167	A	2	2	1.00	18	0.111
168	A	2	2	1.00	16	0.125
169	A	2	2	1.00	14	0.143
170	A	2	2	1.00	12	0.167
171	A	2	2	1.00	16	0.125
172	A	2	2	1.00	16	0.125
173	A	2	2	1.00	16	0.125
174	A	2	2	1.00	16	0.125
175	A	2	2	1.00	16	0.125
176	A	2	2	1.00	14	0.143
177	A	2	2	1.00	12	0.167
178	A	2	2	1.00	10	0.200
179	A	2	2	1.00	14	0.143
180	A	2	2	1.00	14	0.143
181	A	2	2	1.00	14	0.143
182	A	2	2	1.00	14	0.143
183	A	2	2	1.00	20	0.100
184	A	2	2	1.00	18	0.111
185	A	2	2	1.00	16	0.125
186	A	2	2	1.00	14	0.143
187	A	2	2	1.00	18	0.111
188	A	2	2	1.00	18	0.111
189	A	2	2	1.00	18	0.111
190	A	2	2	1.00	18	0.111
191	A	2	2	1.00	18	0.111
192	A	3	3	1.00	20	0.150
193	A	4	3	1.00	27	0.111

Chapter 3

Listing of integrals

Local contents

3.1 $\int x^3 \log(cx)\,dx$

Optimal. Leaf size=19

$$-\frac{x^4}{16}+\frac{1}{4}x^4\log(cx)$$

```
[Out] -1/16*x^4+1/4*x^4*ln(c*x)
```

Rubi [A]
time = 0.00, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2341}

$$\frac{1}{4}x^4\log(cx)-\frac{x^4}{16}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Log[c*x],x]
[Out] -1/16*x^4 + (x^4*Log[c*x])/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int x^3\log(cx)\,dx=-\frac{x^4}{16}+\frac{1}{4}x^4\log(cx)$$

Mathematica [A]
time = 0.00, size = 19, normalized size = 1.00

$$-\frac{x^4}{16}+\frac{1}{4}x^4\log(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Log[c*x],x]
[Out] -1/16*x^4 + (x^4*Log[c*x])/4
```

Maple [A]
time = 0.01, size = 26, normalized size = 1.37

method	result	size
norman	$-\frac{x^4}{16}+\frac{x^4\ln(cx)}{4}$	16
risch	$-\frac{x^4}{16}+\frac{x^4\ln(cx)}{4}$	16
derivativedivides	$\frac{\frac{c^4x^4\ln(cx)}{4}-\frac{c^4x^4}{16}}{c^4}$	26
default	$\frac{\frac{c^4x^4\ln(cx)}{4}-\frac{c^4x^4}{16}}{c^4}$	26

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*ln(c*x),x,method=_RETURNVERBOSE)
[Out] 1/c^4*(1/4*c^4*x^4*ln(c*x)-1/16*c^4*x^4)
```

Maxima [A]
time = 0.28, size = 15, normalized size = 0.79

$$\frac{1}{4}\,x^4\log\left(cx\right)-\frac{1}{16}\,x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x),x, algorithm="maxima")
[Out] 1/4*x^4*log(c*x) - 1/16*x^4
```

Fricas [A]
time = 0.35, size = 15, normalized size = 0.79

$$\frac{1}{4}\,x^4\log\left(cx\right)-\frac{1}{16}\,x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x),x, algorithm="fricas")
[Out] 1/4*x^4*log(c*x) - 1/16*x^4
```

Sympy [A]
time = 0.03, size = 14, normalized size = 0.74

$$\frac{x^4\log\left(cx\right)}{4}-\frac{x^4}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*ln(c*x),x)
[Out] x**4*log(c*x)/4 - x**4/16
```

Giac [A]
time = 3.17, size = 15, normalized size = 0.79

$$\frac{1}{4}\,x^4\log\left(cx\right)-\frac{1}{16}\,x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x),x, algorithm="giac")
```

```
[Out] 1/4*x^4*log(c*x) - 1/16*x^4
```

Mupad [B]
time = 0.04, size = 11, normalized size = 0.58

$$\frac{x^4\,\left(\ln\left(c\,x\right)-\frac{1}{4}\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*log(c*x),x)
```

```
[Out] (x^4*(log(c*x) - 1/4))/4
```

3.2 $\int x^2 \log(cx)\, dx$

Optimal. Leaf size=19

$$-\frac{x^3}{9}+\frac{1}{3}x^3\log(cx)$$

```
[Out] -1/9*x^3+1/3*x^3*ln(c*x)
```

Rubi [A]
time = 0.00, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2341}

$$\frac{1}{3}x^3\log(cx)-\frac{x^3}{9}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Log[c*x],x]
```

```
[Out] -1/9*x^3 + (x^3*Log[c*x])/3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int x^2\log(cx)\,dx=-\frac{x^3}{9}+\frac{1}{3}x^3\log(cx)$$

Mathematica [A]
time = 0.00, size = 19, normalized size = 1.00

$$-\frac{x^3}{9}+\frac{1}{3}x^3\log(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Log[c*x],x]
```

```
[Out] -1/9*x^3 + (x^3*Log[c*x])/3
```

Maple [A]
time = 0.01, size = 26, normalized size = 1.37

method	result	size
norman	$-\frac{x^3}{9}+\frac{x^3\ln(cx)}{3}$	16
risch	$-\frac{x^3}{9}+\frac{x^3\ln(cx)}{3}$	16
derivativedivides	$\frac{\frac{c^3x^3\ln(cx)}{3}-\frac{c^3x^3}{9}}{c^3}$	26
default	$\frac{\frac{c^3x^3\ln(cx)}{3}-\frac{c^3x^3}{9}}{c^3}$	26

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*ln(c*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^3*(1/3*c^3*x^3*ln(c*x)-1/9*c^3*x^3)
```

Maxima [A]
time = 0.27, size = 15, normalized size = 0.79

$$\frac{1}{3}\,x^3\log\left(cx\right)-\frac{1}{9}\,x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x),x, algorithm="maxima")
```

```
[Out] 1/3*x^3*log(c*x) - 1/9*x^3
```

Fricas [A]
time = 0.36, size = 15, normalized size = 0.79

$$\frac{1}{3}\,x^3\log\left(cx\right)-\frac{1}{9}\,x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x),x, algorithm="fricas")
```

```
[Out] 1/3*x^3*log(c*x) - 1/9*x^3
```

Sympy [A]
time = 0.03, size = 14, normalized size = 0.74

$$\frac{x^3\log\left(cx\right)}{3}-\frac{x^3}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*ln(c*x),x)
```

```
[Out] x**3*log(c*x)/3 - x**3/9
```

Giac [A]
time = 3.48, size = 15, normalized size = 0.79

$$\frac{1}{3}\,x^3 \log\left(cx\right) - \frac{1}{9}\,x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x),x, algorithm="giac")
```

```
[Out] 1/3*x^3*log(c*x) - 1/9*x^3
```

Mupad [B]
time = 0.03, size = 11, normalized size = 0.58

$$\frac{x^3\left(\ln\left(c\,x\right)-\frac{1}{3}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*log(c*x),x)
```

```
[Out] (x^3*(log(c*x) - 1/3))/3
```

3.3 $\int x \log(cx)\,dx$

Optimal. Leaf size=19

$$-\frac{x^2}{4}+\frac{1}{2}x^2\log(cx)$$

```
[Out] -1/4*x^2+1/2*x^2*ln(c*x)
```

Rubi [A]
time = 0.00, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}=0.167$, Rules used = {2341}

$$\frac{1}{2}x^2\log(cx)-\frac{x^2}{4}$$

Antiderivative was successfully verified.

```
[In] Int[x*Log[c*x],x]
```

```
[Out] -1/4*x^2 + (x^2*Log[c*x])/2
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int x\log(cx)\,dx=-\frac{x^2}{4}+\frac{1}{2}x^2\log(cx)$$

Mathematica [A]
time = 0.00, size = 19, normalized size = 1.00

$$-\frac{x^2}{4}+\frac{1}{2}x^2\log(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Log[c*x],x]
```

```
[Out] -1/4*x^2 + (x^2*Log[c*x])/2
```

Maple [A]
time = 0.01, size = 26, normalized size = 1.37

method	result	size
norman	$-\frac{x^2}{4}+\frac{x^2\ln(cx)}{2}$	16
risch	$-\frac{x^2}{4}+\frac{x^2\ln(cx)}{2}$	16
derivativedivides	$\frac{\frac{c^2x^2\ln(cx)}{2}-\frac{c^2x^2}{4}}{c^2}$	26
default	$\frac{\frac{c^2x^2\ln(cx)}{2}-\frac{c^2x^2}{4}}{c^2}$	26

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(c*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^2*(1/2*c^2*x^2*ln(c*x)-1/4*c^2*x^2)
```

Maxima [A]
time = 0.27, size = 15, normalized size = 0.79

$$\frac{1}{2}\,x^2\log\left(cx\right)-\frac{1}{4}\,x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x),x, algorithm="maxima")
```

```
[Out] 1/2*x^2*log(c*x) - 1/4*x^2
```

Fricas [A]
time = 0.35, size = 15, normalized size = 0.79

$$\frac{1}{2}\,x^2\log\left(cx\right)-\frac{1}{4}\,x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x),x, algorithm="fricas")
```

```
[Out] 1/2*x^2*log(c*x) - 1/4*x^2
```

Sympy [A]
time = 0.02, size = 14, normalized size = 0.74

$$\frac{x^2\log\left(cx\right)}{2}-\frac{x^2}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(c*x),x)
```

```
[Out] x**2*log(c*x)/2 - x**2/4
```

Giac [A]
time = 2.84, size = 15, normalized size = 0.79

$$\frac{1}{2}x^2\log\left(cx\right) - \frac{1}{4}x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x),x, algorithm="giac")
```

```
[Out] 1/2*x^2*log(c*x) - 1/4*x^2
```

Mupad [B]
time = 0.03, size = 11, normalized size = 0.58

$$\frac{x^2\left(\ln\left(c\,x\right) - \frac{1}{2}\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(c*x),x)
```

```
[Out] (x^2*(log(c*x) - 1/2))/2
```

3.4 $\int \log(cx)\,dx$

Optimal. Leaf size=10

$$-x + x\log(cx)$$

```
[Out] -x+x*ln(c*x)
```

Rubi [A]
time = 0.00, antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2332}

$$x\log(cx) - x$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x],x]
```

```
[Out] -x + x*Log[c*x]
```

Rule 2332

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

Rubi steps

$$\int \log(cx)\,dx = -x + x\log(cx)$$

Mathematica [A]
time = 0.00, size = 10, normalized size = 1.00

$$-x + x\log(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x],x]
```

```
[Out] -x + x*Log[c*x]
```

Maple [A]
time = 0.01, size = 17, normalized size = 1.70

method	result	size

norman	$-x + x\ln(cx)$	11
risch	$-x + x\ln(cx)$	11
derivativedivides	$\frac{cx\ln(cx)-cx}{c}$	17
default	$\frac{cx\ln(cx)-cx}{c}$	17

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x),x,method=_RETURNVERBOSE)
[Out] 1/c*(c*x*ln(c*x)-c*x)
```

Maxima [A]
time = 0.28, size = 16, normalized size = 1.60

$$\frac{cx\log(cx) - cx}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x),x, algorithm="maxima")
[Out] (c*x*log(c*x) - c*x)/c
```

Fricas [A]
time = 0.34, size = 10, normalized size = 1.00

$$x\log(cx) - x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x),x, algorithm="fricas")
[Out] x*log(c*x) - x
```

Sympy [A]
time = 0.02, size = 7, normalized size = 0.70

$$x\log(cx) - x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x),x)
[Out] x*log(c*x) - x
```

Giac [A]
time = 2.44, size = 16, normalized size = 1.60

$$\frac{cx\log(cx) - cx}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x),x, algorithm="giac")
```

```
[Out] (c*x*log(c*x) - c*x)/c
```

Mupad [B]
time = 0.02, size = 8, normalized size = 0.80

$$x\,\left(\ln\left(c\,x\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x),x)
```

```
[Out] x*(log(c*x) - 1)
```

3.5 $\int \frac{\log(cx)}{x} \, dx$

Optimal. Leaf size=10

$$\frac{1}{2}\log^2(cx)$$

[Out] 1/2*ln(c*x)^2

Rubi [A]
time = 0.00, antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2338}

$$\frac{1}{2}\log^2(cx)$$

Antiderivative was successfully verified.

[In] Int[Log[c*x]/x,x]

[Out] Log[c*x]^2/2

Rule 2338

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

Rubi steps

$$\int \frac{\log(cx)}{x} \, dx = \frac{1}{2}\log^2(cx)$$

Mathematica [A]
time = 0.00, size = 10, normalized size = 1.00

$$\frac{1}{2}\log^2(cx)$$

Antiderivative was successfully verified.

[In] Integrate[Log[c*x]/x,x]

[Out] Log[c*x]^2/2

Maple [A]
time = 0.01, size = 9, normalized size = 0.90

method	result	size
derivativedivides	$\frac{\ln(cx)^2}{2}$	9
default	$\frac{\ln(cx)^2}{2}$	9
norman	$\frac{\ln(cx)^2}{2}$	9
risch	$\frac{\ln(cx)^2}{2}$	9

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*ln(c*x)^2
```

Maxima [A]
time = 0.28, size = 8, normalized size = 0.80

$$\frac{1}{2}\log(cx)^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x,x, algorithm="maxima")
```

```
[Out] 1/2*log(c*x)^2
```

Fricas [A]
time = 0.34, size = 8, normalized size = 0.80

$$\frac{1}{2}\log(cx)^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x,x, algorithm="fricas")
```

```
[Out] 1/2*log(c*x)^2
```

Sympy [A]
time = 0.02, size = 7, normalized size = 0.70

$$\frac{\log(cx)^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)/x,x)
```

```
[Out] log(c*x)**2/2
```

<u>Giac</u> [**A**]
time = 4.80, size = 8, normalized size = 0.80

$$\frac{1}{2}\log\left(cx\right)^{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x,x, algorithm="giac")
```

```
[Out] 1/2*log(c*x)^2
```

<u>Mupad</u> [**B**]
time = 3.60, size = 8, normalized size = 0.80

$$\frac{\ln\left(c\,x\right)^{2}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)/x,x)
```

```
[Out] log(c*x)^2/2
```

3.6 $\int \frac{\log(cx)}{x^2}\,dx$

Optimal. Leaf size=15

$$-\frac{1}{x}-\frac{\log(cx)}{x}$$

[Out] -1/x-ln(c*x)/x

Rubi [A]
time = 0.00, antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2341}

$$-\frac{\log(cx)}{x}-\frac{1}{x}$$

Antiderivative was successfully verified.

[In] Int[Log[c*x]/x^2,x]

[Out] -x^(-1) - Log[c*x]/x

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{\log(cx)}{x^2}\,dx = -\frac{1}{x}-\frac{\log(cx)}{x}$$

Mathematica [A]
time = 0.00, size = 15, normalized size = 1.00

$$-\frac{1}{x}-\frac{\log(cx)}{x}$$

Antiderivative was successfully verified.

[In] Integrate[Log[c*x]/x^2,x]

[Out] -x^(-1) - Log[c*x]/x

Maple [A]
time = 0.01, size = 24, normalized size = 1.60

method	result	size
norman	$\frac{-1-\ln(cx)}{x}$	13
risch	$-\frac{1}{x}-\frac{\ln(cx)}{x}$	16
derivativedivides	$c\left(-\frac{\ln(cx)}{cx}-\frac{1}{cx}\right)$	24
default	$c\left(-\frac{\ln(cx)}{cx}-\frac{1}{cx}\right)$	24

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] c*(-ln(c*x)/c/x-1/c/x)
```

Maxima [A]
time = 0.28, size = 15, normalized size = 1.00

$$-\frac{\log(cx)}{x}-\frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x^2,x, algorithm="maxima")
```

```
[Out] -log(c*x)/x - 1/x
```

Fricas [A]
time = 0.37, size = 11, normalized size = 0.73

$$-\frac{\log(cx)+1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x^2,x, algorithm="fricas")
```

```
[Out] -(log(c*x) + 1)/x
```

Sympy [A]
time = 0.03, size = 10, normalized size = 0.67

$$-\frac{\log(cx)}{x}-\frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)/x**2,x)
```

```
[Out] -log(c*x)/x - 1/x
```

Giac [A]
time = 3.99, size = 15, normalized size = 1.00

$$-\frac{\log\left(cx\right)}{x}-\frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x^2,x, algorithm="giac")
```

```
[Out] -log(c*x)/x - 1/x
```

Mupad [B]
time = 3.48, size = 11, normalized size = 0.73

$$-\frac{\ln\left(c\,x\right)+1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)/x^2,x)
```

```
[Out] -(log(c*x) + 1)/x
```

3.7 $\int \frac{\log(cx)}{x^3} dx$

Optimal. Leaf size=19

$$-\frac{1}{4x^2} - \frac{\log(cx)}{2x^2}$$

```
[Out] -1/4/x^2-1/2*ln(c*x)/x^2
```

Rubi [A]
time = 0.00, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2341}

$$-\frac{\log(cx)}{2x^2} - \frac{1}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]/x^3,x]
```

```
[Out] -1/4*1/x^2 - Log[c*x]/(2*x^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{\log(cx)}{x^3} dx = -\frac{1}{4x^2} - \frac{\log(cx)}{2x^2}$$

Mathematica [A]
time = 0.00, size = 19, normalized size = 1.00

$$-\frac{1}{4x^2} - \frac{\log(cx)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]/x^3,x]
```

```
[Out] -1/4*1/x^2 - Log[c*x]/(2*x^2)
```

Maple [A]
time = 0.01, size = 26, normalized size = 1.37

method	result	size
norman	$\frac{-\frac{1}{4}-\frac{\ln(cx)}{2}}{x^2}$	13
risch	$-\frac{1}{4x^2}-\frac{\ln(cx)}{2x^2}$	16
derivativedivides	$c^2\left(-\frac{\ln(cx)}{2c^2x^2}-\frac{1}{4c^2x^2}\right)$	26
default	$c^2\left(-\frac{\ln(cx)}{2c^2x^2}-\frac{1}{4c^2x^2}\right)$	26

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] c^2*(-1/2*ln(c*x)/c^2/x^2-1/4/c^2/x^2)
```

Maxima [A]
time = 0.27, size = 15, normalized size = 0.79

$$-\frac{\log\left(cx\right)}{2\,x^2}-\frac{1}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x^3,x, algorithm="maxima")
```

```
[Out] -1/2*log(c*x)/x^2 - 1/4/x^2
```

Fricas [A]
time = 0.34, size = 13, normalized size = 0.68

$$-\frac{2\,\log\left(cx\right)+1}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(2*log(c*x) + 1)/x^2
```

Sympy [A]
time = 0.03, size = 17, normalized size = 0.89

$$-\frac{\log\left(cx\right)}{2x^2}-\frac{1}{4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)/x**3,x)
```

```
[Out] -log(c*x)/(2*x**2) - 1/(4*x**2)
```

Giac [A]
time = 3.48, size = 15, normalized size = 0.79

$$-\frac{\log(cx)}{2\,x^2}-\frac{1}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)/x^3,x, algorithm="giac")
[Out] -1/2*log(c*x)/x^2 - 1/4/x^2
```

Mupad [B]
time = 0.02, size = 11, normalized size = 0.58

$$-\frac{\ln(c\,x)+\frac{1}{2}}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)/x^3,x)
[Out] -(log(c*x) + 1/2)/(2*x^2)
```

3.8 $\int x^3 \log^2(cx)\,dx$

Optimal. Leaf size=32

$$\frac{x^4}{32} - \frac{1}{8}x^4 \log(cx) + \frac{1}{4}x^4 \log^2(cx)$$

```
[Out] 1/32*x^4-1/8*x^4*ln(c*x)+1/4*x^4*ln(c*x)^2
```

Rubi [A]
time = 0.01, antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2342, 2341}

$$\frac{1}{4}x^4 \log^2(cx) - \frac{1}{8}x^4 \log(cx) + \frac{x^4}{32}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Log[c*x]^2,x]
```

```
[Out] x^4/32 - (x^4*Log[c*x])/8 + (x^4*Log[c*x]^2)/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^3 \log^2(cx)\,dx &= \frac{1}{4}x^4 \log^2(cx) - \frac{1}{2}\int x^3 \log(cx)\,dx \\ &= \frac{x^4}{32} - \frac{1}{8}x^4 \log(cx) + \frac{1}{4}x^4 \log^2(cx)\end{aligned}$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.00

$$\frac{x^4}{32} - \frac{1}{8}x^4 \log(cx) + \frac{1}{4}x^4 \log^2(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Log[c*x]^2,x]
```

```
[Out] x^4/32 - (x^4*Log[c*x])/8 + (x^4*Log[c*x]^2)/4
```

Maple [A]
time = 0.01, size = 40, normalized size = 1.25

method	result	size
norman	$\frac{x^4}{32}-\frac{x^4\ln(cx)}{8}+\frac{x^4\ln(cx)^2}{4}$	27
risch	$\frac{x^4}{32}-\frac{x^4\ln(cx)}{8}+\frac{x^4\ln(cx)^2}{4}$	27
derivativedivides	$\frac{\frac{c^4x^4\ln(cx)^2}{4}-\frac{c^4x^4\ln(cx)}{8}+\frac{c^4x^4}{32}}{c^4}$	40
default	$\frac{\frac{c^4x^4\ln(cx)^2}{4}-\frac{c^4x^4\ln(cx)}{8}+\frac{c^4x^4}{32}}{c^4}$	40

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*ln(c*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^4*(1/4*c^4*x^4*ln(c*x)^2-1/8*c^4*x^4*ln(c*x)+1/32*c^4*x^4)
```

Maxima [A]
time = 0.28, size = 21, normalized size = 0.66

$$\frac{1}{32}\left(8\log\left(cx\right)^2-4\log\left(cx\right)+1\right)x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x)^2,x, algorithm="maxima")
```

```
[Out] 1/32*(8*log(c*x)^2 - 4*log(c*x) + 1)*x^4
```

Fricas [A]
time = 0.34, size = 26, normalized size = 0.81

$$\frac{1}{4}x^4\log\left(cx\right)^2-\frac{1}{8}x^4\log\left(cx\right)+\frac{1}{32}x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x)^2,x, algorithm="fricas")
```

```
[Out] 1/4*x^4*log(c*x)^2 - 1/8*x^4*log(c*x) + 1/32*x^4
```

Sympy [A]
time = 0.04, size = 26, normalized size = 0.81

$$\frac{x^4\log\left(cx\right)^2}{4}-\frac{x^4\log\left(cx\right)}{8}+\frac{x^4}{32}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*ln(c*x)**2,x)
[Out] x**4*log(c*x)**2/4 - x**4*log(c*x)/8 + x**4/32
```

Giac [A]
time = 3.00, size = 26, normalized size = 0.81

$$\frac{1}{4}\,x^4\log\left(cx\right)^2 - \frac{1}{8}\,x^4\log\left(cx\right) + \frac{1}{32}\,x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x)^2,x, algorithm="giac")
[Out] 1/4*x^4*log(c*x)^2 - 1/8*x^4*log(c*x) + 1/32*x^4
```

Mupad [B]
time = 3.60, size = 21, normalized size = 0.66

$$\frac{x^4\left(8\ln\left(c\,x\right)^2 - 4\,\ln\left(c\,x\right) + 1\right)}{32}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*log(c*x)^2,x)
[Out] (x^4*(8*log(c*x)^2 - 4*log(c*x) + 1))/32
```

3.9 $\int x^2 \log^2(cx)\,dx$

Optimal. Leaf size=32

$$\frac{2x^3}{27}-\frac{2}{9}x^3\log(cx)+\frac{1}{3}x^3\log^2(cx)$$

```
[Out] 2/27*x^3-2/9*x^3*ln(c*x)+1/3*x^3*ln(c*x)^2
```

Rubi [A]
time = 0.01, antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2342, 2341}

$$\frac{1}{3}x^3\log^2(cx)-\frac{2}{9}x^3\log(cx)+\frac{2x^3}{27}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Log[c*x]^2,x]
```

```
[Out] (2*x^3)/27 - (2*x^3*Log[c*x])/9 + (x^3*Log[c*x]^2)/3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^2\log^2(cx)\,dx&=\frac{1}{3}x^3\log^2(cx)-\frac{2}{3}\int x^2\log(cx)\,dx\\&=\frac{2x^3}{27}-\frac{2}{9}x^3\log(cx)+\frac{1}{3}x^3\log^2(cx)\end{aligned}$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.00

$$\frac{2x^3}{27}-\frac{2}{9}x^3\log(cx)+\frac{1}{3}x^3\log^2(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Log[c*x]^2,x]
[Out] (2*x^3)/27 - (2*x^3*Log[c*x])/9 + (x^3*Log[c*x]^2)/3
```

Maple [A]
time = 0.01, size = 40, normalized size = 1.25

method	result	size
norman	$\frac{2x^3}{27}-\frac{2x^3\ln(cx)}{9}+\frac{x^3\ln(cx)^2}{3}$	27
risch	$\frac{2x^3}{27}-\frac{2x^3\ln(cx)}{9}+\frac{x^3\ln(cx)^2}{3}$	27
derivativedivides	$\frac{\frac{c^3x^3\ln(cx)^2}{3}-\frac{2c^3x^3\ln(cx)}{9}+\frac{2c^3x^3}{27}}{c^3}$	40
default	$\frac{\frac{c^3x^3\ln(cx)^2}{3}-\frac{2c^3x^3\ln(cx)}{9}+\frac{2c^3x^3}{27}}{c^3}$	40

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] 1/c^3*(1/3*c^3*x^3*ln(c*x)^2-2/9*c^3*x^3*ln(c*x)+2/27*c^3*x^3)
```

Maxima [A]
time = 0.30, size = 21, normalized size = 0.66

$$\frac{1}{27}\left(9\,\log\left(cx\right)^2-6\,\log\left(cx\right)+2\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x)^2,x, algorithm="maxima")
[Out] 1/27*(9*log(c*x)^2 - 6*log(c*x) + 2)*x^3
```

Fricas [A]
time = 0.35, size = 26, normalized size = 0.81

$$\frac{1}{3}\,x^3\log\left(cx\right)^2-\frac{2}{9}\,x^3\log\left(cx\right)+\frac{2}{27}\,x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x)^2,x, algorithm="fricas")
[Out] 1/3*x^3*log(c*x)^2 - 2/9*x^3*log(c*x) + 2/27*x^3
```

Sympy [A]
time = 0.04, size = 29, normalized size = 0.91

$$\frac{x^3\log\left(cx\right)^2}{3}-\frac{2x^3\log\left(cx\right)}{9}+\frac{2x^3}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*ln(c*x)**2,x)
```

```
[Out] x**3*log(c*x)**2/3 - 2*x**3*log(c*x)/9 + 2*x**3/27
```

Giac [A]
time = 3.62, size = 26, normalized size = 0.81

$$\frac{1}{3}\,x^{3}\log\left(cx\right)^{2}-\frac{2}{9}\,x^{3}\log\left(cx\right)+\frac{2}{27}\,x^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x)^2,x, algorithm="giac")
```

```
[Out] 1/3*x^3*log(c*x)^2 - 2/9*x^3*log(c*x) + 2/27*x^3
```

Mupad [B]
time = 3.55, size = 21, normalized size = 0.66

$$\frac{x^{3}\,\left(9\ln\left(c\,x\right)^{2}-6\,\ln\left(c\,x\right)+2\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*log(c*x)^2,x)
```

```
[Out] (x^3*(9*log(c*x)^2 - 6*log(c*x) + 2))/27
```

3.10 $\int x \log^2(cx)\,dx$

Optimal. Leaf size=32

$$\frac{x^2}{4}-\frac{1}{2}x^2\log(cx)+\frac{1}{2}x^2\log^2(cx)$$

```
[Out] 1/4*x^2-1/2*x^2*ln(c*x)+1/2*x^2*ln(c*x)^2
```

Rubi [A]
time = 0.01, antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {2342, 2341}

$$\frac{1}{2}x^2\log^2(cx)-\frac{1}{2}x^2\log(cx)+\frac{x^2}{4}$$

Antiderivative was successfully verified.

```
[In] Int[x*Log[c*x]^2,x]
```

```
[Out] x^2/4 - (x^2*Log[c*x])/2 + (x^2*Log[c*x]^2)/2
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x\log^2(cx)\,dx&=\frac{1}{2}x^2\log^2(cx)-\int x\log(cx)\,dx\\&=\frac{x^2}{4}-\frac{1}{2}x^2\log(cx)+\frac{1}{2}x^2\log^2(cx)\end{aligned}$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.00

$$\frac{x^2}{4}-\frac{1}{2}x^2\log(cx)+\frac{1}{2}x^2\log^2(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Log[c*x]^2,x]
```

```
[Out] x^2/4 - (x^2*Log[c*x])/2 + (x^2*Log[c*x]^2)/2
```

Maple [A]
time = 0.01, size = 40, normalized size = 1.25

method	result	size
norman	$\frac{x^2}{4}-\frac{x^2\ln(cx)}{2}+\frac{x^2\ln(cx)^2}{2}$	27
risch	$\frac{x^2}{4}-\frac{x^2\ln(cx)}{2}+\frac{x^2\ln(cx)^2}{2}$	27
derivativedivides	$\frac{\frac{c^2x^2\ln(cx)^2}{2}-\frac{c^2x^2\ln(cx)}{2}+\frac{c^2x^2}{4}}{c^2}$	40
default	$\frac{\frac{c^2x^2\ln(cx)^2}{2}-\frac{c^2x^2\ln(cx)}{2}+\frac{c^2x^2}{4}}{c^2}$	40

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(c*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^2*(1/2*c^2*x^2*ln(c*x)^2-1/2*c^2*x^2*ln(c*x)+1/4*c^2*x^2)
```

Maxima [A]
time = 0.29, size = 21, normalized size = 0.66

$$\frac{1}{4}\left(2\log\left(cx\right)^2-2\log\left(cx\right)+1\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x)^2,x, algorithm="maxima")
```

```
[Out] 1/4*(2*log(c*x)^2 - 2*log(c*x) + 1)*x^2
```

Fricas [A]
time = 0.35, size = 26, normalized size = 0.81

$$\frac{1}{2}x^2\log\left(cx\right)^2-\frac{1}{2}x^2\log\left(cx\right)+\frac{1}{4}x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x)^2,x, algorithm="fricas")
```

```
[Out] 1/2*x^2*log(c*x)^2 - 1/2*x^2*log(c*x) + 1/4*x^2
```

Sympy [A]
time = 0.03, size = 26, normalized size = 0.81

$$\frac{x^2\log\left(cx\right)^2}{2}-\frac{x^2\log\left(cx\right)}{2}+\frac{x^2}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(c*x)**2,x)
```

```
[Out] x**2*log(c*x)**2/2 - x**2*log(c*x)/2 + x**2/4
```

Giac [A]
time = 4.13, size = 26, normalized size = 0.81

$$\frac{1}{2}\,x^2\log\left(cx\right)^2-\frac{1}{2}\,x^2\log\left(cx\right)+\frac{1}{4}\,x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x)^2,x, algorithm="giac")
```

```
[Out] 1/2*x^2*log(c*x)^2 - 1/2*x^2*log(c*x) + 1/4*x^2
```

Mupad [B]
time = 3.49, size = 21, normalized size = 0.66

$$\frac{x^2\,\left(2\ln\left(c\,x\right)^2-2\,\ln\left(c\,x\right)+1\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(c*x)^2,x)
```

```
[Out] (x^2*(2*log(c*x)^2 - 2*log(c*x) + 1))/4
```

3.11 $\int \log^2(cx)\,dx$

Optimal. Leaf size=19

$$2x-2x\log(cx)+x\log^2(cx)$$

```
[Out] 2*x-2*x*ln(c*x)+x*ln(c*x)^2
```

Rubi [A]

time = 0.00, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {2333, 2332}

$$x\log^2(cx)-2x\log(cx)+2x$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^2,x]
```

```
[Out] 2*x - 2*x*Log[c*x] + x*Log[c*x]^2
```

Rule 2332

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

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rubi steps

$$\begin{aligned}\int \log^2(cx)\,dx &= x\log^2(cx)-2\int \log(cx)\,dx\\ &= 2x-2x\log(cx)+x\log^2(cx)\end{aligned}$$

Mathematica [A]

time = 0.00, size = 19, normalized size = 1.00

$$2x-2x\log(cx)+x\log^2(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^2,x]
```

```
[Out] 2*x - 2*x*Log[c*x] + x*Log[c*x]^2
```

Maple [A]
time = 0.01, size = 27, normalized size = 1.42

method	result	size
norman	$2x - 2x\ln(cx) + x\ln(cx)^2$	20
risch	$2x - 2x\ln(cx) + x\ln(cx)^2$	20
derivativedivides	$\frac{\ln(cx)^2 cx - 2cx\ln(cx) + 2cx}{c}$	27
default	$\frac{\ln(cx)^2 cx - 2cx\ln(cx) + 2cx}{c}$	27

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] 1/c*(ln(c*x)^2*c*x-2*c*x*ln(c*x)+2*c*x)
```

Maxima [A]
time = 0.28, size = 16, normalized size = 0.84

$$\left(\log(cx)^2 - 2\log(cx) + 2\right)x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2,x, algorithm="maxima")
[Out] (log(c*x)^2 - 2*log(c*x) + 2)*x
```

Fricas [A]
time = 0.34, size = 19, normalized size = 1.00

$$x\log(cx)^2 - 2\,x\log(cx) + 2\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2,x, algorithm="fricas")
[Out] x*log(c*x)^2 - 2*x*log(c*x) + 2*x
```

Sympy [A]
time = 0.03, size = 19, normalized size = 1.00

$$x\log(cx)^2 - 2x\log(cx) + 2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**2,x)
```

```
[Out] x*log(c*x)**2 - 2*x*log(c*x) + 2*x
```

Giac [A]
time = 3.16, size = 19, normalized size = 1.00

$$x\log(cx)^2 - 2x\log(cx) + 2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2,x, algorithm="giac")
```

```
[Out] x*log(c*x)^2 - 2*x*log(c*x) + 2*x
```

Mupad [B]
time = 3.59, size = 16, normalized size = 0.84

$$x\left(\ln(c\,x)^2 - 2\,\ln(c\,x) + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^2,x)
```

```
[Out] x*(log(c*x)^2 - 2*log(c*x) + 2)
```

3.12 $\int \frac{\log^2(cx)}{x} \, dx$

Optimal. Leaf size=10

$$\frac{1}{3}\log^3(cx)$$

```
[Out] 1/3*ln(c*x)^3
```

Rubi [A]
time = 0.01, antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2339, 30}

$$\frac{1}{3}\log^3(cx)$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^2/x,x]
```

```
[Out] Log[c*x]^3/3
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\log^2(cx)}{x} \, dx &= \text{Subst}\left(\int x^2 \, dx, x, \log(cx)\right)\\
&= \frac{1}{3}\log^3(cx)
\end{aligned}$$

Mathematica [A]
time = 0.00, size = 10, normalized size = 1.00

$$\frac{1}{3}\log^3(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^2/x,x]
```

```
[Out] Log[c*x]^3/3
```

Maple [A]
time = 0.01, size = 9, normalized size = 0.90

method	result	size
derivativedivides	$\frac{\ln(cx)^3}{3}$	9
default	$\frac{\ln(cx)^3}{3}$	9
norman	$\frac{\ln(cx)^3}{3}$	9
risch	$\frac{\ln(cx)^3}{3}$	9

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^2/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*ln(c*x)^3
```

Maxima [A]
time = 0.27, size = 8, normalized size = 0.80

$$\frac{1}{3}\log\left(cx\right)^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x,x, algorithm="maxima")
```

```
[Out] 1/3*log(c*x)^3
```

Fricas [A]
time = 0.36, size = 8, normalized size = 0.80

$$\frac{1}{3}\log\left(cx\right)^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x,x, algorithm="fricas")
```

```
[Out] 1/3*log(c*x)^3
```

Sympy [A]
time = 0.03, size = 7, normalized size = 0.70

$$\frac{\log\left(cx\right)^{3}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**2/x,x)
```

```
[Out] log(c*x)**3/3
```

Giac [A]
time = 2.51, size = 8, normalized size = 0.80

$$\frac{1}{3}\log\left(cx\right)^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x,x, algorithm="giac")
```

```
[Out] 1/3*log(c*x)^3
```

Mupad [B]
time = 3.40, size = 8, normalized size = 0.80

$$\frac{\ln\left(c\,x\right)^{3}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^2/x,x)
```

```
[Out] log(c*x)^3/3
```

3.13 $\int \frac{\log^2(cx)}{x^2}\,dx$

Optimal. Leaf size=26

$$-\frac{2}{x}-\frac{2\log(cx)}{x}-\frac{\log^2(cx)}{x}$$

```
[Out] -2/x-2*ln(c*x)/x-ln(c*x)^2/x
```

Rubi [A]
time = 0.01, antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2342, 2341}

$$-\frac{\log^2(cx)}{x}-\frac{2\log(cx)}{x}-\frac{2}{x}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^2/x^2,x]
```

```
[Out] -2/x - (2*Log[c*x])/x - Log[c*x]^2/x
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\log^2(cx)}{x^2}\,dx &= -\frac{\log^2(cx)}{x}+2\int \frac{\log(cx)}{x^2}\,dx\\ &= -\frac{2}{x}-\frac{2\log(cx)}{x}-\frac{\log^2(cx)}{x}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 26, normalized size = 1.00

$$-\frac{2}{x}-\frac{2\log(cx)}{x}-\frac{\log^2(cx)}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^2/x^2,x]
[Out] -2/x - (2*Log[c*x])/x - Log[c*x]^2/x
```

Maple [A]
time = 0.02, size = 38, normalized size = 1.46

method	result	size
norman	$\frac{-2-\ln(cx)^2-2\ln(cx)}{x}$	21
risch	$-\frac{2}{x}-\frac{2\ln(cx)}{x}-\frac{\ln(cx)^2}{x}$	27
derivativedivides	$c\left(-\frac{\ln(cx)^2}{cx}-\frac{2\ln(cx)}{cx}-\frac{2}{cx}\right)$	38
default	$c\left(-\frac{\ln(cx)^2}{cx}-\frac{2\ln(cx)}{cx}-\frac{2}{cx}\right)$	38

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^2/x^2,x,method=_RETURNVERBOSE)
[Out] c*(-ln(c*x)^2/c/x-2*ln(c*x)/c/x-2/c/x)
```

Maxima [A]
time = 0.28, size = 19, normalized size = 0.73

$$-\frac{\log(cx)^2+2\log(cx)+2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x^2,x, algorithm="maxima")
[Out] -(log(c*x)^2 + 2*log(c*x) + 2)/x
```

Fricas [A]
time = 0.35, size = 19, normalized size = 0.73

$$-\frac{\log(cx)^2+2\log(cx)+2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x^2,x, algorithm="fricas")
[Out] -(log(c*x)^2 + 2*log(c*x) + 2)/x
```

Sympy [A]
time = 0.04, size = 20, normalized size = 0.77

$$-\frac{\log(cx)^2}{x}-\frac{2\log(cx)}{x}-\frac{2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**2/x**2,x)
```

```
[Out] -log(c*x)**2/x - 2*log(c*x)/x - 2/x
```

Giac [A]
time = 2.72, size = 26, normalized size = 1.00

$$-\frac{\log(cx)^2}{x} - \frac{2\log(cx)}{x} - \frac{2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x^2,x, algorithm="giac")
```

```
[Out] -log(c*x)^2/x - 2*log(c*x)/x - 2/x
```

Mupad [B]
time = 3.59, size = 19, normalized size = 0.73

$$-\frac{\ln(c\,x)^2 + 2\,\ln(c\,x) + 2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^2/x^2,x)
```

```
[Out] -(2*log(c*x) + log(c*x)^2 + 2)/x
```

3.14 $\int \frac{\log^2(cx)}{x^3}\,dx$

Optimal. Leaf size=32

$$-\frac{1}{4x^2}-\frac{\log(cx)}{2x^2}-\frac{\log^2(cx)}{2x^2}$$

```
[Out] -1/4/x^2-1/2*ln(c*x)/x^2-1/2*ln(c*x)^2/x^2
```

Rubi [A]
time = 0.01, antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2342, 2341}

$$-\frac{\log^2(cx)}{2x^2}-\frac{\log(cx)}{2x^2}-\frac{1}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^2/x^3,x]
```

```
[Out] -1/4*1/x^2 - Log[c*x]/(2*x^2) - Log[c*x]^2/(2*x^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\log^2(cx)}{x^3}\,dx &= -\frac{\log^2(cx)}{2x^2}+\int \frac{\log(cx)}{x^3}\,dx\\ &= -\frac{1}{4x^2}-\frac{\log(cx)}{2x^2}-\frac{\log^2(cx)}{2x^2}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.00

$$-\frac{1}{4x^2}-\frac{\log(cx)}{2x^2}-\frac{\log^2(cx)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^2/x^3,x]
```

```
[Out] -1/4*1/x^2 - Log[c*x]/(2*x^2) - Log[c*x]^2/(2*x^2)
```

Maple [A]
time = 0.02, size = 40, normalized size = 1.25

method	result	size
norman	$\frac{-\frac{1}{4}-\frac{\ln(cx)^2}{2}-\frac{\ln(cx)}{2}}{x^2}$	21
risch	$-\frac{1}{4x^2}-\frac{\ln(cx)}{2x^2}-\frac{\ln(cx)^2}{2x^2}$	27
derivativedivides	$c^2\left(-\frac{\ln(cx)^2}{2c^2x^2}-\frac{\ln(cx)}{2c^2x^2}-\frac{1}{4c^2x^2}\right)$	40
default	$c^2\left(-\frac{\ln(cx)^2}{2c^2x^2}-\frac{\ln(cx)}{2c^2x^2}-\frac{1}{4c^2x^2}\right)$	40

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^2/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] c^2*(-1/2*ln(c*x)^2/c^2/x^2-1/2*ln(c*x)/c^2/x^2-1/4/c^2/x^2)
```

Maxima [A]
time = 0.30, size = 21, normalized size = 0.66

$$-\frac{2\,\log\left(cx\right)^2+2\,\log\left(cx\right)+1}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x^3,x, algorithm="maxima")
```

```
[Out] -1/4*(2*log(c*x)^2 + 2*log(c*x) + 1)/x^2
```

Fricas [A]
time = 0.35, size = 21, normalized size = 0.66

$$-\frac{2\,\log\left(cx\right)^2+2\,\log\left(cx\right)+1}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(2*log(c*x)^2 + 2*log(c*x) + 1)/x^2
```

Sympy [A]
time = 0.04, size = 29, normalized size = 0.91

$$-\frac{\log\left(cx\right)^2}{2x^2}-\frac{\log\left(cx\right)}{2x^2}-\frac{1}{4x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**2/x**3,x)
[Out] -log(c*x)**2/(2*x**2) - log(c*x)/(2*x**2) - 1/(4*x**2)
```

Giac [A]
time = 3.67, size = 26, normalized size = 0.81

$$-\frac{\log\left(cx\right)^2}{2\,x^2}-\frac{\log\left(cx\right)}{2\,x^2}-\frac{1}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^2/x^3,x, algorithm="giac")
[Out] -1/2*log(c*x)^2/x^2 - 1/2*log(c*x)/x^2 - 1/4/x^2
```

Mupad [B]
time = 3.38, size = 21, normalized size = 0.66

$$-\frac{\frac{\ln(c\,x)^2}{2}+\frac{\ln(c\,x)}{2}+\frac{1}{4}}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^2/x^3,x)
[Out] -(log(c*x)/2 + log(c*x)^2/2 + 1/4)/x^2
```

3.15 $\int x^3 \log^3(cx)\,dx$

Optimal. Leaf size=45

$$-\frac{3x^4}{128}+\frac{3}{32}x^4\log(cx)-\frac{3}{16}x^4\log^2(cx)+\frac{1}{4}x^4\log^3(cx)$$

```
[Out] -3/128*x^4+3/32*x^4*ln(c*x)-3/16*x^4*ln(c*x)^2+1/4*x^4*ln(c*x)^3
```

Rubi [A]
time = 0.02, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2342, 2341}

$$\frac{1}{4}x^4\log^3(cx)-\frac{3}{16}x^4\log^2(cx)+\frac{3}{32}x^4\log(cx)-\frac{3x^4}{128}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Log[c*x]^3,x]
```

```
[Out] (-3*x^4)/128 + (3*x^4*Log[c*x])/32 - (3*x^4*Log[c*x]^2)/16 + (x^4*Log[c*x]^
3)/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int x^3\log^3(cx)\,dx &= \frac{1}{4}x^4\log^3(cx)-\frac{3}{4}\int x^3\log^2(cx)\,dx\\
&= -\frac{3}{16}x^4\log^2(cx)+\frac{1}{4}x^4\log^3(cx)+\frac{3}{8}\int x^3\log(cx)\,dx\\
&= -\frac{3x^4}{128}+\frac{3}{32}x^4\log(cx)-\frac{3}{16}x^4\log^2(cx)+\frac{1}{4}x^4\log^3(cx)
\end{aligned}$$

Mathematica [A]
time = 0.00, size = 45, normalized size = 1.00

$$-\frac{3x^4}{128}+\frac{3}{32}x^4\log(cx)-\frac{3}{16}x^4\log^2(cx)+\frac{1}{4}x^4\log^3(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Log[c*x]^3,x]
```

```
[Out] (-3*x^4)/128 + (3*x^4*Log[c*x])/32 - (3*x^4*Log[c*x]^2)/16 + (x^4*Log[c*x]^
3)/4
```

Maple [A]
time = 0.01, size = 54, normalized size = 1.20

method	result	size
norman	$-\frac{3x^4}{128}+\frac{3x^4\ln(cx)}{32}-\frac{3x^4\ln(cx)^2}{16}+\frac{x^4\ln(cx)^3}{4}$	38
risch	$-\frac{3x^4}{128}+\frac{3x^4\ln(cx)}{32}-\frac{3x^4\ln(cx)^2}{16}+\frac{x^4\ln(cx)^3}{4}$	38
derivativedivides	$\frac{\frac{c^4x^4\ln(cx)^3}{4}-\frac{3c^4x^4\ln(cx)^2}{16}+\frac{3c^4x^4\ln(cx)}{32}-\frac{3c^4x^4}{128}}{c^4}$	54
default	$\frac{\frac{c^4x^4\ln(cx)^3}{4}-\frac{3c^4x^4\ln(cx)^2}{16}+\frac{3c^4x^4\ln(cx)}{32}-\frac{3c^4x^4}{128}}{c^4}$	54

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*ln(c*x)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^4*(1/4*c^4*x^4*ln(c*x)^3-3/16*c^4*x^4*ln(c*x)^2+3/32*c^4*x^4*ln(c*x)-3/
128*c^4*x^4)
```

Maxima [A]
time = 0.29, size = 29, normalized size = 0.64

$$\frac{1}{128}\left(32\log\left(cx\right)^3-24\log\left(cx\right)^2+12\log\left(cx\right)-3\right)x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x)^3,x, algorithm="maxima")
```

```
[Out] 1/128*(32*log(c*x)^3 - 24*log(c*x)^2 + 12*log(c*x) - 3)*x^4
```

Fricas [A]
time = 0.34, size = 37, normalized size = 0.82

$$\frac{1}{4}x^4\log\left(cx\right)^3-\frac{3}{16}x^4\log\left(cx\right)^2+\frac{3}{32}x^4\log\left(cx\right)-\frac{3}{128}x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x)^3,x, algorithm="fricas")
```

```
[Out] 1/4*x^4*log(c*x)^3 - 3/16*x^4*log(c*x)^2 + 3/32*x^4*log(c*x) - 3/128*x^4
```

Sympy [A]
time = 0.05, size = 42, normalized size = 0.93

$$\frac{x^4 \log{(cx)}^3}{4} - \frac{3x^4 \log{(cx)}^2}{16} + \frac{3x^4 \log{(cx)}}{32} - \frac{3x^4}{128}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*ln(c*x)**3,x)
```

```
[Out] x**4*log(c*x)**3/4 - 3*x**4*log(c*x)**2/16 + 3*x**4*log(c*x)/32 - 3*x**4/12
8
```

Giac [A]
time = 6.79, size = 37, normalized size = 0.82

$$\frac{1}{4} x^4 \log\left(cx\right)^3 - \frac{3}{16} x^4 \log\left(cx\right)^2 + \frac{3}{32} x^4 \log\left(cx\right) - \frac{3}{128} x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(c*x)^3,x, algorithm="giac")
```

```
[Out] 1/4*x^4*log(c*x)^3 - 3/16*x^4*log(c*x)^2 + 3/32*x^4*log(c*x) - 3/128*x^4
```

Mupad [B]
time = 3.29, size = 29, normalized size = 0.64

$$\frac{x^4 \left(32 \ln\left(c\,x\right)^3 - 24 \ln\left(c\,x\right)^2 + 12\,\ln\left(c\,x\right) - 3\right)}{128}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*log(c*x)^3,x)
```

```
[Out] (x^4*(12*log(c*x) - 24*log(c*x)^2 + 32*log(c*x)^3 - 3))/128
```

3.16 $\int x^2 \log^3(cx)\,dx$

Optimal. Leaf size=45

$$-\frac{2x^3}{27}+\frac{2}{9}x^3\log(cx)-\frac{1}{3}x^3\log^2(cx)+\frac{1}{3}x^3\log^3(cx)$$

```
[Out] -2/27*x^3+2/9*x^3*ln(c*x)-1/3*x^3*ln(c*x)^2+1/3*x^3*ln(c*x)^3
```

Rubi [A]

time = 0.02, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2342, 2341}

$$\frac{1}{3}x^3\log^3(cx)-\frac{1}{3}x^3\log^2(cx)+\frac{2}{9}x^3\log(cx)-\frac{2x^3}{27}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Log[c*x]^3,x]
```

```
[Out] (-2*x^3)/27 + (2*x^3*Log[c*x])/9 - (x^3*Log[c*x]^2)/3 + (x^3*Log[c*x]^3)/3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^2\log^3(cx)\,dx&=\frac{1}{3}x^3\log^3(cx)-\int x^2\log^2(cx)\,dx\\&=-\frac{1}{3}x^3\log^2(cx)+\frac{1}{3}x^3\log^3(cx)+\frac{2}{3}\int x^2\log(cx)\,dx\\&=-\frac{2x^3}{27}+\frac{2}{9}x^3\log(cx)-\frac{1}{3}x^3\log^2(cx)+\frac{1}{3}x^3\log^3(cx)\end{aligned}$$

Mathematica [A]
time = 0.00, size = 45, normalized size = 1.00

$$-\frac{2x^3}{27}+\frac{2}{9}x^3\log(cx)-\frac{1}{3}x^3\log^2(cx)+\frac{1}{3}x^3\log^3(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Log[c*x]^3,x]
```

```
[Out] (-2*x^3)/27 + (2*x^3*Log[c*x])/9 - (x^3*Log[c*x]^2)/3 + (x^3*Log[c*x]^3)/3
```

Maple [A]
time = 0.01, size = 54, normalized size = 1.20

method	result	size
norman	$-\frac{2x^3}{27}+\frac{2x^3\ln(cx)}{9}-\frac{x^3\ln(cx)^2}{3}+\frac{x^3\ln(cx)^3}{3}$	38
risch	$-\frac{2x^3}{27}+\frac{2x^3\ln(cx)}{9}-\frac{x^3\ln(cx)^2}{3}+\frac{x^3\ln(cx)^3}{3}$	38
derivativedivides	$\frac{\frac{c^3x^3\ln(cx)^3}{3}-\frac{c^3x^3\ln(cx)^2}{3}+\frac{2c^3x^3\ln(cx)}{9}-\frac{2c^3x^3}{27}}{c^3}$	54
default	$\frac{\frac{c^3x^3\ln(cx)^3}{3}-\frac{c^3x^3\ln(cx)^2}{3}+\frac{2c^3x^3\ln(cx)}{9}-\frac{2c^3x^3}{27}}{c^3}$	54

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*ln(c*x)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^3*(1/3*c^3*x^3*ln(c*x)^3-1/3*c^3*x^3*ln(c*x)^2+2/9*c^3*x^3*ln(c*x)-2/27
*c^3*x^3)
```

Maxima [A]
time = 0.28, size = 29, normalized size = 0.64

$$\frac{1}{27}\left(9\log(cx)^3-9\log(cx)^2+6\log(cx)-2\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x)^3,x, algorithm="maxima")
```

```
[Out] 1/27*(9*log(c*x)^3 - 9*log(c*x)^2 + 6*log(c*x) - 2)*x^3
```

Fricas [A]
time = 0.39, size = 37, normalized size = 0.82

$$\frac{1}{3}x^3\log(cx)^3-\frac{1}{3}x^3\log(cx)^2+\frac{2}{9}x^3\log(cx)-\frac{2}{27}x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x)^3,x, algorithm="fricas")
```

```
[Out] 1/3*x^3*log(c*x)^3 - 1/3*x^3*log(c*x)^2 + 2/9*x^3*log(c*x) - 2/27*x^3
```

Sympy [A]
time = 0.05, size = 41, normalized size = 0.91

$$\frac{x^3\log{(cx)}^3}{3}-\frac{x^3\log{(cx)}^2}{3}+\frac{2x^3\log{(cx)}}{9}-\frac{2x^3}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*ln(c*x)**3,x)
```

```
[Out] x**3*log(c*x)**3/3 - x**3*log(c*x)**2/3 + 2*x**3*log(c*x)/9 - 2*x**3/27
```

Giac [A]
time = 4.25, size = 37, normalized size = 0.82

$$\frac{1}{3}\,x^3\log{(cx)}^3-\frac{1}{3}\,x^3\log{(cx)}^2+\frac{2}{9}\,x^3\log{(cx)}-\frac{2}{27}\,x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(c*x)^3,x, algorithm="giac")
```

```
[Out] 1/3*x^3*log(c*x)^3 - 1/3*x^3*log(c*x)^2 + 2/9*x^3*log(c*x) - 2/27*x^3
```

Mupad [B]
time = 3.56, size = 29, normalized size = 0.64

$$\frac{x^3\,\left(9\ln{(c\,x)}^3-9\ln{(c\,x)}^2+6\,\ln{(c\,x)}-2\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*log(c*x)^3,x)
```

```
[Out] (x^3*(6*log(c*x) - 9*log(c*x)^2 + 9*log(c*x)^3 - 2))/27
```

3.17 $\int x \log^3(cx)\,dx$

Optimal. Leaf size=45

$$-\frac{3x^2}{8}+\frac{3}{4}x^2\log(cx)-\frac{3}{4}x^2\log^2(cx)+\frac{1}{2}x^2\log^3(cx)$$

```
[Out] -3/8*x^2+3/4*x^2*ln(c*x)-3/4*x^2*ln(c*x)^2+1/2*x^2*ln(c*x)^3
```

Rubi [A]
time = 0.01, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {2342, 2341}

$$\frac{1}{2}x^2\log^3(cx)-\frac{3}{4}x^2\log^2(cx)+\frac{3}{4}x^2\log(cx)-\frac{3x^2}{8}$$

Antiderivative was successfully verified.

```
[In] Int[x*Log[c*x]^3,x]
```

```
[Out] (-3*x^2)/8 + (3*x^2*Log[c*x])/4 - (3*x^2*Log[c*x]^2)/4 + (x^2*Log[c*x]^3)/2
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int x\log^3(cx)\,dx &= \frac{1}{2}x^2\log^3(cx)-\frac{3}{2}\int x\log^2(cx)\,dx\\
&= -\frac{3}{4}x^2\log^2(cx)+\frac{1}{2}x^2\log^3(cx)+\frac{3}{2}\int x\log(cx)\,dx\\
&= -\frac{3x^2}{8}+\frac{3}{4}x^2\log(cx)-\frac{3}{4}x^2\log^2(cx)+\frac{1}{2}x^2\log^3(cx)
\end{aligned}$$

Mathematica [A]
time = 0.00, size = 45, normalized size = 1.00

$$-\frac{3x^2}{8}+\frac{3}{4}x^2\log(cx)-\frac{3}{4}x^2\log^2(cx)+\frac{1}{2}x^2\log^3(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Log[c*x]^3,x]
[Out] (-3*x^2)/8 + (3*x^2*Log[c*x])/4 - (3*x^2*Log[c*x]^2)/4 + (x^2*Log[c*x]^3)/2
```

Maple [A]
time = 0.01, size = 54, normalized size = 1.20

method	result	size
norman	$-\frac{3x^2}{8}+\frac{3x^2\ln(cx)}{4}-\frac{3x^2\ln(cx)^2}{4}+\frac{x^2\ln(cx)^3}{2}$	38
risch	$-\frac{3x^2}{8}+\frac{3x^2\ln(cx)}{4}-\frac{3x^2\ln(cx)^2}{4}+\frac{x^2\ln(cx)^3}{2}$	38
derivativedivides	$\frac{\frac{c^2x^2\ln(cx)^3}{2}-\frac{3c^2x^2\ln(cx)^2}{4}+\frac{3c^2x^2\ln(cx)}{4}-\frac{3c^2x^2}{8}}{c^2}$	54
default	$\frac{\frac{c^2x^2\ln(cx)^3}{2}-\frac{3c^2x^2\ln(cx)^2}{4}+\frac{3c^2x^2\ln(cx)}{4}-\frac{3c^2x^2}{8}}{c^2}$	54

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(c*x)^3,x,method=_RETURNVERBOSE)
[Out] 1/c^2*(1/2*c^2*x^2*ln(c*x)^3-3/4*c^2*x^2*ln(c*x)^2+3/4*c^2*x^2*ln(c*x)-3/8*
c^2*x^2)
```

Maxima [A]
time = 0.27, size = 29, normalized size = 0.64

$$\frac{1}{8}\left(4\,\log\left(cx\right)^3-6\,\log\left(cx\right)^2+6\,\log\left(cx\right)-3\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x)^3,x, algorithm="maxima")
[Out] 1/8*(4*log(c*x)^3 - 6*log(c*x)^2 + 6*log(c*x) - 3)*x^2
```

Fricas [A]
time = 0.35, size = 37, normalized size = 0.82

$$\frac{1}{2}\,x^2\log\left(cx\right)^3-\frac{3}{4}\,x^2\log\left(cx\right)^2+\frac{3}{4}\,x^2\log\left(cx\right)-\frac{3}{8}\,x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x)^3,x, algorithm="fricas")
[Out] 1/2*x^2*log(c*x)^3 - 3/4*x^2*log(c*x)^2 + 3/4*x^2*log(c*x) - 3/8*x^2
```

Sympy [A]
time = 0.04, size = 42, normalized size = 0.93

$$\frac{x^2 \log{(cx)}^3}{2} - \frac{3x^2 \log{(cx)}^2}{4} + \frac{3x^2 \log{(cx)}}{4} - \frac{3x^2}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(c*x)**3,x)
[Out] x**2*log(c*x)**3/2 - 3*x**2*log(c*x)**2/4 + 3*x**2*log(c*x)/4 - 3*x**2/8
```

Giac [A]
time = 2.47, size = 37, normalized size = 0.82

$$\frac{1}{2}\,x^2\log\left(cx\right)^3 - \frac{3}{4}\,x^2\log\left(cx\right)^2 + \frac{3}{4}\,x^2\log\left(cx\right) - \frac{3}{8}\,x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(c*x)^3,x, algorithm="giac")
[Out] 1/2*x^2*log(c*x)^3 - 3/4*x^2*log(c*x)^2 + 3/4*x^2*log(c*x) - 3/8*x^2
```

Mupad [B]
time = 3.48, size = 29, normalized size = 0.64

$$\frac{x^2\,\left(4\ln\left(c\,x\right)^3-6\ln\left(c\,x\right)^2+6\,\ln\left(c\,x\right)-3\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(c*x)^3,x)
[Out] (x^2*(6*log(c*x) - 6*log(c*x)^2 + 4*log(c*x)^3 - 3))/8
```

3.18 $\int \log^3(cx)\,dx$

Optimal. Leaf size=28

$$-6x + 6x\log(cx) - 3x\log^2(cx) + x\log^3(cx)$$

```
[Out] -6*x+6*x*ln(c*x)-3*x*ln(c*x)^2+x*ln(c*x)^3
```

Rubi [A]
time = 0.01, antiderivative size = 28, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2333, 2332}

$$x\log^3(cx) - 3x\log^2(cx) + 6x\log(cx) - 6x$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^3,x]
```

```
[Out] -6*x + 6*x*Log[c*x] - 3*x*Log[c*x]^2 + x*Log[c*x]^3
```

Rule 2332

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

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rubi steps

$$\begin{aligned}
\int \log^3(cx)\,dx &= x\log^3(cx) - 3\int \log^2(cx)\,dx \\
&= -3x\log^2(cx) + x\log^3(cx) + 6\int \log(cx)\,dx \\
&= -6x + 6x\log(cx) - 3x\log^2(cx) + x\log^3(cx)
\end{aligned}$$

Mathematica [A]
time = 0.00, size = 28, normalized size = 1.00

$$-6x + 6x\log(cx) - 3x\log^2(cx) + x\log^3(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^3,x]
```

```
[Out] -6*x + 6*x*Log[c*x] - 3*x*Log[c*x]^2 + x*Log[c*x]^3
```

Maple [A]
time = 0.02, size = 37, normalized size = 1.32

method	result	size
norman	$-6x+6x\ln(cx)-3x\ln(cx)^2+x\ln(cx)^3$	29
risch	$-6x+6x\ln(cx)-3x\ln(cx)^2+x\ln(cx)^3$	29
derivativedivides	$\frac{\ln(cx)^3cx-3\ln(cx)^2cx+6cx\ln(cx)-6cx}{c}$	37
default	$\frac{\ln(cx)^3cx-3\ln(cx)^2cx+6cx\ln(cx)-6cx}{c}$	37

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c*(ln(c*x)^3*c*x-3*ln(c*x)^2*c*x+6*c*x*ln(c*x)-6*c*x)
```

Maxima [A]
time = 0.27, size = 24, normalized size = 0.86

$$\left(\log(cx)^3-3\log(cx)^2+6\log(cx)-6\right)x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3,x, algorithm="maxima")
```

```
[Out] (log(c*x)^3 - 3*log(c*x)^2 + 6*log(c*x) - 6)*x
```

Fricas [A]
time = 0.34, size = 28, normalized size = 1.00

$$x\log(cx)^3-3x\log(cx)^2+6x\log(cx)-6x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3,x, algorithm="fricas")
```

```
[Out] x*log(c*x)^3 - 3*x*log(c*x)^2 + 6*x*log(c*x) - 6*x
```

Sympy [A]
time = 0.04, size = 29, normalized size = 1.04

$$x\log(cx)^3-3x\log(cx)^2+6x\log(cx)-6x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**3,x)
```

```
[Out] x*log(c*x)**3 - 3*x*log(c*x)**2 + 6*x*log(c*x) - 6*x
```

Giac [A]
time = 3.85, size = 28, normalized size = 1.00

$$x \log (cx)^3 - 3\,x \log (cx)^2 + 6\,x \log (cx) - 6\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3,x, algorithm="giac")
```

```
[Out] x*log(c*x)^3 - 3*x*log(c*x)^2 + 6*x*log(c*x) - 6*x
```

Mupad [B]
time = 3.56, size = 24, normalized size = 0.86

$$x \left(\ln (c\,x)^3 - 3 \ln (c\,x)^2 + 6\,\ln (c\,x) - 6\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^3,x)
```

```
[Out] x*(6*log(c*x) - 3*log(c*x)^2 + log(c*x)^3 - 6)
```

3.19 $\int \frac{\log^3(cx)}{x} \, dx$

Optimal. Leaf size=10

$$\frac{1}{4}\log^4(cx)$$

```
[Out] 1/4*ln(c*x)^4
```

Rubi [A]
time = 0.01, antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2339, 30}

$$\frac{1}{4}\log^4(cx)$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^3/x,x]
```

```
[Out] Log[c*x]^4/4
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{\log^3(cx)}{x} \, dx &= \text{Subst}\left(\int x^3 \, dx, x, \log(cx)\right)\\ &= \frac{1}{4}\log^4(cx)\end{aligned}$$

Mathematica [A]
time = 0.00, size = 10, normalized size = 1.00

$$\frac{1}{4}\log^4(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^3/x,x]
```

```
[Out] Log[c*x]^4/4
```

Maple [A]
time = 0.01, size = 9, normalized size = 0.90

method	result	size
derivativedivides	$\frac{\ln(cx)^4}{4}$	9
default	$\frac{\ln(cx)^4}{4}$	9
norman	$\frac{\ln(cx)^4}{4}$	9
risch	$\frac{\ln(cx)^4}{4}$	9

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^3/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*ln(c*x)^4
```

Maxima [A]
time = 0.29, size = 8, normalized size = 0.80

$$\frac{1}{4}\log\left(cx\right)^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x,x, algorithm="maxima")
```

```
[Out] 1/4*log(c*x)^4
```

Fricas [A]
time = 0.34, size = 8, normalized size = 0.80

$$\frac{1}{4}\log\left(cx\right)^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x,x, algorithm="fricas")
```

```
[Out] 1/4*log(c*x)^4
```

Sympy [A]
time = 0.02, size = 7, normalized size = 0.70

$$\frac{\log\left(cx\right)^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**3/x,x)
```

```
[Out] log(c*x)**4/4
```

Giac [A]
time = 4.77, size = 8, normalized size = 0.80

$$\frac{1}{4}\,\log\left(cx\right)^{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x,x, algorithm="giac")
```

```
[Out] 1/4*log(c*x)^4
```

Mupad [B]
time = 3.53, size = 8, normalized size = 0.80

$$\frac{\ln\left(c\,x\right)^{4}}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^3/x,x)
```

```
[Out] log(c*x)^4/4
```

3.20 $\int \frac{\log^3(cx)}{x^2} dx$

Optimal. Leaf size=37

$$-\frac{6}{x}-\frac{6\log(cx)}{x}-\frac{3\log^2(cx)}{x}-\frac{\log^3(cx)}{x}$$

```
[Out] -6/x-6*ln(c*x)/x-3*ln(c*x)^2/x-ln(c*x)^3/x
```

Rubi [A]
time = 0.02, antiderivative size = 37, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2342, 2341}

$$-\frac{\log^3(cx)}{x}-\frac{3\log^2(cx)}{x}-\frac{6\log(cx)}{x}-\frac{6}{x}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^3/x^2,x]
```

```
[Out] -6/x - (6*Log[c*x])/x - (3*Log[c*x]^2)/x - Log[c*x]^3/x
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\log^3(cx)}{x^2}\,dx &= -\frac{\log^3(cx)}{x}+3\int \frac{\log^2(cx)}{x^2}\,dx\\ &= -\frac{3\log^2(cx)}{x}-\frac{\log^3(cx)}{x}+6\int \frac{\log(cx)}{x^2}\,dx\\ &= -\frac{6}{x}-\frac{6\log(cx)}{x}-\frac{3\log^2(cx)}{x}-\frac{\log^3(cx)}{x}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 37, normalized size = 1.00

$$-\frac{6}{x}-\frac{6\log(cx)}{x}-\frac{3\log^2(cx)}{x}-\frac{\log^3(cx)}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^3/x^2,x]
[Out] -6/x - (6*Log[c*x])/x - (3*Log[c*x]^2)/x - Log[c*x]^3/x
```

Maple [A]
time = 0.02, size = 52, normalized size = 1.41

method	result	size
norman	$\frac{-6-3\ln(cx)^2-\ln(cx)^3-6\ln(cx)}{x}$	29
risch	$-\frac{6}{x}-\frac{6\ln(cx)}{x}-\frac{3\ln(cx)^2}{x}-\frac{\ln(cx)^3}{x}$	38
derivativedivides	$c\left(-\frac{\ln(cx)^3}{cx}-\frac{3\ln(cx)^2}{cx}-\frac{6\ln(cx)}{cx}-\frac{6}{cx}\right)$	52
default	$c\left(-\frac{\ln(cx)^3}{cx}-\frac{3\ln(cx)^2}{cx}-\frac{6\ln(cx)}{cx}-\frac{6}{cx}\right)$	52

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^3/x^2,x,method=_RETURNVERBOSE)
[Out] c*(-ln(c*x)^3/c/x-3*ln(c*x)^2/c/x-6*ln(c*x)/c/x-6/c/x)
```

Maxima [A]
time = 0.28, size = 27, normalized size = 0.73

$$-\frac{\log(cx)^3+3\log(cx)^2+6\log(cx)+6}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x^2,x, algorithm="maxima")
[Out] -(log(c*x)^3 + 3*log(c*x)^2 + 6*log(c*x) + 6)/x
```

Fricas [A]
time = 0.34, size = 27, normalized size = 0.73

$$-\frac{\log(cx)^3+3\log(cx)^2+6\log(cx)+6}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x^2,x, algorithm="fricas")
```

```
[Out] -(log(c*x)^3 + 3*log(c*x)^2 + 6*log(c*x) + 6)/x
```

Sympy [A]
time = 0.05, size = 31, normalized size = 0.84

$$-\frac{\log{(cx)}^{3}}{x}-\frac{3\log{(cx)}^{2}}{x}-\frac{6\log{(cx)}}{x}-\frac{6}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**3/x**2,x)
```

```
[Out] -log(c*x)**3/x - 3*log(c*x)**2/x - 6*log(c*x)/x - 6/x
```

Giac [A]
time = 6.07, size = 37, normalized size = 1.00

$$-\frac{\log\left(cx\right)^{3}}{x}-\frac{3\,\log\left(cx\right)^{2}}{x}-\frac{6\,\log\left(cx\right)}{x}-\frac{6}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x^2,x, algorithm="giac")
```

```
[Out] -log(c*x)^3/x - 3*log(c*x)^2/x - 6*log(c*x)/x - 6/x
```

Mupad [B]
time = 3.46, size = 27, normalized size = 0.73

$$-\frac{\ln\left(c\,x\right)^3+3\ln\left(c\,x\right)^2+6\,\ln\left(c\,x\right)+6}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^3/x^2,x)
```

```
[Out] -(6*log(c*x) + 3*log(c*x)^2 + log(c*x)^3 + 6)/x
```

3.21 $\int \frac{\log^3(cx)}{x^3} \, dx$

Optimal. Leaf size=45

$$-\frac{3}{8x^2}-\frac{3\log(cx)}{4x^2}-\frac{3\log^2(cx)}{4x^2}-\frac{\log^3(cx)}{2x^2}$$

```
[Out] -3/8/x^2-3/4*ln(c*x)/x^2-3/4*ln(c*x)^2/x^2-1/2*ln(c*x)^3/x^2
```

Rubi [A]
time = 0.02, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2342, 2341}

$$-\frac{\log^3(cx)}{2x^2}-\frac{3\log^2(cx)}{4x^2}-\frac{3\log(cx)}{4x^2}-\frac{3}{8x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^3/x^3,x]
```

```
[Out] -3/(8*x^2) - (3*Log[c*x])/(4*x^2) - (3*Log[c*x]^2)/(4*x^2) - Log[c*x]^3/(2*
x^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{\log^3(cx)}{x^3} \, dx &= -\frac{\log^3(cx)}{2x^2}+\frac{3}{2}\int \frac{\log^2(cx)}{x^3} \, dx \\
&= -\frac{3\log^2(cx)}{4x^2}-\frac{\log^3(cx)}{2x^2}+\frac{3}{2}\int \frac{\log(cx)}{x^3} \, dx \\
&= -\frac{3}{8x^2}-\frac{3\log(cx)}{4x^2}-\frac{3\log^2(cx)}{4x^2}-\frac{\log^3(cx)}{2x^2}
\end{aligned}$$

Mathematica [A]
time = 0.00, size = 45, normalized size = 1.00

$$-\frac{3}{8x^2}-\frac{3\log(cx)}{4x^2}-\frac{3\log^2(cx)}{4x^2}-\frac{\log^3(cx)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^3/x^3,x]
```

```
[Out] -3/(8*x^2) - (3*Log[c*x])/(4*x^2) - (3*Log[c*x]^2)/(4*x^2) - Log[c*x]^3/(2*
x^2)
```

Maple [A]
time = 0.02, size = 54, normalized size = 1.20

method	result	size
norman	$\frac{-\frac{3}{8}-\frac{3\ln(cx)^2}{4}-\frac{\ln(cx)^3}{2}-\frac{3\ln(cx)}{4}}{x^2}$	29
risch	$-\frac{3}{8x^2}-\frac{3\ln(cx)}{4x^2}-\frac{3\ln(cx)^2}{4x^2}-\frac{\ln(cx)^3}{2x^2}$	38
derivativedivides	$c^2\left(-\frac{\ln(cx)^3}{2c^2x^2}-\frac{3\ln(cx)^2}{4c^2x^2}-\frac{3\ln(cx)}{4c^2x^2}-\frac{3}{8c^2x^2}\right)$	54
default	$c^2\left(-\frac{\ln(cx)^3}{2c^2x^2}-\frac{3\ln(cx)^2}{4c^2x^2}-\frac{3\ln(cx)}{4c^2x^2}-\frac{3}{8c^2x^2}\right)$	54

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(c*x)^3/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] c^2*(-1/2*ln(c*x)^3/c^2/x^2-3/4*ln(c*x)^2/c^2/x^2-3/4*ln(c*x)/c^2/x^2-3/8/c
^2/x^2)
```

Maxima [A]
time = 0.28, size = 29, normalized size = 0.64

$$-\frac{4\log(cx)^3+6\log(cx)^2+6\log(cx)+3}{8x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x^3,x, algorithm="maxima")
```

```
[Out] -1/8*(4*log(c*x)^3 + 6*log(c*x)^2 + 6*log(c*x) + 3)/x^2
```

Fricas [A]
time = 0.36, size = 29, normalized size = 0.64

$$-\frac{4\log(cx)^3+6\log(cx)^2+6\log(cx)+3}{8x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x^3,x, algorithm="fricas")
```

```
[Out] -1/8*(4*log(c*x)^3 + 6*log(c*x)^2 + 6*log(c*x) + 3)/x^2
```

Sympy [A]
time = 0.06, size = 44, normalized size = 0.98

$$-\frac{\log(cx)^3}{2x^2} - \frac{3\log(cx)^2}{4x^2} - \frac{3\log(cx)}{4x^2} - \frac{3}{8x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(c*x)**3/x**3,x)
```

```
[Out] -log(c*x)**3/(2*x**2) - 3*log(c*x)**2/(4*x**2) - 3*log(c*x)/(4*x**2) - 3/(8
*x**2)
```

Giac [A]
time = 5.77, size = 37, normalized size = 0.82

$$-\frac{\log(cx)^3}{2\,x^2} - \frac{3\,\log(cx)^2}{4\,x^2} - \frac{3\,\log(cx)}{4\,x^2} - \frac{3}{8\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(c*x)^3/x^3,x, algorithm="giac")
```

```
[Out] -1/2*log(c*x)^3/x^2 - 3/4*log(c*x)^2/x^2 - 3/4*log(c*x)/x^2 - 3/8/x^2
```

Mupad [B]
time = 3.60, size = 29, normalized size = 0.64

$$-\frac{\frac{\ln(c\,x)^3}{2} + \frac{3\ln(c\,x)^2}{4} + \frac{3\,\ln(c\,x)}{4} + \frac{3}{8}}{x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x)^3/x^3,x)
```

```
[Out] -((3*log(c*x))/4 + (3*log(c*x)^2)/4 + log(c*x)^3/2 + 3/8)/x^2
```

3.22 $\int \frac{x^3}{\log(cx)}\,dx$

Optimal. Leaf size=11

$$\frac{\text{Ei}(4\log(cx))}{c^4}$$

[Out] Ei(4*ln(c*x))/c^4

Rubi [A]
time = 0.02, antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2346, 2209}

$$\frac{\text{Ei}(4\log(cx))}{c^4}$$

Antiderivative was successfully verified.

[In] Int[x^3/Log[c*x],x]

[Out] ExpIntegralEi[4*Log[c*x]]/c^4

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{x^3}{\log(cx)}\,dx &= \frac{\text{Subst}\left(\int \frac{e^{4x}}{x}\,dx, x, \log(cx)\right)}{c^4}\\ &= \frac{\text{Ei}(4\log(cx))}{c^4}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 11, normalized size = 1.00

$$\frac{\text{Ei}(4\log(cx))}{c^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Log[c*x],x]
```

```
[Out] ExpIntegralEi[4*Log[c*x]]/c^4
```

Maple [A]
time = 0.02, size = 14, normalized size = 1.27

method	result	size
derivativedivides	$-\frac{\mathrm{expIntegral}(1,-4\ln(cx))}{c^4}$	14
default	$-\frac{\mathrm{expIntegral}(1,-4\ln(cx))}{c^4}$	14
risch	$-\frac{\mathrm{expIntegral}(1,-4\ln(cx))}{c^4}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/ln(c*x),x,method=_RETURNVERBOSE)
```

```
[Out] -1/c^4*Ei(1,-4*ln(c*x))
```

Maxima [A]
time = 0.33, size = 11, normalized size = 1.00

$$\frac{\mathrm{Ei}(4\log(cx))}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x),x, algorithm="maxima")
```

```
[Out] Ei(4*log(c*x))/c^4
```

Fricas [A]
time = 0.34, size = 12, normalized size = 1.09

$$\frac{\mathrm{log\_integral}\left(c^4x^4\right)}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x),x, algorithm="fricas")
```

```
[Out] log_integral(c^4*x^4)/c^4
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\log(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/ln(c*x),x)
```

```
[Out] Integral(x**3/log(c*x), x)
```

Giac [A]
time = 4.72, size = 11, normalized size = 1.00

$$\frac{\operatorname{Ei}(4\log{(cx)})}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x),x, algorithm="giac")
```

```
[Out] Ei(4*log(c*x))/c^4
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.09

$$\int \frac{x^3}{\ln{(c\,x)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/log(c*x),x)
```

```
[Out] int(x^3/log(c*x), x)
```

3.23 $\int \frac{x^2}{\log(cx)}\,dx$

Optimal. Leaf size=11

$$\frac{\text{Ei}(3\log(cx))}{c^3}$$

```
[Out] Ei(3*ln(c*x))/c^3
```

Rubi [A]
time = 0.02, antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2346, 2209}

$$\frac{\text{Ei}(3\log(cx))}{c^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Log[c*x],x]
```

```
[Out] ExpIntegralEi[3*Log[c*x]]/c^3
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{x^2}{\log(cx)}\,dx &= \frac{\text{Subst}\left(\int \frac{e^{3x}}{x}\,dx, x, \log(cx)\right)}{c^3}\\ &= \frac{\text{Ei}(3\log(cx))}{c^3}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 11, normalized size = 1.00

$$\frac{\text{Ei}(3\log(cx))}{c^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/Log[c*x],x]
```

```
[Out] ExpIntegralEi[3*Log[c*x]]/c^3
```

Maple [A]
time = 0.02, size = 14, normalized size = 1.27

method	result	size
derivativedivides	$-\frac{\mathrm{expIntegral}(1,-3\ln(cx))}{c^3}$	14
default	$-\frac{\mathrm{expIntegral}(1,-3\ln(cx))}{c^3}$	14
risch	$-\frac{\mathrm{expIntegral}(1,-3\ln(cx))}{c^3}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/ln(c*x),x,method=_RETURNVERBOSE)
```

```
[Out] -1/c^3*Ei(1,-3*ln(c*x))
```

Maxima [A]
time = 0.32, size = 11, normalized size = 1.00

$$\frac{\mathrm{Ei}(3\log{(cx)})}{c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x),x, algorithm="maxima")
```

```
[Out] Ei(3*log(c*x))/c^3
```

Fricas [A]
time = 0.33, size = 12, normalized size = 1.09

$$\frac{\mathrm{log\_integral}\left(c^3x^3\right)}{c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x),x, algorithm="fricas")
```

```
[Out] log_integral(c^3*x^3)/c^3
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{x^2}{\log{(cx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/ln(c*x),x)
```

```
[Out] Integral(x**2/log(c*x), x)
```

Giac [A]
time = 2.87, size = 11, normalized size = 1.00

$$\frac{\mathrm{Ei}(3\log(cx))}{c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x),x, algorithm="giac")
```

```
[Out] Ei(3*log(c*x))/c^3
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.09

$$\int \frac{x^2}{\ln(c\,x)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/log(c*x),x)
```

```
[Out] int(x^2/log(c*x), x)
```

3.24 $\int \frac{x}{\log(cx)} \, dx$

Optimal. Leaf size=11

$$\frac{\text{Ei}(2\log(cx))}{c^2}$$

```
[Out] Ei(2*ln(c*x))/c^2
```

Rubi [A]
time = 0.01, antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2346, 2209}

$$\frac{\text{Ei}(2\log(cx))}{c^2}$$

Antiderivative was successfully verified.

```
[In] Int[x/Log[c*x],x]
```

```
[Out] ExpIntegralEi[2*Log[c*x]]/c^2
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{x}{\log(cx)} \, dx &= \frac{\text{Subst}\left(\int \frac{e^{2x}}{x} \, dx, x, \log(cx)\right)}{c^2}\\ &= \frac{\text{Ei}(2\log(cx))}{c^2}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 11, normalized size = 1.00

$$\frac{\text{Ei}(2\log(cx))}{c^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Log[c*x],x]
```

```
[Out] ExpIntegralEi[2*Log[c*x]]/c^2
```

Maple [A]
time = 0.04, size = 14, normalized size = 1.27

method	result	size
derivativedivides	$-\frac{\text{expIntegral}(1,-2\ln(cx))}{c^2}$	14
default	$-\frac{\text{expIntegral}(1,-2\ln(cx))}{c^2}$	14
risch	$-\frac{\text{expIntegral}(1,-2\ln(cx))}{c^2}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/ln(c*x),x,method=_RETURNVERBOSE)
```

```
[Out] -1/c^2*Ei(1,-2*ln(c*x))
```

Maxima [A]
time = 0.33, size = 11, normalized size = 1.00

$$\frac{\text{Ei}(2\,\log(cx))}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x),x, algorithm="maxima")
```

```
[Out] Ei(2*log(c*x))/c^2
```

Fricas [A]
time = 0.36, size = 12, normalized size = 1.09

$$\frac{\text{log\_integral}\left(c^2x^2\right)}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x),x, algorithm="fricas")
```

```
[Out] log_integral(c^2*x^2)/c^2
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\log(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/ln(c*x),x)
```

```
[Out] Integral(x/log(c*x), x)
```

Giac [A]
time = 3.69, size = 11, normalized size = 1.00

$$\frac{\operatorname{Ei}(2\,\log{(cx)})}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x),x, algorithm="giac")
```

```
[Out] Ei(2*log(c*x))/c^2
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.09

$$\int \frac{x}{\ln{(c\,x)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/log(c*x),x)
```

```
[Out] int(x/log(c*x), x)
```

3.25 $\int \frac{1}{\log(cx)} dx$

Optimal. Leaf size=8

$$\frac{\text{li}(cx)}{c}$$

```
[Out] Li(c*x)/c
```

Rubi [A]
time = 0.00, antiderivative size = 8, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2335}

$$\frac{\text{li}(cx)}{c}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^(-1),x]
```

```
[Out] LogIntegral[c*x]/c
```

Rule 2335

```
Int[Log[(c_.)*(x_)]^(-1), x_Symbol] :> Simp[LogIntegral[c*x]/c, x] /; FreeQ
[c, x]
```

Rubi steps

$$\int \frac{1}{\log(cx)} dx = \frac{\text{li}(cx)}{c}$$

Mathematica [A]
time = 0.01, size = 8, normalized size = 1.00

$$\frac{\text{li}(cx)}{c}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^(-1),x]
```

```
[Out] LogIntegral[c*x]/c
```

Maple [A]
time = 0.02, size = 14, normalized size = 1.75

method	result	size
derivativedivides	$-\frac{\text{expIntegral}(1,-\ln(cx))}{c}$	14
default	$-\frac{\text{expIntegral}(1,-\ln(cx))}{c}$	14
risch	$-\frac{\text{expIntegral}(1,-\ln(cx))}{c}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/ln(c*x),x,method=_RETURNVERBOSE)
```

```
[Out] -1/c*Ei(1,-ln(c*x))
```

Maxima [A]
time = 0.33, size = 9, normalized size = 1.12

$$\frac{\text{Ei}(\log{(cx)})}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x),x, algorithm="maxima")
```

```
[Out] Ei(log(c*x))/c
```

Fricas [A]
time = 0.35, size = 8, normalized size = 1.00

$$\frac{\text{log\_integral}(cx)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x),x, algorithm="fricas")
```

```
[Out] log_integral(c*x)/c
```

Sympy [A]
time = 0.23, size = 5, normalized size = 0.62

$$\frac{\text{li}(cx)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/ln(c*x),x)
```

```
[Out] li(c*x)/c
```

Giac [A]
time = 3.58, size = 9, normalized size = 1.12

$$\frac{\mathrm{Ei}(\log(cx))}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x),x, algorithm="giac")
```

```
[Out] Ei(log(c*x))/c
```

Mupad [B]
time = 3.43, size = 8, normalized size = 1.00

$$\frac{\mathrm{logint}(c\,x)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/log(c*x),x)
```

```
[Out] logint(c*x)/c
```

3.26 $\int \frac{1}{x \log(cx)} \, dx$

Optimal. Leaf size=5

$$\log(\log(cx))$$

```
[Out] ln(ln(c*x))
```

Rubi [A]
time = 0.01, antiderivative size = 5, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2339, 29}

$$\log(\log(cx))$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Log[c*x]),x]
```

```
[Out] Log[Log[c*x]]
```

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x \log(cx)} \, dx &= \text{Subst}\left(\int \frac{1}{x} \, dx, x, \log(cx)\right)\\ &= \log(\log(cx))\end{aligned}$$

Mathematica [A]
time = 0.00, size = 5, normalized size = 1.00

$$\log(\log(cx))$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Log[c*x]),x]
```

```
[Out] Log[Log[c*x]]
```

Maple [A]
time = 0.01, size = 6, normalized size = 1.20

method	result	size
derivativedivides	$\ln(\ln(cx))$	6
default	$\ln(\ln(cx))$	6
norman	$\ln(\ln(cx))$	6
risch	$\ln(\ln(cx))$	6

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/ln(c*x),x,method=_RETURNVERBOSE)
[Out] ln(ln(c*x))
```

Maxima [A]
time = 0.27, size = 5, normalized size = 1.00

$$\log(\log(cx))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x),x, algorithm="maxima")
[Out] log(log(c*x))
```

Fricas [A]
time = 0.33, size = 5, normalized size = 1.00

$$\log(\log(cx))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x),x, algorithm="fricas")
[Out] log(log(c*x))
```

Sympy [A]
time = 0.03, size = 5, normalized size = 1.00

$$\log(\log(cx))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/ln(c*x),x)
[Out] log(log(c*x))
```

Giac [**A**]
time = 3.39, size = 5, normalized size = 1.00

$$\log(\log(cx))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x),x, algorithm="giac")
```

```
[Out] log(log(c*x))
```

Mupad [**B**]
time = 3.54, size = 5, normalized size = 1.00

$$\ln(\ln(c\,x))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*log(c*x)),x)
```

```
[Out] log(log(c*x))
```

3.27 $\int \frac{1}{x^2 \log(cx)} \, dx$

Optimal. Leaf size=9

$$c\text{Ei}(-\log(cx))$$

```
[Out] c*Ei(-ln(c*x))
```

Rubi [A]
time = 0.01, antiderivative size = 9, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2346, 2209}

$$c\text{Ei}(-\log(cx))$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Log[c*x]),x]
```

```
[Out] c*ExpIntegralEi[-Log[c*x]]
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned} \int \frac{1}{x^2 \log(cx)} \, dx &= c\text{Subst}\left(\int \frac{e^{-x}}{x} \, dx, x, \log(cx)\right) \\ &= c\text{Ei}(-\log(cx)) \end{aligned}$$

Mathematica [A]
time = 0.02, size = 9, normalized size = 1.00

$$c\text{Ei}(-\log(cx))$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Log[c*x]),x]
[Out] c*ExpIntegralEi[-Log[c*x]]
```

Maple [A]
time = 0.02, size = 10, normalized size = 1.11

method	result	size
derivativedivides	$-c\,\mathrm{expIntegral}\left(1, \ln\left(cx\right)\right)$	10
default	$-c\,\mathrm{expIntegral}\left(1, \ln\left(cx\right)\right)$	10
risch	$-c\,\mathrm{expIntegral}\left(1, \ln\left(cx\right)\right)$	10

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/ln(c*x),x,method=_RETURNVERBOSE)
[Out] -c*Ei(1,ln(c*x))
```

Maxima [A]
time = 0.33, size = 9, normalized size = 1.00

$$c\mathrm{Ei}(-\log\left(cx\right))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x),x, algorithm="maxima")
[Out] c*Ei(-log(c*x))
```

Fricas [A]
time = 0.36, size = 10, normalized size = 1.11

$$c\,\mathrm{log\_integral}\left(\frac{1}{cx}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x),x, algorithm="fricas")
[Out] c*log_integral(1/(c*x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2\log\left(cx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/ln(c*x),x)
```

```
[Out] Integral(1/(x**2*log(c*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x),x, algorithm="giac")
[Out] integrate(1/(x^2*log(c*x)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.11

$$\int \frac{1}{x^2\,\ln\left(c\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*log(c*x)),x)
[Out] int(1/(x^2*log(c*x)), x)
```

3.28 $\int \frac{1}{x^3 \log(cx)} \, dx$

Optimal. Leaf size=11

$$c^2 \text{Ei}(-2 \log(cx))$$

[Out] c^2*Ei(-2*ln(c*x))

Rubi [A]
time = 0.02, antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2346, 2209}

$$c^2 \text{Ei}(-2 \log(cx))$$

Antiderivative was successfully verified.

[In] Int[1/(x^3*Log[c*x]),x]

[Out] c^2*ExpIntegralEi[-2*Log[c*x]]

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned} \int \frac{1}{x^3 \log(cx)} \, dx &= c^2 \text{Subst}\left(\int \frac{e^{-2x}}{x} \, dx, x, \log(cx)\right) \\ &= c^2 \text{Ei}(-2 \log(cx)) \end{aligned}$$

Mathematica [A]
time = 0.02, size = 11, normalized size = 1.00

$$c^2 \text{Ei}(-2 \log(cx))$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*Log[c*x]),x]
[Out] c^2*ExpIntegralEi[-2*Log[c*x]]
```

Maple [A]
time = 0.02, size = 14, normalized size = 1.27

method	result	size
derivativedivides	$-c^2 \operatorname{expIntegral}(1, 2\ln(cx))$	14
default	$-c^2 \operatorname{expIntegral}(1, 2\ln(cx))$	14
risch	$-c^2 \operatorname{expIntegral}(1, 2\ln(cx))$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/ln(c*x),x,method=_RETURNVERBOSE)
[Out] -c^2*Ei(1,2*ln(c*x))
```

Maxima [A]
time = 0.33, size = 11, normalized size = 1.00

$$c^2 \operatorname{Ei}(-2\log(cx))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x),x, algorithm="maxima")
[Out] c^2*Ei(-2*log(c*x))
```

Fricas [A]
time = 0.35, size = 12, normalized size = 1.09

$$c^2 \operatorname{log\_integral}\left(\frac{1}{c^2x^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x),x, algorithm="fricas")
[Out] c^2*log_integral(1/(c^2*x^2))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3 \log(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/ln(c*x),x)
```

```
[Out] Integral(1/(x**3*log(c*x)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x),x, algorithm="giac")
```

```
[Out] integrate(1/(x^3*log(c*x)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.09

$$\int \frac{1}{x^3\,\ln\left(c\,x\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*log(c*x)),x)
```

```
[Out] int(1/(x^3*log(c*x)), x)
```

3.29 $\int \frac{x^3}{\log^2(cx)}\,dx$

Optimal. Leaf size=24

$$\frac{4\text{Ei}(4\log(cx))}{c^4}-\frac{x^4}{\log(cx)}$$

[Out] 4*Ei(4*ln(c*x))/c^4-x^4/ln(c*x)

Rubi [A]
time = 0.02, antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2343, 2346, 2209}

$$\frac{4\text{Ei}(4\log(cx))}{c^4}-\frac{x^4}{\log(cx)}$$

Antiderivative was successfully verified.

[In] Int[x^3/Log[c*x]^2,x]

[Out] (4*ExpIntegralEi[4*Log[c*x]])/c^4 - x^4/Log[c*x]

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{x^3}{\log^2(cx)}\,dx = -\frac{x^4}{\log(cx)} + 4\int \frac{x^3}{\log(cx)}\,dx$$
$$= -\frac{x^4}{\log(cx)} + \frac{4\text{Subst}\left(\int \frac{e^{4x}}{x}\,dx, x, \log(cx)\right)}{c^4}$$
$$= \frac{4\text{Ei}(4\log(cx))}{c^4} - \frac{x^4}{\log(cx)}$$

Mathematica [A]
time = 0.02, size = 24, normalized size = 1.00

$$\frac{4\text{Ei}(4\log(cx))}{c^4} - \frac{x^4}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Log[c*x]^2,x]
[Out] (4*ExpIntegralEi[4*Log[c*x]])/c^4 - x^4/Log[c*x]
```

Maple [A]
time = 0.02, size = 30, normalized size = 1.25

method	result	size
risch	$-\frac{x^4}{\ln(cx)} - \frac{4\,\text{expIntegral}(1,-4\ln(cx))}{c^4}$	26
derivativedivides	$\frac{-\frac{c^4x^4}{\ln(cx)}-4\,\text{expIntegral}(1,-4\ln(cx))}{c^4}$	30
default	$\frac{-\frac{c^4x^4}{\ln(cx)}-4\,\text{expIntegral}(1,-4\ln(cx))}{c^4}$	30

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] 1/c^4*(-c^4*x^4/ln(c*x)-4*Ei(1,-4*ln(c*x)))
```

Maxima [A]
time = 0.33, size = 13, normalized size = 0.54

$$\frac{4\,\Gamma(-1, -4\,\log(cx))}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x)^2,x, algorithm="maxima")
```

```
[Out] 4*gamma(-1, -4*log(c*x))/c^4
```

Fricas [A]
time = 0.35, size = 33, normalized size = 1.38

$$-\frac{c^4x^4 - 4\log(cx)\,\text{log\_integral}\left(c^4x^4\right)}{c^4\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x)^2,x, algorithm="fricas")
[Out] -(c^4*x^4 - 4*log(c*x)*log_integral(c^4*x^4))/(c^4*log(c*x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\frac{x^4}{\log(cx)} + 4\int\frac{x^3}{\log(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/ln(c*x)**2,x)
[Out] -x**4/log(c*x) + 4*Integral(x**3/log(c*x), x)
```

Giac [A]
time = 3.50, size = 24, normalized size = 1.00

$$-\frac{x^4}{\log(cx)} + \frac{4\,\text{Ei}(4\log(cx))}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x)^2,x, algorithm="giac")
[Out] -x^4/log(c*x) + 4*Ei(4*log(c*x))/c^4
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.04

$$\int\frac{x^3}{\ln(c\,x)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/log(c*x)^2,x)
[Out] int(x^3/log(c*x)^2, x)
```

3.30 $\int \frac{x^2}{\log^2(cx)}\, dx$

Optimal. Leaf size=24

$$\frac{3\text{Ei}(3\log(cx))}{c^3} - \frac{x^3}{\log(cx)}$$

```
[Out] 3*Ei(3*ln(c*x))/c^3-x^3/ln(c*x)
```

Rubi [A]

time = 0.02, antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2343, 2346, 2209}

$$\frac{3\text{Ei}(3\log(cx))}{c^3} - \frac{x^3}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Log[c*x]^2,x]
```

```
[Out] (3*ExpIntegralEi[3*Log[c*x]])/c^3 - x^3/Log[c*x]
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{x^2}{\log^2(cx)}\,dx = -\frac{x^3}{\log(cx)} + 3\int \frac{x^2}{\log(cx)}\,dx$$
$$= -\frac{x^3}{\log(cx)} + \frac{3\text{Subst}\left(\int \frac{e^{3x}}{x}\,dx, x, \log(cx)\right)}{c^3}$$
$$= \frac{3\text{Ei}(3\log(cx))}{c^3} - \frac{x^3}{\log(cx)}$$

Mathematica [A]
time = 0.02, size = 24, normalized size = 1.00

$$\frac{3\text{Ei}(3\log(cx))}{c^3} - \frac{x^3}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/Log[c*x]^2,x]
[Out] (3*ExpIntegralEi[3*Log[c*x]])/c^3 - x^3/Log[c*x]
```

Maple [A]
time = 0.02, size = 30, normalized size = 1.25

method	result	size
risch	$-\frac{x^3}{\ln(cx)} - \frac{3\,\text{expIntegral}(1,-3\ln(cx))}{c^3}$	26
derivativedivides	$\frac{-\frac{c^3x^3}{\ln(cx)} - 3\,\text{expIntegral}(1,-3\ln(cx))}{c^3}$	30
default	$\frac{-\frac{c^3x^3}{\ln(cx)} - 3\,\text{expIntegral}(1,-3\ln(cx))}{c^3}$	30

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] 1/c^3*(-c^3*x^3/ln(c*x)-3*Ei(1,-3*ln(c*x)))
```

Maxima [A]
time = 0.32, size = 13, normalized size = 0.54

$$\frac{3\,\Gamma(-1, -3\,\log(cx))}{c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x)^2,x, algorithm="maxima")
```

```
[Out] 3*gamma(-1, -3*log(c*x))/c^3
```

Fricas [A]
time = 0.35, size = 33, normalized size = 1.38

$$-\frac{c^3x^3 - 3\,\log\left(cx\right)\operatorname{log\_integral}\left(c^3x^3\right)}{c^3\log\left(cx\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x)^2,x, algorithm="fricas")
[Out] -(c^3*x^3 - 3*log(c*x)*log_integral(c^3*x^3))/(c^3*log(c*x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\frac{x^3}{\log\left(cx\right)} + 3\int\frac{x^2}{\log\left(cx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/ln(c*x)**2,x)
[Out] -x**3/log(c*x) + 3*Integral(x**2/log(c*x), x)
```

Giac [A]
time = 2.48, size = 24, normalized size = 1.00

$$-\frac{x^3}{\log\left(cx\right)} + \frac{3\,\mathrm{Ei}(3\,\log\left(cx\right))}{c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x)^2,x, algorithm="giac")
[Out] -x^3/log(c*x) + 3*Ei(3*log(c*x))/c^3
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.04

$$\int\frac{x^2}{{\ln\left(c\,x\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/log(c*x)^2,x)
[Out] int(x^2/log(c*x)^2, x)
```

3.31 $\int \frac{x}{\log^2(cx)} \, dx$

Optimal. Leaf size=24

$$\frac{2\text{Ei}(2\log(cx))}{c^2} - \frac{x^2}{\log(cx)}$$

```
[Out] 2*Ei(2*ln(c*x))/c^2-x^2/ln(c*x)
```

Rubi [A]
time = 0.02, antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.375$, Rules used = {2343, 2346, 2209}

$$\frac{2\text{Ei}(2\log(cx))}{c^2} - \frac{x^2}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[x/Log[c*x]^2,x]
```

```
[Out] (2*ExpIntegralEi[2*Log[c*x]])/c^2 - x^2/Log[c*x]
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{x}{\log^2(cx)}\,dx = -\frac{x^2}{\log(cx)} + 2\int \frac{x}{\log(cx)}\,dx$$
$$= -\frac{x^2}{\log(cx)} + \frac{2\text{Subst}\left(\int \frac{e^{2x}}{x}\,dx, x, \log(cx)\right)}{c^2}$$
$$= \frac{2\text{Ei}(2\log(cx))}{c^2} - \frac{x^2}{\log(cx)}$$

Mathematica [A]
time = 0.02, size = 24, normalized size = 1.00

$$\frac{2\text{Ei}(2\log(cx))}{c^2} - \frac{x^2}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Log[c*x]^2,x]
[Out] (2*ExpIntegralEi[2*Log[c*x]])/c^2 - x^2/Log[c*x]
```

Maple [A]
time = 0.02, size = 30, normalized size = 1.25

method	result	size
risch	$-\frac{x^2}{\ln(cx)} - \frac{2\,\text{expIntegral}(1,-2\ln(cx))}{c^2}$	26
derivativedivides	$\frac{-\frac{c^2x^2}{\ln(cx)} - 2\,\text{expIntegral}(1,-2\ln(cx))}{c^2}$	30
default	$\frac{-\frac{c^2x^2}{\ln(cx)} - 2\,\text{expIntegral}(1,-2\ln(cx))}{c^2}$	30

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] 1/c^2*(-c^2*x^2/ln(c*x)-2*Ei(1,-2*ln(c*x)))
```

Maxima [A]
time = 0.34, size = 13, normalized size = 0.54

$$\frac{2\,\Gamma(-1, -2\,\log(cx))}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x)^2,x, algorithm="maxima")
```

```
[Out] 2*gamma(-1, -2*log(c*x))/c^2
```

Fricas [A]
time = 0.35, size = 33, normalized size = 1.38

$$-\frac{c^2x^2 - 2\log(cx)\,\mathrm{log\_integral}(c^2x^2)}{c^2\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x)^2,x, algorithm="fricas")
[Out] -(c^2*x^2 - 2*log(c*x)*log_integral(c^2*x^2))/(c^2*log(c*x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\frac{x^2}{\log(cx)} + 2\int \frac{x}{\log(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/ln(c*x)**2,x)
[Out] -x**2/log(c*x) + 2*Integral(x/log(c*x), x)
```

Giac [A]
time = 3.65, size = 24, normalized size = 1.00

$$-\frac{x^2}{\log(cx)} + \frac{2\,\mathrm{Ei}(2\log(cx))}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x)^2,x, algorithm="giac")
[Out] -x^2/log(c*x) + 2*Ei(2*log(c*x))/c^2
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{x}{\ln(c\,x)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/log(c*x)^2,x)
[Out] int(x/log(c*x)^2, x)
```

3.32 $\int \frac{1}{\log^2(cx)}\,dx$

Optimal. Leaf size=18

$$-\frac{x}{\log(cx)}+\frac{\mathrm{li}(cx)}{c}$$

```
[Out] Li(c*x)/c-x/ln(c*x)
```

Rubi [A]
time = 0.00, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}=0.333$, Rules used = {2334, 2335}

$$\frac{\mathrm{li}(cx)}{c}-\frac{x}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^(-2),x]
```

```
[Out] -(x/Log[c*x]) + LogIntegral[c*x]/c
```

Rule 2334

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Simp[x*((a + b
*Log[c*x^n])^(p + 1)/(b*n*(p + 1))), x] - Dist[1/(b*n*(p + 1)), Int[(a + b*
Log[c*x^n])^(p + 1), x], x] /; FreeQ[{a, b, c, n}, x] && LtQ[p, -1] && Inte
gerQ[2*p]
```

Rule 2335

```
Int[Log[(c_.)*(x_)]^(-1), x_Symbol] :> Simp[LogIntegral[c*x]/c, x] /; FreeQ
[c, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{\log^2(cx)}\,dx&=-\frac{x}{\log(cx)}+\int \frac{1}{\log(cx)}\,dx\\&=-\frac{x}{\log(cx)}+\frac{\mathrm{li}(cx)}{c}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 18, normalized size = 1.00

$$-\frac{x}{\log(cx)}+\frac{\mathrm{li}(cx)}{c}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^(-2),x]
```

```
[Out] -(x/Log[c*x]) + LogIntegral[c*x]/c
```

Maple [A]
time = 0.02, size = 26, normalized size = 1.44

method	result	size
risch	$-\frac{x}{\ln(cx)}-\frac{\text{expIntegral}(1,-\ln(cx))}{c}$	24
derivativedivides	$\frac{-\frac{cx}{\ln(cx)}-\text{expIntegral}(1,-\ln(cx))}{c}$	26
default	$\frac{-\frac{cx}{\ln(cx)}-\text{expIntegral}(1,-\ln(cx))}{c}$	26

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/ln(c*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c*(-c*x/ln(c*x)-Ei(1,-ln(c*x)))
```

Maxima [A]
time = 0.33, size = 12, normalized size = 0.67

$$\frac{\Gamma(-1, -\log(cx))}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x)^2,x, algorithm="maxima")
```

```
[Out] gamma(-1, -log(c*x))/c
```

Fricas [A]
time = 0.36, size = 25, normalized size = 1.39

$$-\frac{cx - \log(cx)\,\mathrm{log\_integral}(cx)}{c\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x)^2,x, algorithm="fricas")
```

```
[Out] -(c*x - log(c*x)*log_integral(c*x))/(c*log(c*x))
```

Sympy [A]
time = 0.22, size = 12, normalized size = 0.67

$$-\frac{x}{\log(cx)} + \frac{\mathrm{li}(cx)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/ln(c*x)**2,x)
```

```
[Out] -x/log(c*x) + li(c*x)/c
```

Giac [A]
time = 3.00, size = 19, normalized size = 1.06

$$\frac{\mathrm{Ei}(\log(cx))}{c} - \frac{x}{\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x)^2,x, algorithm="giac")
```

```
[Out] Ei(log(c*x))/c - x/log(c*x)
```

Mupad [B]
time = 3.34, size = 18, normalized size = 1.00

$$\frac{\mathrm{logint}(c\,x)}{c} - \frac{x}{\ln(c\,x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/log(c*x)^2,x)
```

```
[Out] logint(c*x)/c - x/log(c*x)
```

3.33 $\int \frac{1}{x \log^2(cx)} dx$

Optimal. Leaf size=8

$$-\frac{1}{\log(cx)}$$

```
[Out] -1/ln(c*x)
```

Rubi [A]
time = 0.01, antiderivative size = 8, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2339, 30}

$$-\frac{1}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Log[c*x]^2),x]
```

```
[Out] -Log[c*x]^(-1)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned} \int \frac{1}{x \log^2(cx)} dx &= \text{Subst}\left(\int \frac{1}{x^2} dx, x, \log(cx)\right) \\ &= -\frac{1}{\log(cx)} \end{aligned}$$

Mathematica [A]
time = 0.00, size = 8, normalized size = 1.00

$$-\frac{1}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Log[c*x]^2),x]
```

```
[Out] -Log[c*x]^(-1)
```

Maple [A]
time = 0.01, size = 9, normalized size = 1.12

method	result	size
derivativedivides	$-\frac{1}{\ln(cx)}$	9
default	$-\frac{1}{\ln(cx)}$	9
norman	$-\frac{1}{\ln(cx)}$	9
risch	$-\frac{1}{\ln(cx)}$	9

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/ln(c*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] -1/ln(c*x)
```

Maxima [A]
time = 0.29, size = 8, normalized size = 1.00

$$-\frac{1}{\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x)^2,x, algorithm="maxima")
```

```
[Out] -1/log(c*x)
```

Fricas [A]
time = 0.34, size = 8, normalized size = 1.00

$$-\frac{1}{\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x)^2,x, algorithm="fricas")
```

```
[Out] -1/log(c*x)
```

Sympy [A]
time = 0.02, size = 7, normalized size = 0.88

$$-\frac{1}{\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/ln(c*x)**2,x)
```

```
[Out] -1/log(c*x)
```

Giac [A]
time = 2.76, size = 8, normalized size = 1.00

$$-\frac{1}{\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x)^2,x, algorithm="giac")
```

```
[Out] -1/log(c*x)
```

Mupad [B]
time = 3.56, size = 8, normalized size = 1.00

$$-\frac{1}{\ln(c\,x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*log(c*x)^2),x)
```

```
[Out] -1/log(c*x)
```

3.34 $\int \frac{1}{x^2 \log^2(cx)}\,dx$

Optimal. Leaf size=22

$$-c\text{Ei}(-\log(cx)) - \frac{1}{x\log(cx)}$$

```
[Out] -c*Ei(-ln(c*x))-1/x/ln(c*x)
```

Rubi [A]

time = 0.02, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2343, 2346, 2209}

$$-c\text{Ei}(-\log(cx)) - \frac{1}{x\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Log[c*x]^2),x]
```

```
[Out] -(c*ExpIntegralEi[-Log[c*x]]) - 1/(x*Log[c*x])
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{1}{x^2 \log^2(cx)} dx = -\frac{1}{x \log(cx)} - \int \frac{1}{x^2 \log(cx)} dx$$
$$= -\frac{1}{x \log(cx)} - c\text{Subst}\left(\int \frac{e^{-x}}{x} dx, x, \log(cx)\right)$$
$$= -c\text{Ei}(-\log(cx)) - \frac{1}{x \log(cx)}$$

Mathematica [A]
time = 0.02, size = 22, normalized size = 1.00

$$-c\text{Ei}(-\log(cx)) - \frac{1}{x \log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Log[c*x]^2),x]
[Out] -(c*ExpIntegralEi[-Log[c*x]]) - 1/(x*Log[c*x])
```

Maple [A]
time = 0.02, size = 24, normalized size = 1.09

method	result	size
risch	$-\frac{1}{x \ln(cx)} + c \,\text{expIntegral}\left(1, \ln\left(cx\right)\right)$	21
derivativedivides	$c\left(-\frac{1}{cx \ln(cx)} + \text{expIntegral}\left(1, \ln\left(cx\right)\right)\right)$	24
default	$c\left(-\frac{1}{cx \ln(cx)} + \text{expIntegral}\left(1, \ln\left(cx\right)\right)\right)$	24

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] c*(-1/c/x/ln(c*x)+Ei(1,ln(c*x)))
```

Maxima [A]
time = 0.33, size = 9, normalized size = 0.41

$$-c\Gamma(-1, \log(cx))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x)^2,x, algorithm="maxima")
[Out] -c*gamma(-1, log(c*x))
```

Fricas [A]
time = 0.35, size = 28, normalized size = 1.27

$$-\frac{cx\log(cx)\log\_integral\left(\frac{1}{cx}\right)+1}{x\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x)^2,x, algorithm="fricas")
[Out] -(c*x*log(c*x)*log_integral(1/(c*x)) + 1)/(x*log(c*x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-\int\frac{1}{x^2\log(cx)}\,dx-\frac{1}{x\log(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/ln(c*x)**2,x)
[Out] -Integral(1/(x**2*log(c*x)), x) - 1/(x*log(c*x))
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x)^2,x, algorithm="giac")
[Out] integrate(1/(x^2*log(c*x)^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.05

$$\int\frac{1}{x^2\ln(c\,x)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*log(c*x)^2),x)
[Out] int(1/(x^2*log(c*x)^2), x)
```

3.35 $\int \frac{1}{x^3 \log^2(cx)} \, dx$

Optimal. Leaf size=24

$$-2c^2\text{Ei}(-2\log(cx)) - \frac{1}{x^2\log(cx)}$$

```
[Out] -2*c^2*Ei(-2*ln(c*x))-1/x^2/ln(c*x)
```

Rubi [A]
time = 0.02, antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2343, 2346, 2209}

$$-2c^2\text{Ei}(-2\log(cx)) - \frac{1}{x^2\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*Log[c*x]^2),x]
```

```
[Out] -2*c^2*ExpIntegralEi[-2*Log[c*x]] - 1/(x^2*Log[c*x])
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{1}{x^3 \log^2(cx)}\,dx = -\frac{1}{x^2\log(cx)} - 2\int \frac{1}{x^3\log(cx)}\,dx$$
$$= -\frac{1}{x^2\log(cx)} - (2c^2)\,\text{Subst}\left(\int \frac{e^{-2x}}{x}\,dx, x, \log(cx)\right)$$
$$= -2c^2\text{Ei}(-2\log(cx)) - \frac{1}{x^2\log(cx)}$$

Mathematica [A]
time = 0.02, size = 24, normalized size = 1.00

$$-2c^2\text{Ei}(-2\log(cx)) - \frac{1}{x^2\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*Log[c*x]^2),x]
[Out] -2*c^2*ExpIntegralEi[-2*Log[c*x]] - 1/(x^2*Log[c*x])
```

Maple [A]
time = 0.02, size = 30, normalized size = 1.25

method	result	size
risch	$-\frac{1}{x^2\ln(cx)} + 2c^2\,\text{expIntegral}\left(1, 2\ln(cx)\right)$	26
derivativedivides	$c^2\left(-\frac{1}{c^2x^2\ln(cx)} + 2\,\text{expIntegral}\left(1, 2\ln(cx)\right)\right)$	30
default	$c^2\left(-\frac{1}{c^2x^2\ln(cx)} + 2\,\text{expIntegral}\left(1, 2\ln(cx)\right)\right)$	30

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/ln(c*x)^2,x,method=_RETURNVERBOSE)
[Out] c^2*(-1/c^2/x^2/ln(c*x)+2*Ei(1,2*ln(c*x)))
```

Maxima [A]
time = 0.33, size = 13, normalized size = 0.54

$$-2\,c^2\Gamma\left(-1, 2\,\log(cx)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x)^2,x, algorithm="maxima")
[Out] -2*c^2*gamma(-1, 2*log(c*x))
```

Fricas [A]
time = 0.36, size = 33, normalized size = 1.38

$$-\frac{2\,c^2x^2\log\left(cx\right)\operatorname{log\_integral}\left(\frac{1}{c^2x^2}\right)+1}{x^2\log\left(cx\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x)^2,x, algorithm="fricas")
[Out] -(2*c^2*x^2*log(c*x)*log_integral(1/(c^2*x^2)) + 1)/(x^2*log(c*x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$-2\int\frac{1}{x^3\log\left(cx\right)}\,dx-\frac{1}{x^2\log\left(cx\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/ln(c*x)**2,x)
[Out] -2*Integral(1/(x**3*log(c*x)), x) - 1/(x**2*log(c*x))
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x)^2,x, algorithm="giac")
[Out] integrate(1/(x^3*log(c*x)^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.04

$$\int\frac{1}{x^3\ln\left(c\,x\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*log(c*x)^2),x)
[Out] int(1/(x^3*log(c*x)^2), x)
```

3.36 $\int \frac{x^3}{\log^3(cx)}\,dx$

Optimal. Leaf size=37

$$\frac{8\text{Ei}(4\log(cx))}{c^4}-\frac{x^4}{2\log^2(cx)}-\frac{2x^4}{\log(cx)}$$

```
[Out] 8*Ei(4*ln(c*x))/c^4-1/2*x^4/ln(c*x)^2-2*x^4/ln(c*x)
```

Rubi [A]
time = 0.03, antiderivative size = 37, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}=0.300$, Rules used = {2343, 2346, 2209}

$$\frac{8\text{Ei}(4\log(cx))}{c^4}-\frac{x^4}{2\log^2(cx)}-\frac{2x^4}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/Log[c*x]^3,x]
```

```
[Out] (8*ExpIntegralEi[4*Log[c*x]])/c^4 - x^4/(2*Log[c*x]^2) - (2*x^4)/Log[c*x]
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{x^3}{\log^3(cx)}\,dx &= -\frac{x^4}{2\log^2(cx)} + 2\int \frac{x^3}{\log^2(cx)}\,dx \\ &= -\frac{x^4}{2\log^2(cx)} - \frac{2x^4}{\log(cx)} + 8\int \frac{x^3}{\log(cx)}\,dx \\ &= -\frac{x^4}{2\log^2(cx)} - \frac{2x^4}{\log(cx)} + \frac{8\mathrm{Subst}\left(\int \frac{e^{4x}}{x}\,dx, x, \log(cx)\right)}{c^4} \\ &= \frac{8\mathrm{Ei}(4\log(cx))}{c^4} - \frac{x^4}{2\log^2(cx)} - \frac{2x^4}{\log(cx)}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 37, normalized size = 1.00

$$\frac{8\mathrm{Ei}(4\log(cx))}{c^4} - \frac{x^4}{2\log^2(cx)} - \frac{2x^4}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Log[c*x]^3,x]
[Out] (8*ExpIntegralEi[4*Log[c*x]])/c^4 - x^4/(2*Log[c*x]^2) - (2*x^4)/Log[c*x]
```

Maple [A]
time = 0.02, size = 44, normalized size = 1.19

method	result	size
risch	$-\frac{x^4(1+4\ln(cx))}{2\ln(cx)^2} - \frac{8\,\mathrm{expIntegral}(1,-4\ln(cx))}{c^4}$	34
derivativedivides	$\frac{-\frac{c^4x^4}{2\ln(cx)^2} - \frac{2c^4x^4}{\ln(cx)} - 8\,\mathrm{expIntegral}(1,-4\ln(cx))}{c^4}$	44
default	$\frac{-\frac{c^4x^4}{2\ln(cx)^2} - \frac{2c^4x^4}{\ln(cx)} - 8\,\mathrm{expIntegral}(1,-4\ln(cx))}{c^4}$	44

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/ln(c*x)^3,x,method=_RETURNVERBOSE)
[Out] 1/c^4*(-1/2*c^4*x^4/ln(c*x)^2-2*c^4*x^4/ln(c*x)-8*Ei(1,-4*ln(c*x)))
```

Maxima [A]
time = 0.32, size = 13, normalized size = 0.35

$$-\frac{16\,\Gamma(-2, -4\,\log(cx))}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x)^3,x, algorithm="maxima")
```

```
[Out] -16*gamma(-2, -4*log(c*x))/c^4
```

Fricas [A]
time = 0.35, size = 47, normalized size = 1.27

$$-\frac{4\,c^4x^4\log\left(cx\right)+c^4x^4-16\,\log\left(cx\right)^2\log\_integral\left(c^4x^4\right)}{2\,c^4\log\left(cx\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] -1/2*(4*c^4*x^4*log(c*x) + c^4*x^4 - 16*log(c*x)^2*log_integral(c^4*x^4))/(
c^4*log(c*x)^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\frac{-4x^4\log\left(cx\right)-x^4}{2\log\left(cx\right)^2}+8\int\frac{x^3}{\log\left(cx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/ln(c*x)**3,x)
```

```
[Out] (-4*x**4*log(c*x) - x**4)/(2*log(c*x)**2) + 8*Integral(x**3/log(c*x), x)
```

Giac [A]
time = 4.46, size = 35, normalized size = 0.95

$$-\frac{2\,x^4}{\log\left(cx\right)}-\frac{x^4}{2\,\log\left(cx\right)^2}+\frac{8\,\mathrm{Ei}(4\,\log\left(cx\right))}{c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(c*x)^3,x, algorithm="giac")
```

```
[Out] -2*x^4/log(c*x) - 1/2*x^4/log(c*x)^2 + 8*Ei(4*log(c*x))/c^4
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int\frac{x^3}{\ln\left(c\,x\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/log(c*x)^3,x)
```

```
[Out] int(x^3/log(c*x)^3, x)
```

3.37 $\int \frac{x^2}{\log^3(cx)}\,dx$

Optimal. Leaf size=41

$$\frac{9\text{Ei}(3\log(cx))}{2c^3}-\frac{x^3}{2\log^2(cx)}-\frac{3x^3}{2\log(cx)}$$

```
[Out] 9/2*Ei(3*ln(c*x))/c^3-1/2*x^3/ln(c*x)^2-3/2*x^3/ln(c*x)
```

Rubi [A]
time = 0.03, antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2343, 2346, 2209}

$$\frac{9\text{Ei}(3\log(cx))}{2c^3}-\frac{x^3}{2\log^2(cx)}-\frac{3x^3}{2\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Log[c*x]^3,x]
```

```
[Out] (9*ExpIntegralEi[3*Log[c*x]])/(2*c^3) - x^3/(2*Log[c*x]^2) - (3*x^3)/(2*Log
[c*x])
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{x^2}{\log^3(cx)}\,dx = -\frac{x^3}{2\log^2(cx)} + \frac{3}{2}\int \frac{x^2}{\log^2(cx)}\,dx$$
$$= -\frac{x^3}{2\log^2(cx)} - \frac{3x^3}{2\log(cx)} + \frac{9}{2}\int \frac{x^2}{\log(cx)}\,dx$$
$$= -\frac{x^3}{2\log^2(cx)} - \frac{3x^3}{2\log(cx)} + \frac{9\text{Subst}\left(\int \frac{e^{3x}}{x}\,dx, x, \log(cx)\right)}{2c^3}$$
$$= \frac{9\text{Ei}(3\log(cx))}{2c^3} - \frac{x^3}{2\log^2(cx)} - \frac{3x^3}{2\log(cx)}$$

Mathematica [A]
time = 0.02, size = 41, normalized size = 1.00

$$\frac{9\text{Ei}(3\log(cx))}{2c^3} - \frac{x^3}{2\log^2(cx)} - \frac{3x^3}{2\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/Log[c*x]^3,x]
```

```
[Out] (9*ExpIntegralEi[3*Log[c*x]])/(2*c^3) - x^3/(2*Log[c*x]^2) - (3*x^3)/(2*Log
[c*x])
```

Maple [A]
time = 0.02, size = 44, normalized size = 1.07

method	result	size
risch	$-\frac{x^3(1+3\ln(cx))}{2\ln(cx)^2} - \frac{9\,\text{expIntegral}(1,-3\ln(cx))}{2c^3}$	34
derivativedivides	$\frac{-\frac{c^3x^3}{2\ln(cx)^2} - \frac{3c^3x^3}{2\ln(cx)} - \frac{9\,\text{expIntegral}(1,-3\ln(cx))}{2}}{c^3}$	44
default	$\frac{-\frac{c^3x^3}{2\ln(cx)^2} - \frac{3c^3x^3}{2\ln(cx)} - \frac{9\,\text{expIntegral}(1,-3\ln(cx))}{2}}{c^3}$	44

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/ln(c*x)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/c^3*(-1/2*c^3*x^3/ln(c*x)^2-3/2*c^3*x^3/ln(c*x)-9/2*Ei(1,-3*ln(c*x)))
```

Maxima [A]
time = 0.32, size = 13, normalized size = 0.32

$$-\frac{9\,\Gamma(-2, -3\,\log(cx))}{c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x)^3,x, algorithm="maxima")
```

```
[Out] -9*gamma(-2, -3*log(c*x))/c^3
```

Fricas [A]
time = 0.35, size = 47, normalized size = 1.15

$$-\frac{3\,c^3x^3\log\left(cx\right)+c^3x^3-9\,\log\left(cx\right)^2\,\mathrm{log\_integral}\left(c^3x^3\right)}{2\,c^3\log\left(cx\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] -1/2*(3*c^3*x^3*log(c*x) + c^3*x^3 - 9*log(c*x)^2*log_integral(c^3*x^3))/(c
^3*log(c*x)^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\frac{-3x^3\log\left(cx\right)-x^3}{2\log\left(cx\right)^2}+\frac{9\int\frac{x^2}{\log\left(cx\right)}\,dx}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/ln(c*x)**3,x)
```

```
[Out] (-3*x**3*log(c*x) - x**3)/(2*log(c*x)**2) + 9*Integral(x**2/log(c*x), x)/2
```

Giac [A]
time = 4.53, size = 35, normalized size = 0.85

$$-\frac{3\,x^3}{2\,\log\left(cx\right)}-\frac{x^3}{2\,\log\left(cx\right)^2}+\frac{9\,\mathrm{Ei}(3\,\log\left(cx\right))}{2\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(c*x)^3,x, algorithm="giac")
```

```
[Out] -3/2*x^3/log(c*x) - 1/2*x^3/log(c*x)^2 + 9/2*Ei(3*log(c*x))/c^3
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int\frac{x^2}{\ln\left(c\,x\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/log(c*x)^3,x)
```

```
[Out] int(x^2/log(c*x)^3, x)
```

3.38 $\int \frac{x}{\log^3(cx)}\,dx$

Optimal. Leaf size=37

$$\frac{2\text{Ei}(2\log(cx))}{c^2}-\frac{x^2}{2\log^2(cx)}-\frac{x^2}{\log(cx)}$$

```
[Out] 2*Ei(2*ln(c*x))/c^2-1/2*x^2/ln(c*x)^2-x^2/ln(c*x)
```

Rubi [A]
time = 0.02, antiderivative size = 37, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {2343, 2346, 2209}

$$\frac{2\text{Ei}(2\log(cx))}{c^2}-\frac{x^2}{2\log^2(cx)}-\frac{x^2}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[x/Log[c*x]^3,x]
```

```
[Out] (2*ExpIntegralEi[2*Log[c*x]])/c^2 - x^2/(2*Log[c*x]^2) - x^2/Log[c*x]
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{x}{\log^3(cx)}\,dx &= -\frac{x^2}{2\log^2(cx)}+\int \frac{x}{\log^2(cx)}\,dx\\ &= -\frac{x^2}{2\log^2(cx)}-\frac{x^2}{\log(cx)}+2\int \frac{x}{\log(cx)}\,dx\\ &= -\frac{x^2}{2\log^2(cx)}-\frac{x^2}{\log(cx)}+\frac{2\text{Subst}\left(\int \frac{e^{2x}}{x}\,dx,x,\log(cx)\right)}{c^2}\\ &= \frac{2\text{Ei}(2\log(cx))}{c^2}-\frac{x^2}{2\log^2(cx)}-\frac{x^2}{\log(cx)}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 37, normalized size = 1.00

$$\frac{2\text{Ei}(2\log(cx))}{c^2}-\frac{x^2}{2\log^2(cx)}-\frac{x^2}{\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Log[c*x]^3,x]
[Out] (2*ExpIntegralEi[2*Log[c*x]])/c^2 - x^2/(2*Log[c*x]^2) - x^2/Log[c*x]
```

Maple [A]
time = 0.02, size = 44, normalized size = 1.19

method	result	size
risch	$-\frac{x^2(1+2\ln(cx))}{2\ln(cx)^2}-\frac{2\,\text{expIntegral}(1,-2\ln(cx))}{c^2}$	34
derivativedivides	$\frac{-\frac{c^2x^2}{2\ln(cx)^2}-\frac{c^2x^2}{\ln(cx)}-2\,\text{expIntegral}(1,-2\ln(cx))}{c^2}$	44
default	$\frac{-\frac{c^2x^2}{2\ln(cx)^2}-\frac{c^2x^2}{\ln(cx)}-2\,\text{expIntegral}(1,-2\ln(cx))}{c^2}$	44

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/ln(c*x)^3,x,method=_RETURNVERBOSE)
[Out] 1/c^2*(-1/2*c^2*x^2/ln(c*x)^2-c^2*x^2/ln(c*x)-2*Ei(1,-2*ln(c*x)))
```

Maxima [A]
time = 0.37, size = 13, normalized size = 0.35

$$-\frac{4\,\Gamma(-2,-2\,\log(cx))}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x)^3,x, algorithm="maxima")
```

```
[Out] -4*gamma(-2, -2*log(c*x))/c^2
```

Fricas [A]
time = 0.35, size = 47, normalized size = 1.27

$$-\frac{2\,c^2x^2\log\left(cx\right)+c^2x^2-4\,\log\left(cx\right)^2\,\text{log\_integral}\left(c^2x^2\right)}{2\,c^2\log\left(cx\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] -1/2*(2*c^2*x^2*log(c*x) + c^2*x^2 - 4*log(c*x)^2*log_integral(c^2*x^2))/(c
^2*log(c*x)^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\frac{-2x^2\log\left(cx\right)-x^2}{2\log\left(cx\right)^2}+2\int\frac{x}{\log\left(cx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/ln(c*x)**3,x)
```

```
[Out] (-2*x**2*log(c*x) - x**2)/(2*log(c*x)**2) + 2*Integral(x/log(c*x), x)
```

Giac [A]
time = 4.01, size = 35, normalized size = 0.95

$$-\frac{x^2}{\log\left(cx\right)}-\frac{x^2}{2\,\log\left(cx\right)^2}+\frac{2\,\text{Ei}(2\,\log\left(cx\right))}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(c*x)^3,x, algorithm="giac")
```

```
[Out] -x^2/log(c*x) - 1/2*x^2/log(c*x)^2 + 2*Ei(2*log(c*x))/c^2
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int\frac{x}{\ln\left(c\,x\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/log(c*x)^3,x)
```

```
[Out] int(x/log(c*x)^3, x)
```

3.39 $\int \frac{1}{\log^3(cx)} \, dx$

Optimal. Leaf size=34

$$-\frac{x}{2\log^2(cx)}-\frac{x}{2\log(cx)}+\frac{\mathrm{li}(cx)}{2c}$$

```
[Out] 1/2*Li(c*x)/c-1/2*x/ln(c*x)^2-1/2*x/ln(c*x)
```

Rubi [A]
time = 0.01, antiderivative size = 34, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2334, 2335}

$$\frac{\mathrm{li}(cx)}{2c}-\frac{x}{2\log^2(cx)}-\frac{x}{2\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[Log[c*x]^(-3),x]
```

```
[Out] -1/2*x/Log[c*x]^2 - x/(2*Log[c*x]) + LogIntegral[c*x]/(2*c)
```

Rule 2334

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Simp[x*((a + b
*Log[c*x^n])^(p + 1)/(b*n*(p + 1))), x] - Dist[1/(b*n*(p + 1)), Int[(a + b*
Log[c*x^n])^(p + 1), x], x] /; FreeQ[{a, b, c, n}, x] && LtQ[p, -1] && Inte
gerQ[2*p]
```

Rule 2335

```
Int[Log[(c_.)*(x_)]^(-1), x_Symbol] :> Simp[LogIntegral[c*x]/c, x] /; FreeQ
[c, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{1}{\log^3(cx)} \, dx &= -\frac{x}{2\log^2(cx)}+\frac{1}{2}\int \frac{1}{\log^2(cx)} \, dx \\
&= -\frac{x}{2\log^2(cx)}-\frac{x}{2\log(cx)}+\frac{1}{2}\int \frac{1}{\log(cx)} \, dx \\
&= -\frac{x}{2\log^2(cx)}-\frac{x}{2\log(cx)}+\frac{\mathrm{li}(cx)}{2c}
\end{aligned}$$

Mathematica [A]
time = 0.01, size = 34, normalized size = 1.00

$$-\frac{x}{2\log^2(cx)}-\frac{x}{2\log(cx)}+\frac{\operatorname{li}(cx)}{2c}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[c*x]^(-3),x]
[Out] -1/2*x/Log[c*x]^2 - x/(2*Log[c*x]) + LogIntegral[c*x]/(2*c)
```

Maple [A]
time = 0.02, size = 36, normalized size = 1.06

method	result	size
risch	$-\frac{x(1+\ln(cx))}{2\ln(cx)^2}-\frac{\operatorname{expIntegral}(1,-\ln(cx))}{2c}$	30
derivativedivides	$\frac{-\frac{cx}{2\ln(cx)^2}-\frac{cx}{2\ln(cx)}-\frac{\operatorname{expIntegral}(1,-\ln(cx))}{2}}{c}$	36
default	$\frac{-\frac{cx}{2\ln(cx)^2}-\frac{cx}{2\ln(cx)}-\frac{\operatorname{expIntegral}(1,-\ln(cx))}{2}}{c}$	36

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/ln(c*x)^3,x,method=_RETURNVERBOSE)
[Out] 1/c*(-1/2*c*x/ln(c*x)^2-1/2*c*x/ln(c*x)-1/2*Ei(1,-ln(c*x)))
```

Maxima [A]
time = 0.34, size = 13, normalized size = 0.38

$$-\frac{\Gamma(-2,-\log(cx))}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x)^3,x, algorithm="maxima")
[Out] -gamma(-2, -log(c*x))/c
```

Fricas [A]
time = 0.35, size = 34, normalized size = 1.00

$$-\frac{cx\log(cx)-\log(cx)^2\operatorname{log\_integral}(cx)+cx}{2\,c\log(cx)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] -1/2*(c*x*log(c*x) - log(c*x)^2*log_integral(c*x) + c*x)/(c*log(c*x)^2)
```

Sympy [A]
time = 0.23, size = 26, normalized size = 0.76

$$\frac{-x\log{(cx)} - x}{2\log{(cx)}^2} + \frac{\mathrm{li}\,(cx)}{2c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/ln(c*x)**3,x)
[Out] (-x*log(c*x) - x)/(2*log(c*x)**2) + li(c*x)/(2*c)
```

Giac [A]
time = 3.97, size = 29, normalized size = 0.85

$$\frac{\mathrm{Ei}(\log{(cx)})}{2\,c} - \frac{x}{2\,\log{(cx)}} - \frac{x}{2\,\log{(cx)}^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(c*x)^3,x, algorithm="giac")
[Out] 1/2*Ei(log(c*x))/c - 1/2*x/log(c*x) - 1/2*x/log(c*x)^2
```

Mupad [B]
time = 3.53, size = 29, normalized size = 0.85

$$\frac{\mathrm{logint}(c\,x)}{2\,c} - \frac{\frac{x}{2} + \frac{x\,\ln(c\,x)}{2}}{\ln{(c\,x)}^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/log(c*x)^3,x)
[Out] logint(c*x)/(2*c) - (x/2 + (x*log(c*x))/2)/log(c*x)^2
```

3.40 $\int \frac{1}{x\log^3(cx)}\,dx$

Optimal. Leaf size=10

$$-\frac{1}{2\log^2(cx)}$$

```
[Out] -1/2/ln(c*x)^2
```

Rubi [A]
time = 0.01, antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2339, 30}

$$-\frac{1}{2\log^2(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Log[c*x]^3),x]
```

```
[Out] -1/2*1/Log[c*x]^2
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\log^3(cx)}\,dx &= \text{Subst}\left(\int \frac{1}{x^3}\,dx, x, \log(cx)\right)\\ &= -\frac{1}{2\log^2(cx)}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 10, normalized size = 1.00

$$-\frac{1}{2\log^2(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Log[c*x]^3),x]
```

```
[Out] -1/2*1/Log[c*x]^2
```

Maple [A]
time = 0.01, size = 9, normalized size = 0.90

method	result	size
derivativedivides	$-\frac{1}{2\ln(cx)^2}$	9
default	$-\frac{1}{2\ln(cx)^2}$	9
norman	$-\frac{1}{2\ln(cx)^2}$	9
risch	$-\frac{1}{2\ln(cx)^2}$	9

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/ln(c*x)^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2/ln(c*x)^2
```

Maxima [A]
time = 0.28, size = 8, normalized size = 0.80

$$-\frac{1}{2\log(cx)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x)^3,x, algorithm="maxima")
```

```
[Out] -1/2/log(c*x)^2
```

Fricas [A]
time = 0.33, size = 8, normalized size = 0.80

$$-\frac{1}{2\log(cx)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] -1/2/log(c*x)^2
```

Sympy [A]
time = 0.02, size = 10, normalized size = 1.00

$$-\frac{1}{2\log(cx)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/ln(c*x)**3,x)
```

```
[Out] -1/(2*log(c*x)**2)
```

Giac [A]
time = 4.68, size = 8, normalized size = 0.80

$$-\frac{1}{2\log\left(cx\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(c*x)^3,x, algorithm="giac")
```

```
[Out] -1/2/log(c*x)^2
```

Mupad [B]
time = 3.45, size = 8, normalized size = 0.80

$$-\frac{1}{2\ln\left(c\,x\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*log(c*x)^3),x)
```

```
[Out] -1/(2*log(c*x)^2)
```

3.41 $\int \frac{1}{x^2 \log^3(cx)} \, dx$

Optimal. Leaf size=39

$$\frac{1}{2}c\text{Ei}(-\log(cx)) - \frac{1}{2x\log^2(cx)} + \frac{1}{2x\log(cx)}$$

```
[Out] 1/2*c*Ei(-ln(c*x))-1/2/x/ln(c*x)^2+1/2/x/ln(c*x)
```

Rubi [A]
time = 0.03, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2343, 2346, 2209}

$$\frac{1}{2}c\text{Ei}(-\log(cx)) - \frac{1}{2x\log^2(cx)} + \frac{1}{2x\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Log[c*x]^3),x]
```

```
[Out] (c*ExpIntegralEi[-Log[c*x]])/2 - 1/(2*x*Log[c*x]^2) + 1/(2*x*Log[c*x])
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$
\begin{aligned}
\int \frac{1}{x^2\log^3(cx)}\,dx &= -\frac{1}{2x\log^2(cx)}-\frac{1}{2}\int \frac{1}{x^2\log^2(cx)}\,dx \\
&= -\frac{1}{2x\log^2(cx)}+\frac{1}{2x\log(cx)}+\frac{1}{2}\int \frac{1}{x^2\log(cx)}\,dx \\
&= -\frac{1}{2x\log^2(cx)}+\frac{1}{2x\log(cx)}+\frac{1}{2}c\text{Subst}\left(\int \frac{e^{-x}}{x}\,dx,x,\log(cx)\right) \\
&= \frac{1}{2}c\text{Ei}(-\log(cx))-\frac{1}{2x\log^2(cx)}+\frac{1}{2x\log(cx)}
\end{aligned}
$$

Mathematica [A]
time = 0.02, size = 39, normalized size = 1.00

$$\frac{1}{2}c\text{Ei}(-\log(cx))-\frac{1}{2x\log^2(cx)}+\frac{1}{2x\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Log[c*x]^3),x]
[Out] (c*ExpIntegralEi[-Log[c*x]])/2 - 1/(2*x*Log[c*x]^2) + 1/(2*x*Log[c*x])
```

Maple [A]
time = 0.02, size = 40, normalized size = 1.03

method	result	size
risch	$\frac{-1+\ln(cx)}{2x\ln(cx)^2}-\frac{c\,\text{expIntegral}(1,\ln(cx))}{2}$	28
derivativedivides	$c\left(-\frac{1}{2cx\ln(cx)^2}+\frac{1}{2cx\ln(cx)}-\frac{\text{expIntegral}(1,\ln(cx))}{2}\right)$	40
default	$c\left(-\frac{1}{2cx\ln(cx)^2}+\frac{1}{2cx\ln(cx)}-\frac{\text{expIntegral}(1,\ln(cx))}{2}\right)$	40

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/ln(c*x)^3,x,method=_RETURNVERBOSE)
[Out] c*(-1/2/c/x/ln(c*x)^2+1/2/c/x/ln(c*x)-1/2*Ei(1,ln(c*x)))
```

Maxima [A]
time = 0.31, size = 9, normalized size = 0.23

$$-c\Gamma\left(-2,\log\left(cx\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x)^3,x, algorithm="maxima")
```

```
[Out] -c*gamma(-2, log(c*x))
```

Fricas [A]
time = 0.33, size = 34, normalized size = 0.87

$$\frac{cx\log\left(cx\right)^{2}\,\text{log\_integral}\left(\frac{1}{cx}\right)+\log\left(cx\right)-1}{2\,x\log\left(cx\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(c*x*log(c*x)^2*log_integral(1/(c*x)) + log(c*x) - 1)/(x*log(c*x)^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\frac{\int \frac{1}{x^{2}\log\left(cx\right)}\,dx}{2}+\frac{\log\left(cx\right)-1}{2x\log\left(cx\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/ln(c*x)**3,x)
```

```
[Out] Integral(1/(x**2*log(c*x)), x)/2 + (log(c*x) - 1)/(2*x*log(c*x)**2)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(c*x)^3,x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*log(c*x)^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{1}{x^{2}\ln\left(c\,x\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*log(c*x)^3),x)
```

```
[Out] int(1/(x^2*log(c*x)^3), x)
```

3.42 $\int \frac{1}{x^3 \log^3(cx)}\, dx$

Optimal. Leaf size=36

$$2c^2 \text{Ei}(-2\log(cx)) - \frac{1}{2x^2 \log^2(cx)} + \frac{1}{x^2 \log(cx)}$$

```
[Out] 2*c^2*Ei(-2*ln(c*x))-1/2/x^2/ln(c*x)^2+1/x^2/ln(c*x)
```

Rubi [A]
time = 0.03, antiderivative size = 36, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2343, 2346, 2209}

$$2c^2 \text{Ei}(-2\log(cx)) - \frac{1}{2x^2 \log^2(cx)} + \frac{1}{x^2 \log(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*Log[c*x]^3),x]
```

```
[Out] 2*c^2*ExpIntegralEi[-2*Log[c*x]] - 1/(2*x^2*Log[c*x]^2) + 1/(x^2*Log[c*x])
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\int \frac{1}{x^3 \log^3(cx)}\,dx = -\frac{1}{2x^2\log^2(cx)} - \int \frac{1}{x^3\log^2(cx)}\,dx$$
$$= -\frac{1}{2x^2\log^2(cx)} + \frac{1}{x^2\log(cx)} + 2\int \frac{1}{x^3\log(cx)}\,dx$$
$$= -\frac{1}{2x^2\log^2(cx)} + \frac{1}{x^2\log(cx)} + (2c^2)\,\text{Subst}\left(\int \frac{e^{-2x}}{x}\,dx, x, \log(cx)\right)$$
$$= 2c^2\text{Ei}(-2\log(cx)) - \frac{1}{2x^2\log^2(cx)} + \frac{1}{x^2\log(cx)}$$

Mathematica [A]
time = 0.02, size = 36, normalized size = 1.00

$$2c^2\text{Ei}(-2\log(cx)) - \frac{1}{2x^2\log^2(cx)} + \frac{1}{x^2\log(cx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*Log[c*x]^3),x]
[Out] 2*c^2*ExpIntegralEi[-2*Log[c*x]] - 1/(2*x^2*Log[c*x]^2) + 1/(x^2*Log[c*x])
```

Maple [A]
time = 0.02, size = 43, normalized size = 1.19

method	result	size
risch	$\frac{-1+2\ln(cx)}{2x^2\ln(cx)^2} - 2c^2\,\text{expIntegral}\left(1, 2\ln\left(cx\right)\right)$	34
derivativedivides	$c^2\left(-\frac{1}{2c^2x^2\ln(cx)^2} + \frac{1}{c^2x^2\ln(cx)} - 2\,\text{expIntegral}\left(1, 2\ln\left(cx\right)\right)\right)$	43
default	$c^2\left(-\frac{1}{2c^2x^2\ln(cx)^2} + \frac{1}{c^2x^2\ln(cx)} - 2\,\text{expIntegral}\left(1, 2\ln\left(cx\right)\right)\right)$	43

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/ln(c*x)^3,x,method=_RETURNVERBOSE)
[Out] c^2*(-1/2/c^2/x^2/ln(c*x)^2+1/c^2/x^2/ln(c*x)-2*Ei(1,2*ln(c*x)))
```

Maxima [A]
time = 0.32, size = 13, normalized size = 0.36

$$-4\,c^2\Gamma(-2, 2\,\log\left(cx\right))$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x)^3,x, algorithm="maxima")
```

```
[Out] -4*c^2*gamma(-2, 2*log(c*x))
```

Fricas [A]
time = 0.34, size = 41, normalized size = 1.14

$$\frac{4\,c^2x^2\log\left(cx\right)^2\operatorname{log\_integral}\left(\frac{1}{c^2x^2}\right)+2\,\log\left(cx\right)-1}{2\,x^2\log\left(cx\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(4*c^2*x^2*log(c*x)^2*log_integral(1/(c^2*x^2)) + 2*log(c*x) - 1)/(x^2*
log(c*x)^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$2\int\frac{1}{x^3\log\left(cx\right)}\,dx+\frac{2\log\left(cx\right)-1}{2x^2\log\left(cx\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/ln(c*x)**3,x)
```

```
[Out] 2*Integral(1/(x**3*log(c*x)), x) + (2*log(c*x) - 1)/(2*x**2*log(c*x)**2)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(c*x)^3,x, algorithm="giac")
```

```
[Out] integrate(1/(x^3*log(c*x)^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int\frac{1}{x^3\ln\left(c\,x\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*log(c*x)^3),x)
```

```
[Out] int(1/(x^3*log(c*x)^3), x)
```

3.43 $\int x^3(a+b\log(cx^n))\,dx$

Optimal. Leaf size=27

$$-\frac{1}{16}bnx^4+\frac{1}{4}x^4(a+b\log(cx^n))$$

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

Rubi [A]
time = 0.01, antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}=0.071$, Rules used = {2341}

$$\frac{1}{4}x^4(a+b\log(cx^n))-\frac{1}{16}bnx^4$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int x^3(a+b\log(cx^n))\,dx=-\frac{1}{16}bnx^4+\frac{1}{4}x^4(a+b\log(cx^n))$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.19

$$\frac{ax^4}{4}-\frac{1}{16}bnx^4+\frac{1}{4}bx^4\log(cx^n)$$

Antiderivative was successfully verified.

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

```
[Out] (a*x^4)/4 - (b*n*x^4)/16 + (b*x^4*Log[c*x^n])/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 112, normalized size = 4.15

method	result
risch	$\frac{x^4 b\ln(x^n)}{4}+\frac{x^4\left(-2ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+2ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+2ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-2ib\pi\mathrm{csgn}(ic\,x^n)^3+4b\right.}{16}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

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

Maxima [A]
time = 0.28, size = 26, normalized size = 0.96

$$-\frac{1}{16}\,bnx^4+\frac{1}{4}\,bx^4\log\left(cx^n\right)+\frac{1}{4}\,ax^4$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.36, size = 30, normalized size = 1.11

$$\frac{1}{4}\,bnx^4\log\left(x\right)+\frac{1}{4}\,bx^4\log\left(c\right)-\frac{1}{16}\,(bn-4\,a)x^4$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.26, size = 27, normalized size = 1.00

$$\frac{ax^4}{4}-\frac{bnx^4}{16}+\frac{bx^4\log\left(cx^n\right)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [A]
time = 3.10, size = 31, normalized size = 1.15

$$\frac{1}{4}\,bnx^4\log\left(x\right)-\frac{1}{16}\,bnx^4+\frac{1}{4}\,bx^4\log\left(c\right)+\frac{1}{4}\,ax^4$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.59, size = 25, normalized size = 0.93

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.44 $\int x^2(a + b\log(cx^n))\,dx$

Optimal. Leaf size=27

$$-\frac{1}{9}bnx^3 + \frac{1}{3}x^3(a + b\log(cx^n))$$

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

Rubi [A]
time = 0.01, antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2341}

$$\frac{1}{3}x^3(a + b\log(cx^n)) - \frac{1}{9}bnx^3$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int x^2(a + b\log(cx^n))\,dx = -\frac{1}{9}bnx^3 + \frac{1}{3}x^3(a + b\log(cx^n))$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.19

$$\frac{ax^3}{3} - \frac{1}{9}bnx^3 + \frac{1}{3}bx^3\log(cx^n)$$

Antiderivative was successfully verified.

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

```
[Out] (a*x^3)/3 - (b*n*x^3)/9 + (b*x^3*Log[c*x^n])/3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.03, size = 112, normalized size = 4.15

method	result
risch	$\frac{x^3 b \ln(x^n)}{3}+\frac{x^3\left(-3ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+3ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+3ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-3ib\pi\text{csgn}(ic\,x^n)^3+6\right.}{18}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*x^3*b*ln(x^n)+1/18*x^3*(-3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*
b*Pi*csgn(I*c*x^n)^3+6*b*ln(c)-2*b*n+6*a)
```

Maxima [A]
time = 0.28, size = 26, normalized size = 0.96

$$-\frac{1}{9}\,bnx^3+\frac{1}{3}\,bx^3\log\left(cx^n\right)+\frac{1}{3}\,ax^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.36, size = 30, normalized size = 1.11

$$\frac{1}{3}\,bnx^3\log\left(x\right)+\frac{1}{3}\,bx^3\log\left(c\right)-\frac{1}{9}\,(bn-3\,a)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.17, size = 27, normalized size = 1.00

$$\frac{ax^3}{3}-\frac{bnx^3}{9}+\frac{bx^3\log\left(cx^n\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [A]
time = 5.49, size = 31, normalized size = 1.15

$$\frac{1}{3}\,bnx^3\log\left(x\right)-\frac{1}{9}\,bnx^3+\frac{1}{3}\,bx^3\log\left(c\right)+\frac{1}{3}\,ax^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.36, size = 25, normalized size = 0.93

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.45 $\int x(a+b\log(cx^n))\,dx$

Optimal. Leaf size=27

$$-\frac{1}{4}bnx^2+\frac{1}{2}x^2(a+b\log(cx^n))$$

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

Rubi [A]
time = 0.01, antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {2341}

$$\frac{1}{2}x^2(a+b\log(cx^n))-\frac{1}{4}bnx^2$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int x(a+b\log(cx^n))\,dx=-\frac{1}{4}bnx^2+\frac{1}{2}x^2(a+b\log(cx^n))$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.19

$$\frac{ax^2}{2}-\frac{1}{4}bnx^2+\frac{1}{2}bx^2\log(cx^n)$$

Antiderivative was successfully verified.

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

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

Maple [A]
time = 0.04, size = 29, normalized size = 1.07

method	result
norman	$\left(-\frac{bn}{4}+\frac{a}{2}\right)x^2+\frac{b\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}$
default	$\frac{x^2a}{2}+\frac{b\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}-\frac{bn\,x^2}{4}$
risch	$\frac{x^2b\ln(x^n)}{2}+\frac{x^2\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2b\ln(c)\right.}{4}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
[Out] 1/2*x^2*a+1/2*b*x^2*ln(c*exp(n*ln(x)))-1/4*b*n*x^2
```

Maxima [A]
time = 0.29, size = 26, normalized size = 0.96

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] -1/4*b*n*x^2 + 1/2*b*x^2*log(c*x^n) + 1/2*a*x^2
```

Fricas [A]
time = 0.34, size = 30, normalized size = 1.11

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] 1/2*b*n*x^2*log(x) + 1/2*b*x^2*log(c) - 1/4*(b*n - 2*a)*x^2
```

Sympy [A]
time = 0.11, size = 27, normalized size = 1.00

$$\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log\left(cx^n\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**n)),x)
[Out] a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2
```

Giac [A]
time = 4.29, size = 31, normalized size = 1.15

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n)),x, algorithm="giac")
[Out] 1/2*b*n*x^2*log(x) - 1/4*b*n*x^2 + 1/2*b*x^2*log(c) + 1/2*a*x^2
```

Mupad [B]
time = 3.26, size = 25, normalized size = 0.93

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^n)),x)
[Out] x^2*(a/2 - (b*n)/4) + (b*x^2*log(c*x^n))/2
```

3.46 $\int (a+b\log(cx^n))\,dx$

Optimal. Leaf size=18

$$ax-bnx+bx\log(cx^n)$$

```
[Out] a*x-b*n*x+b*x*ln(c*x^n)
```

Rubi [A]
time = 0.00, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2332}

$$ax+bx\log(cx^n)-bnx$$

Antiderivative was successfully verified.

```
[In] Int[a + b*Log[c*x^n],x]
```

```
[Out] a*x - b*n*x + b*x*Log[c*x^n]
```

Rule 2332

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

Rubi steps

$$\begin{aligned}\int (a+b\log(cx^n))\,dx &= ax+b\int \log(cx^n)\,dx\\ &= ax-bnx+bx\log(cx^n)\end{aligned}$$

Mathematica [A]
time = 0.00, size = 18, normalized size = 1.00

$$ax-bnx+bx\log(cx^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[a + b*Log[c*x^n],x]
```

```
[Out] a*x - b*n*x + b*x*Log[c*x^n]
```

Maple [A]
time = 0.03, size = 19, normalized size = 1.06

method	result
default	$ax - bnx + bx \ln \left(c\,x^{n}\right)$
norman	$\left(-bn + a\right) x + bx \ln \left(c\,{\mathrm e}^{n \ln \left(x \right)}\right)$
risch	$ax + bx \ln \left(x^{n}\right) + \frac{b \left(-i \pi \,\mathrm{csgn}\left(i c \right) \mathrm{csgn}\left(i x^{n}\right) \mathrm{csgn}\left(i c\,x^{n}\right)+i \pi \,\mathrm{csgn}\left(i c \right) \mathrm{csgn}\left(i c\,x^{n}\right)^{2}+i \pi \,\mathrm{csgn}\left(i x^{n}\right) \mathrm{csgn}\left(i c\,x^{n}\right)^{2}-i \pi \mathrm{csgn}\left(i c\,x^{n}\right)^{3}+2$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a*x-b*n*x+b*x*ln(c*x^n)
```

Maxima [A]
time = 0.28, size = 18, normalized size = 1.00

$$-bnx + bx \log \left(cx^{n}\right) + ax$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.34, size = 22, normalized size = 1.22

$$bnx \log \left(x\right) + bx \log \left(c\right) - (bn - a)x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b*n*x*log(x) + b*x*log(c) - (b*n - a)*x
```

Sympy [A]
time = 0.07, size = 15, normalized size = 0.83

$$ax + b(-nx + x \log \left(cx^{n}\right))$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a*x + b*(-n*x + x*log(c*x**n))
```

Giac [A]
time = 4.30, size = 20, normalized size = 1.11

$$(nx \log \left(x\right) - nx + x \log \left(c\right))b + ax$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (n*x*log(x) - n*x + x*log(c))*b + a*x
```

Mupad [B]
time = 3.50, size = 18, normalized size = 1.00

$$x\,(a-b\,n)+b\,x\,\ln\left(c\,x^n\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.47 $\int \frac{a+b\log(cx^n)}{x}\,dx$

Optimal. Leaf size=22

$$\frac{(a+b\log(cx^n))^2}{2bn}$$

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

Rubi [A]
time = 0.01, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2338}

$$\frac{(a+b\log(cx^n))^2}{2bn}$$

Antiderivative was successfully verified.

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

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

Rule 2338

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

Rubi steps

$$\int \frac{a+b\log(cx^n)}{x}\,dx = \frac{(a+b\log(cx^n))^2}{2bn}$$

Mathematica [A]
time = 0.00, size = 21, normalized size = 0.95

$$a\log(x)+\frac{b\log^2(cx^n)}{2n}$$

Antiderivative was successfully verified.

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

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

Maple [A]
time = 0.06, size = 25, normalized size = 1.14

method	result
derivativedivides	$\frac{\frac{b\ln(c\,x^n)^2}{2}+a\ln(c\,x^n)}{n}$
default	$\frac{\frac{b\ln(c\,x^n)^2}{2}+a\ln(c\,x^n)}{n}$
norman	$\frac{a\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{n}+\frac{b\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2}{2n}$
risch	$b\ln(x)\ln(x^n)-\frac{bn\ln(x)^2}{2}-\frac{i\pi\ln(x)b\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)}{2}+\frac{i\pi\ln(x)b\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2}{2}+\frac{i\pi\ln(x$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [A]
time = 0.28, size = 20, normalized size = 0.91

$$\frac{(b\log(cx^n)+a)^2}{2\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.39, size = 18, normalized size = 0.82

$$\frac{1}{2}\,bn\log(x)^2+(b\log(c)+a)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(15) = 30$.
time = 4.15, size = 34, normalized size = 1.55

$$\begin{cases} a\log(x) & \text{for}\ b=0 \\ -(-a-b\log(c))\log(x) & \text{for}\ n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [A]
time = 4.47, size = 19, normalized size = 0.86

$$\frac{1}{2}bn\log(x)^2 + b\log(c)\log(x) + a\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.41, size = 19, normalized size = 0.86

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.48 $\int \frac{a+b\log(cx^n)}{x^2}\,dx$

Optimal. Leaf size=23

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

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

Rubi [A]
time = 0.01, antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2341}

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

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{a+b\log\left(cx^n\right)}{x^2}\,dx=-\frac{bn}{x}-\frac{a+b\log\left(cx^n\right)}{x}$$

Mathematica [A]
time = 0.00, size = 26, normalized size = 1.13

$$-\frac{a}{x}-\frac{bn}{x}-\frac{b\log\left(cx^n\right)}{x}$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.03, size = 112, normalized size = 4.87

method	result
risch	$-\frac{b\ln(x^n)}{x}-\frac{-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2b\ln(c)+}{2x}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -b/x*ln(x^n)-1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)
^3+2*b*ln(c)+2*b*n+2*a)/x
```

Maxima [A]
time = 0.28, size = 26, normalized size = 1.13

$$-\frac{bn}{x}-\frac{b\log(cx^n)}{x}-\frac{a}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.35, size = 19, normalized size = 0.83

$$-\frac{bn\log(x)+bn+b\log(c)+a}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.12, size = 19, normalized size = 0.83

$$-\frac{a}{x}-\frac{bn}{x}-\frac{b\log(cx^n)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -a/x - b*n/x - b*log(c*x**n)/x
```

Giac [A]
time = 3.83, size = 24, normalized size = 1.04

$$-\frac{bn\log(x)}{x}-\frac{bn+b\log(c)+a}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.56, size = 23, normalized size = 1.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.49 $\int \frac{a+b\log(cx^n)}{x^3}\,dx$

Optimal. Leaf size=27

$$-\frac{bn}{4x^2}-\frac{a+b\log(cx^n)}{2x^2}$$

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

Rubi [A]
time = 0.01, antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}=0.071$, Rules used = {2341}

$$-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int\frac{a+b\log(cx^n)}{x^3}\,dx=-\frac{bn}{4x^2}-\frac{a+b\log(cx^n)}{2x^2}$$

Mathematica [A]
time = 0.00, size = 32, normalized size = 1.19

$$-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}$$

Antiderivative was successfully verified.

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

```
[Out] -1/2*a/x^2 - (b*n)/(4*x^2) - (b*Log[c*x^n])/(2*x^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.03, size = 111, normalized size = 4.11

method	result
risch	$-\frac{b\ln(x^n)}{2x^2}-\frac{-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2b\ln(c)+b}{4x^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

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

Maxima [A]
time = 0.28, size = 26, normalized size = 0.96

$$-\frac{bn}{4\,x^2}-\frac{b\log\left(cx^n\right)}{2\,x^2}-\frac{a}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.38, size = 23, normalized size = 0.85

$$-\frac{2\,bn\log\left(x\right)+bn+2\,b\log\left(c\right)+2\,a}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.25, size = 29, normalized size = 1.07

$$-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log\left(cx^n\right)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [A]
time = 3.44, size = 27, normalized size = 1.00

$$-\frac{bn\log\left(x\right)}{2\,x^2}-\frac{bn+2\,b\log\left(c\right)+2\,a}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.49, size = 26, normalized size = 0.96

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.50 $\int x^3(a+b\log(cx^n))^2\,dx$

Optimal. Leaf size=52

$$\frac{1}{32}b^2n^2x^4-\frac{1}{8}bnx^4(a+b\log(cx^n))+\frac{1}{4}x^4(a+b\log(cx^n))^2$$

```
[Out] 1/32*b^2*n^2*x^4-1/8*b*n*x^4*(a+b*ln(c*x^n))+1/4*x^4*(a+b*ln(c*x^n))^2
```

Rubi [A]
time = 0.02, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}=0.125$, Rules used = {2342, 2341}

$$\frac{1}{4}x^4(a+b\log(cx^n))^2-\frac{1}{8}bnx^4(a+b\log(cx^n))+\frac{1}{32}b^2n^2x^4$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (b^2*n^2*x^4)/32 - (b*n*x^4*(a + b*Log[c*x^n]))/8 + (x^4*(a + b*Log[c*x^n])
^2)/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^3(a+b\log(cx^n))^2\,dx &= \frac{1}{4}x^4(a+b\log(cx^n))^2-\frac{1}{2}(bn)\int x^3(a+b\log(cx^n))\,dx\\ &= \frac{1}{32}b^2n^2x^4-\frac{1}{8}bnx^4(a+b\log(cx^n))+\frac{1}{4}x^4(a+b\log(cx^n))^2\end{aligned}$$

Mathematica [A]
time = 0.01, size = 43, normalized size = 0.83

$$\frac{1}{32}x^4\left(b^2n^2-4bn(a+b\log(cx^n))+8(a+b\log(cx^n))^2\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x^4*(b^2*n^2 - 4*b*n*(a + b*Log[c*x^n]) + 8*(a + b*Log[c*x^n])^2))/32
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 691, normalized size = 13.29

method	result
risch	$\frac{x^4 b^2 \ln(x^n)^2}{4} + \frac{x^4 b\left(-2ib\pi\, \mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)+2ib\pi\, \mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+2ib\pi\, \mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2-2ib\pi\mathrm{csgn}(icx^n)\right.}{8}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*b^2*ln(x^n)^2+1/8*x^4*b*(-2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
-2*I*b*Pi*csgn(I*c*x^n)^3+4*b*ln(c)-b*n+4*a)*ln(x^n)+1/32*x^4*(-8*I*Pi*ln(c
)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-8*I*Pi*a*b*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+8*a^2-2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+4*Pi^2*b^2*csgn(
I*c)*csgn(I*c*x^n)^5-2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+4*Pi^2*b^2*cs
gn(I*x^n)*csgn(I*c*x^n)^5-2*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-2*I*Pi*b^2
*n*csgn(I*x^n)*csgn(I*c*x^n)^2-4*b^2*ln(c)*n-4*b*a*n+8*I*Pi*ln(c)*b^2*csgn(
I*c)*csgn(I*c*x^n)^2+8*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*a*
b*csgn(I*c)*csgn(I*c*x^n)^2+16*a*b*ln(c)+8*b^2*ln(c)^2+2*I*Pi*b^2*n*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+8*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-2*Pi^2*
b^2*csgn(I*c*x^n)^6+b^2*n^2+4*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n
)^3-8*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-8*I*Pi*ln(c)*b^2*csgn(
I*c*x^n)^3-8*I*Pi*a*b*csgn(I*c*x^n)^3-2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*
csgn(I*c*x^n)^2+4*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*I*Pi*b
^2*n*csgn(I*c*x^n)^3)
```

Maxima [A]
time = 0.28, size = 71, normalized size = 1.37

$$\frac{1}{4}\, b^2 x^4 \log\left(cx^n\right)^2 - \frac{1}{8}\, abnx^4 + \frac{1}{2}\, abx^4 \log\left(cx^n\right) + \frac{1}{4}\, a^2 x^4 + \frac{1}{32}\, \left(n^2 x^4 - 4\, nx^4 \log\left(cx^n\right)\right) b^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 1/4*b^2*x^4*log(c*x^n)^2 - 1/8*a*b*n*x^4 + 1/2*a*b*x^4*log(c*x^n) + 1/4*a^2
*x^4 + 1/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 102 vs. 2(46) = 92.

time = 0.40, size = 102, normalized size = 1.96

$$\frac{1}{4}\,b^2n^2x^4\log\left(x\right)^2+\frac{1}{4}\,b^2x^4\log\left(c\right)^2-\frac{1}{8}\,\left(b^2n-4\,ab\right)x^4\log\left(c\right)+\frac{1}{32}\,\left(b^2n^2-4\,abn+8\,a^2\right)x^4+\frac{1}{8}\,\left(4\,b^2nx^4\log\left(c\right)-\left(b^2n^2-4\,abn\right)x^4\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 1/4*b^2*n^2*x^4*log(x)^2 + 1/4*b^2*x^4*log(c)^2 - 1/8*(b^2*n - 4*a*b)*x^4*l
og(c) + 1/32*(b^2*n^2 - 4*a*b*n + 8*a^2)*x^4 + 1/8*(4*b^2*n*x^4*log(c) - (b
^2*n^2 - 4*a*b*n)*x^4)*log(x)
```

Sympy [A]
time = 0.40, size = 78, normalized size = 1.50

$$\frac{a^2x^4}{4}-\frac{abnx^4}{8}+\frac{abx^4\log\left(cx^n\right)}{2}+\frac{b^2n^2x^4}{32}-\frac{b^2nx^4\log\left(cx^n\right)}{8}+\frac{b^2x^4\log\left(cx^n\right)^2}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*ln(c*x**n))**2,x)
```

```
[Out] a**2*x**4/4 - a*b*n*x**4/8 + a*b*x**4*log(c*x**n)/2 + b**2*n**2*x**4/32 - b
**2*n*x**4*log(c*x**n)/8 + b**2*x**4*log(c*x**n)**2/4
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 111 vs. 2(46) = 92.
time = 4.86, size = 111, normalized size = 2.13

$$\frac{1}{4}\,b^2n^2x^4\log\left(x\right)^2-\frac{1}{8}\,b^2n^2x^4\log\left(x\right)+\frac{1}{2}\,b^2nx^4\log\left(c\right)\log\left(x\right)+\frac{1}{32}\,b^2n^2x^4-\frac{1}{8}\,b^2nx^4\log\left(c\right)+\frac{1}{4}\,b^2x^4\log\left(c\right)^2+\frac{1}{2}\,abnx^4\log\left(x\right)-\frac{1}{8}\,abnx^4+\frac{1}{2}\,abx^4\log\left(c\right)+\frac{1}{4}\,a^2x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] 1/4*b^2*n^2*x^4*log(x)^2 - 1/8*b^2*n^2*x^4*log(x) + 1/2*b^2*n*x^4*log(c)*lo
g(x) + 1/32*b^2*n^2*x^4 - 1/8*b^2*n*x^4*log(c) + 1/4*b^2*x^4*log(c)^2 + 1/2
*a*b*n*x^4*log(x) - 1/8*a*b*n*x^4 + 1/2*a*b*x^4*log(c) + 1/4*a^2*x^4
```

Mupad [B]
time = 3.60, size = 61, normalized size = 1.17

$$x^4\,\left(\frac{a^2}{4}-\frac{a\,b\,n}{8}+\frac{b^2\,n^2}{32}\right)+\frac{x^4\,\ln\left(c\,x^n\right)\,\left(a\,b-\frac{b^2\,n}{4}\right)}{2}+\frac{b^2\,x^4\,\ln\left(c\,x^n\right)^2}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a + b*log(c*x^n))^2,x)
```

```
[Out] x^4*(a^2/4 + (b^2*n^2)/32 - (a*b*n)/8) + (x^4*log(c*x^n)*(a*b - (b^2*n)/4))
/2 + (b^2*x^4*log(c*x^n)^2)/4
```

3.51 $\int x^2(a+b\log(cx^n))^2\,dx$

Optimal. Leaf size=52

$$\frac{2}{27}b^2n^2x^3-\frac{2}{9}bnx^3(a+b\log(cx^n))+\frac{1}{3}x^3(a+b\log(cx^n))^2$$

```
[Out] 2/27*b^2*n^2*x^3-2/9*b*n*x^3*(a+b*ln(c*x^n))+1/3*x^3*(a+b*ln(c*x^n))^2
```

Rubi [A]
time = 0.03, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2342, 2341}

$$\frac{1}{3}x^3(a+b\log(cx^n))^2-\frac{2}{9}bnx^3(a+b\log(cx^n))+\frac{2}{27}b^2n^2x^3$$

Antiderivative was successfully verified.

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

```
[Out] (2*b^2*n^2*x^3)/27 - (2*b*n*x^3*(a + b*Log[c*x^n]))/9 + (x^3*(a + b*Log[c*x
^n])^2)/3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^2(a+b\log(cx^n))^2\,dx&=\frac{1}{3}x^3(a+b\log(cx^n))^2-\frac{1}{3}(2bn)\int x^2(a+b\log(cx^n))\,dx\\&=\frac{2}{27}b^2n^2x^3-\frac{2}{9}bnx^3(a+b\log(cx^n))+\frac{1}{3}x^3(a+b\log(cx^n))^2\end{aligned}$$

Mathematica [A]
time = 0.02, size = 46, normalized size = 0.88

$$\frac{1}{3}\left(\frac{2}{9}bnx^3(-3a+bn-3b\log(cx^n))+x^3(a+b\log(cx^n))^2\right)$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 692, normalized size = 13.31

method	result
risch	$\frac{x^3 b^2 \ln(x^n)^2}{3} + \frac{x^3 b\left(-3ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+3ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+3ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-3ib\pi\operatorname{csgn}(ic\,x^n)^3+\right.}{9}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*x^3*b^2*ln(x^n)^2+1/9*x^3*b*(-3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
-3*I*b*Pi*csgn(I*c*x^n)^3+6*b*ln(c)-2*b*n+6*a)*ln(x^n)+1/108*x^3*(12*I*Pi*b
^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-36*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+36*a^2-9*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+18*Pi^2*b
^2*csgn(I*c)*csgn(I*c*x^n)^5-9*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+18*Pi
^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-36*I*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)-24*b^2*ln(c)*n-24*b*a*n+72*a*b*ln(c)+36*b^2*ln(c)^2-12*I*Pi*b^2*n*c
sgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*
ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2-9*Pi^2*b^2*csgn(I*c*x^n)^6+8*b^2*n^2+18
*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-36*Pi^2*b^2*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)^4-36*I*Pi*a*b*csgn(I*c*x^n)^3-9*Pi^2*b^2*csgn(I*c)^2
*csgn(I*x^n)^2*csgn(I*c*x^n)^2+18*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c
*x^n)^3+12*I*Pi*b^2*n*csgn(I*c*x^n)^3-36*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3+36*
I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*a*b*csgn(I*c)*csgn(I*c*x
^n)^2+36*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2)
```

Maxima [A]
time = 0.28, size = 71, normalized size = 1.37

$$\frac{1}{3}\,b^2x^3\log\left(cx^n\right)^2-\frac{2}{9}\,abnx^3+\frac{2}{3}\,abx^3\log\left(cx^n\right)+\frac{1}{3}\,a^2x^3+\frac{2}{27}\left(n^2x^3-3\,nx^3\log\left(cx^n\right)\right)b^2$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*b^2*x^3*log(c*x^n)^2 - 2/9*a*b*n*x^3 + 2/3*a*b*x^3*log(c*x^n) + 1/3*a^2
*x^3 + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 103 vs. 2(46) = 92.

time = 0.38, size = 103, normalized size = 1.98

$$\frac{1}{3}\,b^2n^2x^3\log\left(x\right)^2+\frac{1}{3}\,b^2x^3\log\left(c\right)^2-\frac{2}{9}\,(b^2n-3\,ab)x^3\log\left(c\right)+\frac{1}{27}\,(2\,b^2n^2-6\,abn+9\,a^2)x^3+\frac{2}{9}\,(3\,b^2nx^3\log\left(c\right)-(b^2n^2-3\,abn)x^3)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*b^2*n^2*x^3*log(x)^2 + 1/3*b^2*x^3*log(c)^2 - 2/9*(b^2*n - 3*a*b)*x^3*l
og(c) + 1/27*(2*b^2*n^2 - 6*a*b*n + 9*a^2)*x^3 + 2/9*(3*b^2*n*x^3*log(c) -
(b^2*n^2 - 3*a*b*n)*x^3)*log(x)
```

Sympy [A]
time = 0.27, size = 85, normalized size = 1.63

$$\frac{a^2x^3}{3}-\frac{2abnx^3}{9}+\frac{2abx^3\log\left(cx^n\right)}{3}+\frac{2b^2n^2x^3}{27}-\frac{2b^2nx^3\log\left(cx^n\right)}{9}+\frac{b^2x^3\log\left(cx^n\right)^2}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a**2*x**3/3 - 2*a*b*n*x**3/9 + 2*a*b*x**3*log(c*x**n)/3 + 2*b**2*n**2*x**3/
27 - 2*b**2*n*x**3*log(c*x**n)/9 + b**2*x**3*log(c*x**n)**2/3
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 111 vs. 2(46) = 92.
time = 4.57, size = 111, normalized size = 2.13

$$\frac{1}{3}\,b^2n^2x^3\log\left(x\right)^2-\frac{2}{9}\,b^2n^2x^3\log\left(x\right)+\frac{2}{3}\,b^2nx^3\log\left(c\right)\log\left(x\right)+\frac{2}{27}\,b^2n^2x^3-\frac{2}{9}\,b^2nx^3\log\left(c\right)+\frac{1}{3}\,b^2x^3\log\left(c\right)^2+\frac{2}{3}\,abnx^3\log\left(x\right)-\frac{2}{9}\,abnx^3+\frac{2}{3}\,abx^3\log\left(c\right)+\frac{1}{3}\,a^2x^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*b^2*n^2*x^3*log(x)^2 - 2/9*b^2*n^2*x^3*log(x) + 2/3*b^2*n*x^3*log(c)*lo
g(x) + 2/27*b^2*n^2*x^3 - 2/9*b^2*n*x^3*log(c) + 1/3*b^2*x^3*log(c)^2 + 2/3
*a*b*n*x^3*log(x) - 2/9*a*b*n*x^3 + 2/3*a*b*x^3*log(c) + 1/3*a^2*x^3
```

Mupad [B]
time = 3.56, size = 62, normalized size = 1.19

$$x^3\left(\frac{a^2}{3}-\frac{2\,a\,b\,n}{9}+\frac{2\,b^2\,n^2}{27}\right)+\frac{x^3\,\ln\left(c\,x^n\right)\,\left(2\,a\,b-\frac{2\,b^2\,n}{3}\right)}{3}+\frac{b^2\,x^3\,\ln\left(c\,x^n\right)^2}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^3*(a^2/3 + (2*b^2*n^2)/27 - (2*a*b*n)/9) + (x^3*log(c*x^n)*(2*a*b - (2*b^
2*n)/3))/3 + (b^2*x^3*log(c*x^n)^2)/3
```

3.52 $\int x(a+b\log(cx^n))^2\,dx$

Optimal. Leaf size=52

$$\frac{1}{4}b^2n^2x^2-\frac{1}{2}bnx^2(a+b\log(cx^n))+\frac{1}{2}x^2(a+b\log(cx^n))^2$$

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

Rubi [A]
time = 0.02, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}=0.143$, Rules used = {2342, 2341}

$$\frac{1}{2}x^2(a+b\log(cx^n))^2-\frac{1}{2}bnx^2(a+b\log(cx^n))+\frac{1}{4}b^2n^2x^2$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x(a+b\log(cx^n))^2\,dx&=\frac{1}{2}x^2(a+b\log(cx^n))^2-(bn)\int x(a+b\log(cx^n))\,dx\\&=\frac{1}{4}b^2n^2x^2-\frac{1}{2}bnx^2(a+b\log(cx^n))+\frac{1}{2}x^2(a+b\log(cx^n))^2\end{aligned}$$

Mathematica [A]
time = 0.01, size = 41, normalized size = 0.79

$$\frac{1}{4}x^2\left(bn(-2a+bn-2b\log(cx^n))+2(a+b\log(cx^n))^2\right)$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 692, normalized size = 13.31

method	result
risch	$\frac{b^2 x^2 \ln(x^n)^2}{2} + \frac{b\,x^2 \left(-ib\pi \,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n) + ib\pi \,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2 + ib\pi \,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2 - ib\pi \mathrm{csgn}(ic\,x^n)^3 + 2b\right.}{2}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*b^2*x^2*ln(x^n)^2+1/2*b*x^2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3+2*b*ln(c)-b*n+2*a)*ln(x^n)+1/8*x^2*(-4*I*Pi*ln(c)*b^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*a^2-Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4
+2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^
4+2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-2*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^
n)^2-2*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*a*b*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)-4*b^2*ln(c)*n-4*b*a*n+4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c
*x^n)^2+4*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*c)*c
sgn(I*c*x^n)^2+8*a*b*ln(c)+4*b^2*ln(c)^2+2*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+4*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-Pi^2*b^2*csgn(I*c*x^n
)^6+2*b^2*n^2+2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*c
sgn(I*c*x^n)^2+2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-4*I*Pi*a*
b*csgn(I*c*x^n)^3+2*I*Pi*b^2*n*csgn(I*c*x^n)^3-4*I*Pi*ln(c)*b^2*csgn(I*c*x^
n)^3)
```

Maxima [A]
time = 0.32, size = 70, normalized size = 1.35

$$\frac{1}{2}\,b^2x^2\log\left(cx^n\right)^2 - \frac{1}{2}\,abnx^2 + abx^2\log\left(cx^n\right) + \frac{1}{2}\,a^2x^2 + \frac{1}{4}\,\left(n^2x^2 - 2\,nx^2\log\left(cx^n\right)\right)b^2$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 102 vs. 2(46) = 92.

time = 0.33, size = 102, normalized size = 1.96

$$\frac{1}{2}\,b^{2}n^{2}x^{2}\log\left(x\right)^{2} + \frac{1}{2}\,b^{2}x^{2}\log\left(c\right)^{2} - \frac{1}{2}\,\left(b^{2}n - 2\,ab\right)x^{2}\log\left(c\right) + \frac{1}{4}\,\left(b^{2}n^{2} - 2\,abn + 2\,a^{2}\right)x^{2} + \frac{1}{2}\,\left(2\,b^{2}nx^{2}\log\left(c\right) - \left(b^{2}n^{2} - 2\,abn\right)x^{2}\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.18, size = 76, normalized size = 1.46

$$\frac{a^{2}x^{2}}{2} - \frac{abnx^{2}}{2} + abx^{2}\log\left(cx^{n}\right) + \frac{b^{2}n^{2}x^{2}}{4} - \frac{b^{2}nx^{2}\log\left(cx^{n}\right)}{2} + \frac{b^{2}x^{2}\log\left(cx^{n}\right)^{2}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 108 vs. 2(46) = 92.
time = 3.97, size = 108, normalized size = 2.08

$$\frac{1}{2}\,b^{2}n^{2}x^{2}\log\left(x\right)^{2} - \frac{1}{2}\,b^{2}n^{2}x^{2}\log\left(x\right) + b^{2}nx^{2}\log\left(c\right)\log\left(x\right) + \frac{1}{4}\,b^{2}n^{2}x^{2} - \frac{1}{2}\,b^{2}nx^{2}\log\left(c\right) + \frac{1}{2}\,b^{2}x^{2}\log\left(c\right)^{2} + abnx^{2}\log\left(x\right) - \frac{1}{2}\,abnx^{2} + abx^{2}\log\left(c\right) + \frac{1}{2}\,a^{2}x^{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.48, size = 60, normalized size = 1.15

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.53 $\int (a+b\log(cx^n))^2\,dx$

Optimal. Leaf size=43

$$-2abnx+2b^2n^2x-2b^2nx\log(cx^n)+x(a+b\log(cx^n))^2$$

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

Rubi [A]
time = 0.01, antiderivative size = 43, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2333, 2332}

$$x(a+b\log(cx^n))^2-2abnx-2b^2nx\log(cx^n)+2b^2n^2x$$

Antiderivative was successfully verified.

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

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

Rule 2332

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

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rubi steps

$$\begin{aligned}
\int (a+b\log(cx^n))^2\,dx &= x(a+b\log(cx^n))^2-(2bn)\int (a+b\log(cx^n))\,dx\\
&= -2abnx+x(a+b\log(cx^n))^2-\left(2b^2n\right)\int \log(cx^n)\,dx\\
&= -2abnx+2b^2n^2x-2b^2nx\log(cx^n)+x(a+b\log(cx^n))^2
\end{aligned}$$

Mathematica [A]
time = 0.01, size = 33, normalized size = 0.77

$$x\left((a+b\log(cx^n))^2-2bn(a-bn+b\log(cx^n))\right)$$

Antiderivative was successfully verified.

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

Maple [A]
time = 0.06, size = 63, normalized size = 1.47

method	result
norman	$(2b^2n^2-2ban+a^2)\,x+b^2x\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2+(-2b^2n+2ba)\,x\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)$
default	$a^2x+b^2x\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2+2b^2n^2x-2b^2nx\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)+2xab\ln\left(c\,x^n\right)-2abnx$
risch	$x\,b^2\ln\left(x^n\right)^2+b\big(-ib\pi\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\,\mathrm{cs}$

Verification of antiderivative is not currently implemented for this CAS.

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

Maxima [A]
time = 0.28, size = 57, normalized size = 1.33

$$b^2x\log\left(cx^n\right)^2-2\,abnx+2\,abx\log\left(cx^n\right)+2\left(n^2x-nx\log\left(cx^n\right)\right)b^2+a^2x$$

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.35, size = 85, normalized size = 1.98

$$b^2n^2x\log\left(x\right)^2+b^2x\log\left(c\right)^2-2\left(b^2n-ab\right)x\log\left(c\right)+\left(2\,b^2n^2-2\,abn+a^2\right)x+2\left(b^2nx\log\left(c\right)-\left(b^2n^2-abn\right)x\right)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

Sympy [A]
time = 0.12, size = 65, normalized size = 1.51

$$a^2x-2abnx+2abx\log\left(cx^n\right)+2b^2n^2x-2b^2nx\log\left(cx^n\right)+b^2x\log\left(cx^n\right)^2$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 88 vs. $2(43) = 86$.
time = 4.31, size = 88, normalized size = 2.05

$$b^2n^2x\log(x)^2 - 2b^2n^2x\log(x) + 2b^2nx\log(c)\log(x) + 2b^2n^2x - 2b^2nx\log(c) + b^2x\log(c)^2 + 2abnx\log(x) - 2abnx + 2abx\log(c) + a^2x$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.58, size = 49, normalized size = 1.14

$$x\left(a^2 - 2abn + 2b^2n^2\right) + b^2x\ln\left(cx^n\right)^2 + 2bx\ln\left(cx^n\right)(a - bn)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.54 $\int \frac{(a+b\log(cx^n))^2}{x}\,dx$

Optimal. Leaf size=22

$$\frac{(a+b\log(cx^n))^3}{3bn}$$

[Out] 1/3*(a+b*ln(c*x^n))^3/b/n

Rubi [A]
time = 0.02, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2339, 30}

$$\frac{(a+b\log(cx^n))^3}{3bn}$$

Antiderivative was successfully verified.

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

[Out] (a + b*Log[c*x^n])^3/(3*b*n)

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x}\,dx &= \frac{\text{Subst}\left(\int x^2\,dx, x, a+b\log(cx^n)\right)}{bn}\\ &= \frac{(a+b\log(cx^n))^3}{3bn}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 22, normalized size = 1.00

$$\frac{(a+b\log(cx^n))^3}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/x,x]
[Out] (a + b*Log[c*x^n])^3/(3*b*n)
```

Maple [A]
time = 0.11, size = 21, normalized size = 0.95

method	result
derivativedivides	$\frac{(a+b\ln(c\,x^n))^3}{3bn}$
default	$\frac{(a+b\ln(c\,x^n))^3}{3bn}$
risch	$-\frac{i\ln(x)^2\pi\,b^2n\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2}{2}+i\ln(c)\,\pi\ln(x)\,b^2\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+i\ln(c)\,\pi\ln(x)\,b$

Verification of antiderivative is not currently implemented for this CAS.

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

Maxima [A]
time = 0.28, size = 20, normalized size = 0.91

$$\frac{(b\log(cx^n)+a)^3}{3\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x,x, algorithm="maxima")
[Out] 1/3*(b*log(c*x^n) + a)^3/(b*n)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 51 vs. $2(20) = 40$.
time = 0.35, size = 51, normalized size = 2.32

$$\frac{1}{3}\,b^2n^2\log(x)^3+\left(b^2n\log(c)+abn\right)\log(x)^2+\left(b^2\log(c)^2+2\,ab\log(c)+a^2\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x,x, algorithm="fricas")
[Out] 1/3*b^2*n^2*log(x)^3 + (b^2*n*log(c) + a*b*n)*log(x)^2 + (b^2*log(c)^2 + 2*
a*b*log(c) + a^2)*log(x)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 60 vs. $2(15) = 30$.

time = 10.56, size = 60, normalized size = 2.73

$$\begin{cases} \frac{a^2 \log(cx^n) + ab \log(cx^n)^2 + \frac{b^2 \log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ \left(a^2 + 2ab \log(c) + b^2 \log(c)^2\right) \log(x) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/
n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 56 vs. $2(20) = 40$.
time = 4.27, size = 56, normalized size = 2.55

$$\frac{1}{3} b^2 n^2 \log(x)^3 + b^2 n \log(c) \log(x)^2 + b^2 \log(c)^2 \log(x) + abn \log(x)^2 + 2 ab \log(c) \log(x) + a^2 \log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*b^2*n^2*log(x)^3 + b^2*n*log(c)*log(x)^2 + b^2*log(c)^2*log(x) + a*b*n*
log(x)^2 + 2*a*b*log(c)*log(x) + a^2*log(x)
```

Mupad [B]
time = 3.42, size = 37, normalized size = 1.68

$$a^2 \ln(x) + \frac{b^2 \ln(c\, x^n)^3}{3\, n} + \frac{a\, b \ln(c\, x^n)^2}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a^2*log(x) + (b^2*log(c*x^n)^3)/(3*n) + (a*b*log(c*x^n)^2)/n
```

3.55 $\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx$

Optimal. Leaf size=46

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

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

Rubi [A]
time = 0.02, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2342, 2341}

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

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2}\,dx &= -\frac{(a+b\log(cx^n))^2}{x}+(2bn)\int \frac{a+b\log(cx^n)}{x^2}\,dx\\ &= -\frac{2b^2n^2}{x}-\frac{2bn(a+b\log(cx^n))}{x}-\frac{(a+b\log(cx^n))^2}{x}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 35, normalized size = 0.76

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

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 704, normalized size = 15.30

method	result
risch	$-\frac{b^2\ln(x^n)^2}{x}-\frac{\left(-i\pi\, b^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi\, b^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi\, b^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-i\pi\, b^2\mathrm{csgn}(ic\,x^n)^3+2b\right.}{x}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -b^2/x*ln(x^n)^2-(-I*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b^2*cs
gn(I*c)*csgn(I*c*x^n)^2+I*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b^2*csgn(
I*c*x^n)^3+2*b^2*ln(c)+2*b^2*n+2*b*a)/x*ln(x^n)-1/4*(-4*I*Pi*b^2*n*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+4*a^2-Pi^2*b^2*csgn(I*c*x^n)^6-4*I*Pi*ln(c)*b^2
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+8*b^2*ln(c)*n+8*b*a*n+8*a*b*ln(c)+4*b^2*ln(c)^2+4*I*Pi*ln(c)*b^2*c
sgn(I*c)*csgn(I*c*x^n)^2-Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*cs
gn(I*c)*csgn(I*c*x^n)^5-Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*c
sgn(I*x^n)*csgn(I*c*x^n)^5+2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)
^3-4*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-4*I*Pi*a*b*csgn(I*c*x^n
)^3-Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+2*Pi^2*b^2*csgn(I*c)
^2*csgn(I*x^n)*csgn(I*c*x^n)^3+8*b^2*n^2-4*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3-4
*I*Pi*b^2*n*csgn(I*c*x^n)^3+4*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*l
n(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+4
*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n
)^2)/x
```

Maxima [A]
time = 0.28, size = 70, normalized size = 1.52

$$-2\,b^2\left(\frac{n^2}{x}+\frac{n\log(cx^n)}{x}\right)-\frac{b^2\log(cx^n)^2}{x}-\frac{2\,abn}{x}-\frac{2\,ab\log(cx^n)}{x}-\frac{a^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.38, size = 77, normalized size = 1.67

$$-\frac{b^2n^2\log(x)^2 + 2b^2n^2 + b^2\log(c)^2 + 2abn + a^2 + 2(b^2n + ab)\log(c) + 2(b^2n^2 + b^2n\log(c) + abn)\log(x)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.13, size = 66, normalized size = 1.43

$$-\frac{a^2}{x} - \frac{2abn}{x} - \frac{2ab\log(cx^n)}{x} - \frac{2b^2n^2}{x} - \frac{2b^2n\log(cx^n)}{x} - \frac{b^2\log(cx^n)^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Giac [A]
time = 2.41, size = 86, normalized size = 1.87

$$-\frac{b^2n^2\log(x)^2}{x} - \frac{2(b^2n^2 + b^2n\log(c) + abn)\log(x)}{x} - \frac{2b^2n^2 + 2b^2n\log(c) + b^2\log(c)^2 + 2abn + 2ab\log(c) + a^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.61, size = 56, normalized size = 1.22

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.56 $\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx$

Optimal. Leaf size=52

$$-\frac{b^2n^2}{4x^2}-\frac{bn(a+b\log(cx^n))}{2x^2}-\frac{(a+b\log(cx^n))^2}{2x^2}$$

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

Rubi [A]
time = 0.02, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2342, 2341}

$$-\frac{bn(a+b\log(cx^n))}{2x^2}-\frac{(a+b\log(cx^n))^2}{2x^2}-\frac{b^2n^2}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/x^3,x]
```

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx &= -\frac{(a+b\log(cx^n))^2}{2x^2}+(bn)\int \frac{a+b\log(cx^n)}{x^3}\,dx\\ &= -\frac{b^2n^2}{4x^2}-\frac{bn(a+b\log(cx^n))}{2x^2}-\frac{(a+b\log(cx^n))^2}{2x^2}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 41, normalized size = 0.79

$$-\frac{2(a+b\log(cx^n))^2+bn(2a+bn+2b\log(cx^n))}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/x^3,x]
```

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 703, normalized size = 13.52

method	result
risch	$-\frac{b^2\ln(x^n)^2}{2x^2}-\frac{\left(-i\pi\,b^2\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+i\pi\,b^2\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+i\pi\,b^2\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-i\pi\,b^2\mathrm{csgn}(ic\,x^n)^3+\right.}{2x^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b^2/x^2*ln(x^n)^2-1/2*(-I*Pi*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I
*Pi*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi
*b^2*csgn(I*c*x^n)^3+2*b^2*ln(c)+b^2*n+2*b*a)/x^2*ln(x^n)-1/8*(4*a^2-Pi^2*b
^2*csgn(I*c*x^n)^6-4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I
*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*b^2*ln(c)*n+4*b*a*n+8*a*b*ln(
c)+4*b^2*ln(c)^2+4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2-Pi^2*b^2*csgn(I
*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-Pi^2*b^2*csgn(I*
x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+2*I*Pi*b^2*n*
csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2+2*Pi^2*b
^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)^4-4*I*Pi*a*b*csgn(I*c*x^n)^3-Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n
)^2*csgn(I*c*x^n)^2+2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*b^
2*n^2-2*I*Pi*b^2*n*csgn(I*c*x^n)^3-2*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)-4*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3+4*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn
(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*x^n)*csg
n(I*c*x^n)^2)/x^2
```

Maxima [A]
time = 0.28, size = 71, normalized size = 1.37

$$-\frac{1}{4}\,b^2\left(\frac{n^2}{x^2}+\frac{2\,n\log(cx^n)}{x^2}\right)-\frac{b^2\log(cx^n)^2}{2\,x^2}-\frac{abn}{2\,x^2}-\frac{ab\log(cx^n)}{x^2}-\frac{a^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

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

Fricas [A]
time = 0.36, size = 83, normalized size = 1.60

$$-\frac{2\,b^2n^2\log\left(x\right)^2+b^2n^2+2\,b^2\log\left(c\right)^2+2\,abn+2\,a^2+2\,\left(b^2n+2\,ab\right)\log\left(c\right)+2\,\left(b^2n^2+2\,b^2n\log\left(c\right)+2\,abn\right)\log\left(x\right)}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

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

Sympy [A]
time = 0.26, size = 78, normalized size = 1.50

$$-\frac{a^2}{2x^2}-\frac{abn}{2x^2}-\frac{ab\log\left(cx^n\right)}{x^2}-\frac{b^2n^2}{4x^2}-\frac{b^2n\log\left(cx^n\right)}{2x^2}-\frac{b^2\log\left(cx^n\right)^2}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/x**3,x)
```

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

Giac [A]
time = 4.98, size = 90, normalized size = 1.73

$$-\frac{b^2n^2\log\left(x\right)^2}{2\,x^2}-\frac{\left(b^2n^2+2\,b^2n\log\left(c\right)+2\,abn\right)\log\left(x\right)}{2\,x^2}-\frac{b^2n^2+2\,b^2n\log\left(c\right)+2\,b^2\log\left(c\right)^2+2\,abn+4\,ab\log\left(c\right)+2\,a^2}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

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

Mupad [B]
time = 3.43, size = 62, normalized size = 1.19

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/x^3,x)
```

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

3.57 $\int x^3(a+b\log(cx^n))^3\,dx$

Optimal. Leaf size=77

$$-\frac{3}{128}b^3n^3x^4+\frac{3}{32}b^2n^2x^4(a+b\log(cx^n))-\frac{3}{16}bnx^4(a+b\log(cx^n))^2+\frac{1}{4}x^4(a+b\log(cx^n))^3$$

```
[Out] -3/128*b^3*n^3*x^4+3/32*b^2*n^2*x^4*(a+b*ln(c*x^n))-3/16*b*n*x^4*(a+b*ln(c*
x^n))^2+1/4*x^4*(a+b*ln(c*x^n))^3
```

Rubi [A]
time = 0.04, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2342, 2341}

$$\frac{3}{32}b^2n^2x^4(a+b\log(cx^n))+\frac{1}{4}x^4(a+b\log(cx^n))^3-\frac{3}{16}bnx^4(a+b\log(cx^n))^2-\frac{3}{128}b^3n^3x^4$$

Antiderivative was successfully verified.

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

```
[Out] (-3*b^3*n^3*x^4)/128 + (3*b^2*n^2*x^4*(a + b*Log[c*x^n]))/32 - (3*b*n*x^4*(
a + b*Log[c*x^n])^2)/16 + (x^4*(a + b*Log[c*x^n])^3)/4
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^3(a+b\log(cx^n))^3\,dx &= \frac{1}{4}x^4(a+b\log(cx^n))^3-\frac{1}{4}(3bn)\int x^3(a+b\log(cx^n))^2\,dx\\ &= -\frac{3}{16}bnx^4(a+b\log(cx^n))^2+\frac{1}{4}x^4(a+b\log(cx^n))^3+\frac{1}{8}(3b^2n^2)\int x^3(a+b\log(\\ &= -\frac{3}{128}b^3n^3x^4+\frac{3}{32}b^2n^2x^4(a+b\log(cx^n))-\frac{3}{16}bnx^4(a+b\log(cx^n))^2+\frac{1}{4}x^4(a\end{aligned}$$

Mathematica [A]
time = 0.02, size = 66, normalized size = 0.86

$$\frac{1}{4}\left(x^4(a+b\log(cx^n))^3-\frac{3}{32}bnx^4\left(b^2n^2-4bn(a+b\log(cx^n))+8(a+b\log(cx^n))^2\right)\right)$$

Antiderivative was successfully verified.

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

```
[Out] (x^4*(a + b*Log[c*x^n])^3 - (3*b*n*x^4*(b^2*n^2 - 4*b*n*(a + b*Log[c*x^n])
+ 8*(a + b*Log[c*x^n])^2))/32)/4
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 2649, normalized size = 34.40

method	result	size
risch	Expression too large to display	2649

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*b^3*x^4*ln(x^n)^3+3/16*x^4*b^2*(-2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n
)^2-2*I*b*Pi*csgn(I*c*x^n)^3+4*b*ln(c)-b*n+4*a)*ln(x^n)^2+3/32*x^4*b*(-8*I*
Pi*a*b*csgn(I*c*x^n)^3+8*a^2-2*Pi^2*b^2*csgn(I*c*x^n)^6-2*I*Pi*b^2*n*csgn(I
*c)*csgn(I*c*x^n)^2-2*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+2*I*Pi*b^2*n*c
sgn(I*c*x^n)^3-8*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3-4*b^2*ln(c)*n-4*b*a*n+16*a*
b*ln(c)+8*b^2*ln(c)^2-2*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+4*Pi^2*b^2*csg
n(I*c)*csgn(I*c*x^n)^5-2*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+4*Pi^2*b^2*
csgn(I*x^n)*csgn(I*c*x^n)^5+4*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n
)^3-8*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-2*Pi^2*b^2*csgn(I*c)^2
*csgn(I*x^n)^2*csgn(I*c*x^n)^2+4*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*
x^n)^3+b^2*n^2-8*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-8*I*Pi*
a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+8*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2+8*I*Pi*ln(c)*b^2*c
sgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+8*I*Pi*a*b*
csgn(I*x^n)*csgn(I*c*x^n)^2)*ln(x^n)+1/128*x^4*(32*a^3+24*I*Pi*ln(c)*b^3*n*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+24*I*Pi*a*b^2*n*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-36*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^6+36*I*Pi^
3*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^7+48*I*Pi*ln(c)^2*b^3*csgn(I*c)*c
sgn(I*c*x^n)^2+48*I*Pi*ln(c)^2*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-96*I*Pi*ln(c
)*a*b^2*csgn(I*c*x^n)^3-12*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)
^3-12*Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+24*Pi^2*b^3*n*csgn
(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+48*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)^2
*csgn(I*c*x^n)^3-96*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-24
```

```
*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+48*Pi^2*a*b^2*csgn(I*
c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+48*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn
(I*c*x^n)^3-96*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+6*Pi^2*b^3*
n*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-24*I*Pi*ln(c)*b^3*n*csgn(I*x^n)
*csgn(I*c*x^n)^2-6*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-24*I*Pi
*a*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2+12*b^3*ln(c)*n^2-24*b^3*ln(c)^2*n+12*a*b
^2*n^2-24*a^2*b*n+96*a^2*b*ln(c)+96*a*b^2*ln(c)^2+6*I*Pi*b^3*n^2*csgn(I*x^n
)*csgn(I*c*x^n)^2+24*I*Pi*a*b^2*n*csgn(I*c*x^n)^3+4*I*Pi^3*b^3*csgn(I*c)^3*
csgn(I*x^n)^3*csgn(I*c*x^n)^3-24*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)^2*c
sgn(I*c*x^n)^2+48*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+96
*I*Pi*ln(c)*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-48*I*Pi*a^2*b*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)-24*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*c*x^n)^2-4*I*Pi^3
*b^3*csgn(I*c)^3*csgn(I*c*x^n)^6-96*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-3*b^3*n^3-48*a*b^2*ln(c)*n+32*b^3*ln(c)^3+48*I*Pi*a^2*b*csgn(
I*c)*csgn(I*c*x^n)^2+48*I*Pi*a^2*b*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*ln(c
)*b^3*n*csgn(I*c*x^n)^3+6*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*c*x^n)^2+48*Pi^2*ln
(c)*b^3*csgn(I*x^n)*csgn(I*c*x^n)^5-24*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*c*x^n)
^4+48*Pi^2*a*b^2*csgn(I*c)*csgn(I*c*x^n)^5-24*Pi^2*a*b^2*csgn(I*x^n)^2*csgn
(I*c*x^n)^4+48*Pi^2*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-6*I*Pi*b^3*n^2*csgn(I
*c*x^n)^3+6*Pi^2*b^3*n*csgn(I*x^n)^2*csgn(I*c*x^n)^4-12*Pi^2*b^3*n*csgn(I*x
^n)*csgn(I*c*x^n)^5-12*Pi^2*b^3*n*csgn(I*c)*csgn(I*c*x^n)^5-48*I*Pi*ln(c)^2
*b^3*csgn(I*c*x^n)^3-48*I*Pi*a^2*b*csgn(I*c*x^n)^3-24*Pi^2*ln(c)*b^3*csgn(I
*c*x^n)^6-24*Pi^2*a*b^2*csgn(I*c*x^n)^6+6*Pi^2*b^3*n*csgn(I*c*x^n)^6+4*I*Pi
^3*b^3*csgn(I*c*x^n)^9+12*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*c*x^n)^7-12*I*Pi^3*
b^3*csgn(I*c)*csgn(I*c*x^n)^8-4*I*Pi^3*b^3*csgn(I*x^n)^3*csgn(I*c*x^n)^6+12
*I*Pi^3*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^7-12*I*Pi^3*b^3*csgn(I*x^n)*csgn(I*
c*x^n)^8-12*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*I*Pi^3*
b^3*csgn(I*c)^3*csgn(I*x^n)*csgn(I*c*x^n)^5-12*I*Pi^3*b^3*csgn(I*c)^2*csgn(
I*x^n)^3*csgn(I*c*x^n)^4+36*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x
^n)^5-36*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^6+12*I*Pi^3*b^3*c
sgn(I*c)*csgn(I*x^n)^3*csgn(I*c*x^n)^5-24*I*Pi*a*b^2*n*csgn(I*x^n)*csgn(I*c
*x^n)^2-48*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*Pi^2*b^3*
n*csgn(I*c)^2*csgn(I*c*x^n)^4-24*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4
+48*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^5-24*Pi^2*ln(c)*b^3*csgn(I*x^n)^
2*csgn(I*c*x^n)^4+96*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2)
```

Maxima [A]
time = 0.28, size = 135, normalized size = 1.75

$$\frac{1}{4}\,b^3x^4\log\left(cx^n\right)^3+\frac{3}{4}\,ab^2x^4\log\left(cx^n\right)^2-\frac{3}{16}\,a^2bnx^4+\frac{3}{4}\,a^2bx^4\log\left(cx^n\right)+\frac{1}{4}\,a^3x^4+\frac{3}{32}\,\left(n^2x^4-4\,nx^4\log\left(cx^n\right)\right)ab^2-\frac{3}{128}\,\left(8\,nx^4\log\left(cx^n\right)^2+\left(n^2x^4-4\,nx^4\log\left(cx^n\right)\right)n\right)b^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*b^3*x^4*log(c*x^n)^3 + 3/4*a*b^2*x^4*log(c*x^n)^2 - 3/16*a^2*b*n*x^4 +
3/4*a^2*b*x^4*log(c*x^n) + 1/4*a^3*x^4 + 3/32*(n^2*x^4 - 4*n*x^4*log(c*x^n)
```

```
)*a*b^2 - 3/128*(8*n*x^4*log(c*x^n)^2 + (n^2*x^4 - 4*n*x^4*log(c*x^n))*n)*b
^3
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 222 vs. $2(69) = 138$.
time = 0.37, size = 222, normalized size = 2.88

$$\frac{1}{4}\,b^3n^3x^4\log\left(x\right)^3 + \frac{1}{4}\,b^3x^4\log\left(c\right)^3 - \frac{3}{16}\,{\left(b^3n - 4\,ab^2\right)}x^4\log\left(c\right)^2 + \frac{3}{32}\,{\left(b^3n^2 - 4\,ab^2n + 8\,a^2b\right)}x^4\log\left(c\right) - \frac{1}{128}\,{\left(3\,b^3n^3 - 12\,ab^2n^2 + 24\,a^2bn - 32\,a^3\right)}x^4 + \frac{3}{16}\,{\left(4\,b^3n^2x^4\log\left(c\right) - {\left(b^3n^3 - 4\,ab^2n^2\right)}x^4\right)}\log\left(x\right)^2 + \frac{3}{32}\,{\left(8\,b^3nx^4\log\left(c\right)^2 - 4\,{\left(b^3n^2 - 4\,ab^2n\right)}x^4\log\left(c\right) + {\left(b^3n^3 - 4\,ab^2n^2 + 8\,a^2bn\right)}x^4\right)}\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*b^3*n^3*x^4*log(x)^3 + 1/4*b^3*x^4*log(c)^3 - 3/16*(b^3*n - 4*a*b^2)*x^
4*log(c)^2 + 3/32*(b^3*n^2 - 4*a*b^2*n + 8*a^2*b)*x^4*log(c) - 1/128*(3*b^3
*n^3 - 12*a*b^2*n^2 + 24*a^2*b*n - 32*a^3)*x^4 + 3/16*(4*b^3*n^2*x^4*log(c)
 - (b^3*n^3 - 4*a*b^2*n^2)*x^4)*log(x)^2 + 3/32*(8*b^3*n*x^4*log(c)^2 - 4*(
b^3*n^2 - 4*a*b^2*n)*x^4*log(c) + (b^3*n^3 - 4*a*b^2*n^2 + 8*a^2*b*n)*x^4)*
log(x)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 167 vs. $2(75) = 150$.
time = 0.59, size = 167, normalized size = 2.17

$$\frac{a^3x^4}{4} - \frac{3a^2bnx^4}{16} + \frac{3a^2bx^4\log\left(cx^n\right)}{4} + \frac{3ab^2n^2x^4}{32} - \frac{3ab^2nx^4\log\left(cx^n\right)}{8} + \frac{3ab^2x^4\log\left(cx^n\right)^2}{4} - \frac{3b^3n^3x^4}{128} + \frac{3b^3n^2x^4\log\left(cx^n\right)}{32} - \frac{3b^3nx^4\log\left(cx^n\right)^2}{16} + \frac{b^3x^4\log\left(cx^n\right)^3}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a**3*x**4/4 - 3*a**2*b*n*x**4/16 + 3*a**2*b*x**4*log(c*x**n)/4 + 3*a*b**2*n
**2*x**4/32 - 3*a*b**2*n*x**4*log(c*x**n)/8 + 3*a*b**2*x**4*log(c*x**n)**2/
4 - 3*b**3*n**3*x**4/128 + 3*b**3*n**2*x**4*log(c*x**n)/32 - 3*b**3*n*x**4*
log(c*x**n)**2/16 + b**3*x**4*log(c*x**n)**3/4
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 262 vs. $2(69) = 138$.
time = 6.02, size = 262, normalized size = 3.40

$$\frac{1}{4}\,b^3n^3x^4\log\left(x\right)^3 - \frac{3}{16}\,b^3n^3x^4\log\left(x\right)^2 + \frac{3}{4}\,b^3n^2x^4\log\left(c\right)\log\left(x\right)^2 + \frac{3}{32}\,b^3n^3x^4\log\left(x\right) - \frac{3}{8}\,b^3n^2x^4\log\left(c\right)\log\left(x\right) + \frac{3}{4}\,b^3nx^4\log\left(c\right)^2\log\left(x\right) + \frac{3}{4}\,ab^2n^2x^4\log\left(x\right)^2 - \frac{3}{128}\,b^3n^3x^4 + \frac{3}{32}\,b^3n^2x^4\log\left(c\right) - \frac{3}{16}\,b^3nx^4\log\left(c\right)^2 + \frac{1}{4}\,b^3x^4\log\left(c\right)^3 - \frac{3}{8}\,ab^2n^2x^4\log\left(x\right) + \frac{3}{2}\,ab^2nx^4\log\left(c\right)\log\left(x\right) + \frac{3}{32}\,ab^2n^2x^4 - \frac{3}{8}\,ab^2nx^4\log\left(c\right) + \frac{3}{4}\,ab^2x^4\log\left(c\right)^2 + \frac{3}{4}\,a^2bnx^4\log\left(x\right) - \frac{3}{16}\,a^2bnx^4 + \frac{3}{4}\,a^2bx^4\log\left(c\right) + \frac{1}{4}\,a^3x^4$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*b^3*n^3*x^4*log(x)^3 - 3/16*b^3*n^3*x^4*log(x)^2 + 3/4*b^3*n^2*x^4*log(
c)*log(x)^2 + 3/32*b^3*n^3*x^4*log(x) - 3/8*b^3*n^2*x^4*log(c)*log(x) + 3/4
*b^3*n*x^4*log(c)^2*log(x) + 3/4*a*b^2*n^2*x^4*log(x)^2 - 3/128*b^3*n^3*x^4
 + 3/32*b^3*n^2*x^4*log(c) - 3/16*b^3*n*x^4*log(c)^2 + 1/4*b^3*x^4*log(c)^3
```

```
 - 3/8*a*b^2*n^2*x^4*log(x) + 3/2*a*b^2*n*x^4*log(c)*log(x) + 3/32*a*b^2*n^
2*x^4 - 3/8*a*b^2*n*x^4*log(c) + 3/4*a*b^2*x^4*log(c)^2 + 3/4*a^2*b*n*x^4*l
og(x) - 3/16*a^2*b*n*x^4 + 3/4*a^2*b*x^4*log(c) + 1/4*a^3*x^4
```

Mupad [B]
time = 3.66, size = 110, normalized size = 1.43

$$x^4\left(\frac{a^3}{4}-\frac{3\,a^2\,b\,n}{16}+\frac{3\,a\,b^2\,n^2}{32}-\frac{3\,b^3\,n^3}{128}\right)+\frac{x^4\,\ln\left(c\,x^n\right)\,\left(6\,a^2\,b-3\,a\,b^2\,n+\frac{3\,b^3\,n^2}{4}\right)}{8}+\frac{x^4\,\ln\left(c\,x^n\right)^2\,\left(3\,a\,b^2-\frac{3\,b^3\,n}{4}\right)}{4}+\frac{b^3\,x^4\,\ln\left(c\,x^n\right)^3}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^4*(a^3/4 - (3*b^3*n^3)/128 + (3*a*b^2*n^2)/32 - (3*a^2*b*n)/16) + (x^4*lo
g(c*x^n)*(6*a^2*b + (3*b^3*n^2)/4 - 3*a*b^2*n))/8 + (x^4*log(c*x^n)^2*(3*a*
b^2 - (3*b^3*n)/4))/4 + (b^3*x^4*log(c*x^n)^3)/4
```

3.58 $\int x^2(a+b\log(cx^n))^3\,dx$

Optimal. Leaf size=77

$$-\frac{2}{27}b^3n^3x^3+\frac{2}{9}b^2n^2x^3(a+b\log(cx^n))-\frac{1}{3}bnx^3(a+b\log(cx^n))^2+\frac{1}{3}x^3(a+b\log(cx^n))^3$$

```
[Out] -2/27*b^3*n^3*x^3+2/9*b^2*n^2*x^3*(a+b*ln(c*x^n))-1/3*b*n*x^3*(a+b*ln(c*x^n
))^2+1/3*x^3*(a+b*ln(c*x^n))^3
```

Rubi [A]
time = 0.04, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2342, 2341}

$$\frac{2}{9}b^2n^2x^3(a+b\log(cx^n))+\frac{1}{3}x^3(a+b\log(cx^n))^3-\frac{1}{3}bnx^3(a+b\log(cx^n))^2-\frac{2}{27}b^3n^3x^3$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a + b*Log[c*x^n])^3,x]
```

```
[Out] (-2*b^3*n^3*x^3)/27 + (2*b^2*n^2*x^3*(a + b*Log[c*x^n]))/9 - (b*n*x^3*(a +
b*Log[c*x^n])^2)/3 + (x^3*(a + b*Log[c*x^n])^3)/3
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int x^2(a+b\log(cx^n))^3\,dx &= \frac{1}{3}x^3(a+b\log(cx^n))^3-(bn)\int x^2(a+b\log(cx^n))^2\,dx\\ &= -\frac{1}{3}bnx^3(a+b\log(cx^n))^2+\frac{1}{3}x^3(a+b\log(cx^n))^3+\frac{1}{3}(2b^2n^2)\int x^2(a+b\log(cx\\ &= -\frac{2}{27}b^3n^3x^3+\frac{2}{9}b^2n^2x^3(a+b\log(cx^n))-\frac{1}{3}bnx^3(a+b\log(cx^n))^2+\frac{1}{3}x^3(a+b\log\end{aligned}$$

Mathematica [A]
time = 0.01, size = 67, normalized size = 0.87

$$\frac{1}{3}\left(x^3(a+b\log(cx^n))^3-bn\left(\frac{2}{9}bnx^3(-3a+bn-3b\log(cx^n))+x^3(a+b\log(cx^n))^2\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(a + b*Log[c*x^n])^3,x]
```

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 2650, normalized size = 34.42

method	result	size
risch	Expression too large to display	2650

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*b^3*x^3*ln(x^n)^3+1/6*b^2*x^3*(-3*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-3*I*b*Pi*csgn(I*c*x^n)^3+6*b*ln(c)-2*b*n+6*a)*ln(x^n)^2+1/36*x^3*b*(36*a
^2+36*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x
^n)^2-9*Pi^2*b^2*csgn(I*c*x^n)^6-36*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3-36*I*Pi*
a*b*csgn(I*c*x^n)^3-24*b^2*ln(c)*n-24*b*a*n+72*a*b*ln(c)+36*b^2*ln(c)^2-9*P
i^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+18*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-9
*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+18*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^
n)^5+18*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-36*Pi^2*b^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-9*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I
*c*x^n)^2+18*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+8*b^2*n^2+12*
I*Pi*b^2*n*csgn(I*c*x^n)^3-12*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*
b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)
^2+36*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+12*I*Pi*b^2*n*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)-36*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)-36*I*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n))*ln(x^n)+1/216*x^3*(72*a
^3-216*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+216*I*Pi*ln(c)*
a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-108*I*Pi*a^2*b*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)-72*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*c*x^n)^2+81*I*Pi^3*b^3*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)^7+108*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*c*x^
n)^2+108*I*Pi*ln(c)^2*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-216*I*Pi*ln(c)*a*b^2*
csgn(I*c*x^n)^3+108*I*Pi*a^2*b*csgn(I*c)*csgn(I*c*x^n)^2-36*Pi^2*b^3*n*csgn
(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-81*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)*c
sgn(I*c*x^n)^6-36*Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+72*Pi^
```

```
2*b^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+27*I*Pi^3*b^3*csgn(I*c)*csgn(
I*x^n)^3*csgn(I*c*x^n)^5-81*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n
)^6+108*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-216*Pi^2*ln(
c)*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-54*Pi^2*a*b^2*csgn(I*c)^2*csgn
(I*x^n)^2*csgn(I*c*x^n)^2+108*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^3+108*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-27*I*Pi^3*b^3*
csgn(I*c)^2*csgn(I*x^n)^3*csgn(I*c*x^n)^4-216*Pi^2*a*b^2*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)^4+18*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2
+81*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^5-108*I*Pi*ln(c)^2*b
^3*csgn(I*c*x^n)^3-108*I*Pi*a^2*b*csgn(I*c*x^n)^3+72*I*Pi*a*b^2*n*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)-24*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+48*b^3*ln(c)*n^2-72*b^3*ln(c)^2*n+48*a*b^2*n^2-72*a^2*b*n+216*a^2*b*ln(
c)+216*a*b^2*ln(c)^2-54*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x
^n)^2+108*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+72*I*Pi*ln
(c)*b^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi^3*b^3*csgn(I*c)^3*csgn
(I*x^n)^3*csgn(I*c*x^n)^3-27*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^2*csgn(I*c*
x^n)^4+27*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)*csgn(I*c*x^n)^5-24*I*Pi*b^3*n^
2*csgn(I*c*x^n)^3-9*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*c*x^n)^6+27*I*Pi^3*b^3*cs
gn(I*c)^2*csgn(I*c*x^n)^7-16*b^3*n^3-144*a*b^2*ln(c)*n+72*b^3*ln(c)^3-72*I*
Pi*ln(c)*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2-27*I*Pi^3*b^3*csgn(I*c)*csgn(I*c
*x^n)^8-9*I*Pi^3*b^3*csgn(I*x^n)^3*csgn(I*c*x^n)^6+27*I*Pi^3*b^3*csgn(I*x^n
)^2*csgn(I*c*x^n)^7-27*I*Pi^3*b^3*csgn(I*x^n)*csgn(I*c*x^n)^8+108*Pi^2*ln(c
)*b^3*csgn(I*x^n)*csgn(I*c*x^n)^5-54*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4
+108*Pi^2*a*b^2*csgn(I*c)*csgn(I*c*x^n)^5-54*Pi^2*a*b^2*csgn(I*x^n)^2*csgn(
I*c*x^n)^4+108*Pi^2*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+18*Pi^2*b^3*n*csgn(I*
x^n)^2*csgn(I*c*x^n)^4-36*Pi^2*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^5-36*Pi^2*b^
3*n*csgn(I*c)*csgn(I*c*x^n)^5-54*Pi^2*ln(c)*b^3*csgn(I*c*x^n)^6-54*Pi^2*a*b
^2*csgn(I*c*x^n)^6+9*I*Pi^3*b^3*csgn(I*c*x^n)^9+18*Pi^2*b^3*n*csgn(I*c*x^n)
^6-72*I*Pi*a*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-72*I*Pi*a*b^2*n*csgn(I*x^n)*cs
gn(I*c*x^n)^2-108*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+216*
I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2+108*I*Pi*a^2*b*csgn(I*x^n)*csgn(
I*c*x^n)^2+72*I*Pi*ln(c)*b^3*n*csgn(I*c*x^n)^3+24*I*Pi*b^3*n^2*csgn(I*c)*cs
gn(I*c*x^n)^2+24*I*Pi*b^3*n^2*csgn(I*x^n)*csgn(I*c*x^n)^2+72*I*Pi*a*b^2*n*c
sgn(I*c*x^n)^3+18*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*c*x^n)^4-54*Pi^2*ln(c)*b^3*
csgn(I*c)^2*csgn(I*c*x^n)^4+108*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^5-54
*Pi^2*ln(c)*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4)
```

<u>Maxima</u> [A]
time = 0.29, size = 134, normalized size = 1.74

$$\frac{1}{3}\,b^{3}x^{3}\log\left(cx^{n}\right)^{3}+ab^{2}x^{3}\log\left(cx^{n}\right)^{2}-\frac{1}{3}\,a^{2}bnx^{3}+a^{2}bx^{3}\log\left(cx^{n}\right)+\frac{1}{3}\,a^{3}x^{3}+\frac{2}{9}\,\left(n^{2}x^{3}-3\,nx^{3}\log\left(cx^{n}\right)\right)ab^{2}-\frac{1}{27}\,\left(9\,nx^{3}\log\left(cx^{n}\right)^{2}+2\,\left(n^{2}x^{3}-3\,nx^{3}\log\left(cx^{n}\right)\right)n\right)b^{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

```
[Out] 1/3*b^3*x^3*log(c*x^n)^3 + a*b^2*x^3*log(c*x^n)^2 - 1/3*a^2*b*n*x^3 + a^2*b
*x^3*log(c*x^n) + 1/3*a^3*x^3 + 2/9*(n^2*x^3 - 3*n*x^3*log(c*x^n))*a*b^2 -
1/27*(9*n*x^3*log(c*x^n)^2 + 2*(n^2*x^3 - 3*n*x^3*log(c*x^n))*n)*b^3
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 224 vs. $2(69) = 138$.
time = 0.38, size = 224, normalized size = 2.91

$$\frac{1}{3}\,b^3n^3x^3\log\left(x\right)^3+\frac{1}{3}\,b^3x^3\log\left(c\right)^3-\frac{1}{3}\,(b^3n-3\,ab^2)x^3\log\left(c\right)^2+\frac{1}{9}\,(2\,b^3n^2-6\,ab^2n+9\,a^2b)x^3\log\left(c\right)-\frac{1}{27}\,(2\,b^3n^3-6\,ab^2n^2+9\,a^2bn-9\,a^3)x^3+\frac{1}{3}\,(3\,b^3n^2x^3\log\left(c\right)-(b^3n^3-3\,ab^2n^2)x^3)\log\left(x\right)^2+\frac{1}{9}\,(9\,b^3nx^3\log\left(c\right)^2-6\,(b^3n^2-3\,ab^2n)x^3\log\left(c\right)+(2\,b^3n^3-6\,ab^2n^2+9\,a^2bn)x^3)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] 1/3*b^3*n^3*x^3*log(x)^3 + 1/3*b^3*x^3*log(c)^3 - 1/3*(b^3*n - 3*a*b^2)*x^3
*log(c)^2 + 1/9*(2*b^3*n^2 - 6*a*b^2*n + 9*a^2*b)*x^3*log(c) - 1/27*(2*b^3*
n^3 - 6*a*b^2*n^2 + 9*a^2*b*n - 9*a^3)*x^3 + 1/3*(3*b^3*n^2*x^3*log(c) - (b
^3*n^3 - 3*a*b^2*n^2)*x^3)*log(x)^2 + 1/9*(9*b^3*n*x^3*log(c)^2 - 6*(b^3*n^
2 - 3*a*b^2*n)*x^3*log(c) + (2*b^3*n^3 - 6*a*b^2*n^2 + 9*a^2*b*n)*x^3)*log(
x)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 156 vs. $2(73) = 146$.
time = 0.41, size = 156, normalized size = 2.03

$$\frac{a^3x^3}{3}-\frac{a^2bnx^3}{3}+a^2bx^3\log\left(cx^n\right)+\frac{2ab^2n^2x^3}{9}-\frac{2ab^2nx^3\log\left(cx^n\right)}{3}+ab^2x^3\log\left(cx^n\right)^2-\frac{2b^3n^3x^3}{27}+\frac{2b^3n^2x^3\log\left(cx^n\right)}{9}-\frac{b^3nx^3\log\left(cx^n\right)^2}{3}+\frac{b^3x^3\log\left(cx^n\right)^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))**3,x)
```

```
[Out] a**3*x**3/3 - a**2*b*n*x**3/3 + a**2*b*x**3*log(c*x**n) + 2*a*b**2*n**2*x**
3/9 - 2*a*b**2*n*x**3*log(c*x**n)/3 + a*b**2*x**3*log(c*x**n)**2 - 2*b**3*n
**3*x**3/27 + 2*b**3*n**2*x**3*log(c*x**n)/9 - b**3*n*x**3*log(c*x**n)**2/3
 + b**3*x**3*log(c*x**n)**3/3
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 256 vs. $2(69) = 138$.
time = 3.23, size = 256, normalized size = 3.32

$$\frac{1}{3}\,b^3n^3x^3\log\left(x\right)^3-\frac{1}{3}\,b^3n^3x^3\log\left(x\right)^2+b^3n^2x^3\log\left(c\right)\log\left(x\right)^2+\frac{2}{9}\,b^3n^3x^3\log\left(x\right)-\frac{2}{3}\,b^3n^2x^3\log\left(c\right)\log\left(x\right)+b^3nx^3\log\left(c\right)^2\log\left(x\right)+ab^2n^2x^3\log\left(x\right)^2-\frac{2}{27}\,b^3n^3x^3+\frac{2}{9}\,b^3n^2x^3\log\left(c\right)-\frac{1}{3}\,b^3nx^3\log\left(c\right)^2+\frac{1}{3}\,b^3x^3\log\left(c\right)^3-\frac{2}{3}\,ab^2n^2x^3\log\left(x\right)+2\,ab^2nx^3\log\left(c\right)\log\left(x\right)+\frac{2}{9}\,ab^2n^2x^3-\frac{2}{3}\,ab^2nx^3\log\left(c\right)+ab^2x^3\log\left(c\right)^2+a^2bnx^3\log\left(x\right)-\frac{1}{3}\,a^2bnx^3+a^2bx^3\log\left(c\right)+\frac{1}{3}\,a^3x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] 1/3*b^3*n^3*x^3*log(x)^3 - 1/3*b^3*n^3*x^3*log(x)^2 + b^3*n^2*x^3*log(c)*lo
g(x)^2 + 2/9*b^3*n^3*x^3*log(x) - 2/3*b^3*n^2*x^3*log(c)*log(x) + b^3*n*x^3
*log(c)^2*log(x) + a*b^2*n^2*x^3*log(x)^2 - 2/27*b^3*n^3*x^3 + 2/9*b^3*n^2*
```

```
x^3*log(c) - 1/3*b^3*n*x^3*log(c)^2 + 1/3*b^3*x^3*log(c)^3 - 2/3*a*b^2*n^2*
x^3*log(x) + 2*a*b^2*n*x^3*log(c)*log(x) + 2/9*a*b^2*n^2*x^3 - 2/3*a*b^2*n*
x^3*log(c) + a*b^2*x^3*log(c)^2 + a^2*b*n*x^3*log(x) - 1/3*a^2*b*n*x^3 + a^
2*b*x^3*log(c) + 1/3*a^3*x^3
```

Mupad [B]
time = 3.37, size = 108, normalized size = 1.40

$$x^3\left(\frac{a^3}{3}-\frac{a^2\,b\,n}{3}+\frac{2\,a\,b^2\,n^2}{9}-\frac{2\,b^3\,n^3}{27}\right)+\frac{x^3\,\ln\left(c\,x^n\right)\,\left(3\,a^2\,b-2\,a\,b^2\,n+\frac{2\,b^3\,n^2}{3}\right)}{3}+x^3\ln\left(c\,x^n\right)^2\left(a\,b^2-\frac{b^3\,n}{3}\right)+\frac{b^3\,x^3\ln\left(c\,x^n\right)^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^n))^3,x)
```

```
[Out] x^3*(a^3/3 - (2*b^3*n^3)/27 + (2*a*b^2*n^2)/9 - (a^2*b*n)/3) + (x^3*log(c*x
^n)*(3*a^2*b + (2*b^3*n^2)/3 - 2*a*b^2*n))/3 + x^3*log(c*x^n)^2*(a*b^2 - (b
^3*n)/3) + (b^3*x^3*log(c*x^n)^3)/3
```

3.59 $\int x(a+b\log(cx^n))^3\,dx$

Optimal. Leaf size=77

$$-\frac{3}{8}b^3n^3x^2+\frac{3}{4}b^2n^2x^2(a+b\log(cx^n))-\frac{3}{4}bnx^2(a+b\log(cx^n))^2+\frac{1}{2}x^2(a+b\log(cx^n))^3$$

```
[Out] -3/8*b^3*n^3*x^2+3/4*b^2*n^2*x^2*(a+b*ln(c*x^n))-3/4*b*n*x^2*(a+b*ln(c*x^n)
)^2+1/2*x^2*(a+b*ln(c*x^n))^3
```

Rubi [A]
time = 0.03, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}=0.143$, Rules used = {2342, 2341}

$$\frac{3}{4}b^2n^2x^2(a+b\log(cx^n))-\frac{3}{4}bnx^2(a+b\log(cx^n))^2+\frac{1}{2}x^2(a+b\log(cx^n))^3-\frac{3}{8}b^3n^3x^2$$

Antiderivative was successfully verified.

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

```
[Out] (-3*b^3*n^3*x^2)/8 + (3*b^2*n^2*x^2*(a + b*Log[c*x^n]))/4 - (3*b*n*x^2*(a +
 b*Log[c*x^n])^2)/4 + (x^2*(a + b*Log[c*x^n])^3)/2
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\int x(a+b\log(cx^n))^3\,dx=\frac{1}{2}x^2(a+b\log(cx^n))^3-\frac{1}{2}(3bn)\int x(a+b\log(cx^n))^2\,dx$$

$$=-\frac{3}{4}bnx^2(a+b\log(cx^n))^2+\frac{1}{2}x^2(a+b\log(cx^n))^3+\frac{1}{2}(3b^2n^2)\int x(a+b\log(cx$$

$$=-\frac{3}{8}b^3n^3x^2+\frac{3}{4}b^2n^2x^2(a+b\log(cx^n))-\frac{3}{4}bnx^2(a+b\log(cx^n))^2+\frac{1}{2}x^2(a+b\log$$

Mathematica [A]
time = 0.02, size = 60, normalized size = 0.78

$$\frac{1}{8}x^2\left(4(a+b\log\left(cx^n\right))^3-3bn\left(bn(-2a+bn-2b\log\left(cx^n\right))+2(a+b\log\left(cx^n\right))^2\right)\right)$$

Antiderivative was successfully verified.

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

```
[Out] (x^2*(4*(a + b*Log[c*x^n])^3 - 3*b*n*(b*n*(-2*a + b*n - 2*b*Log[c*x^n]) + 2
*(a + b*Log[c*x^n])^2)))/8
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 2650, normalized size = 34.42

method	result	size
risch	Expression too large to display	2650

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*x^2*b^3*ln(x^n)^3+3/4*x^2*b^2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b
*Pi*csgn(I*c*x^n)^3+2*b*ln(c)-b*n+2*a)*ln(x^n)^2+3/8*b*x^2*(-4*I*Pi*a*b*csg
n(I*c*x^n)^3+4*a^2-Pi^2*b^2*csgn(I*c*x^n)^6+2*I*Pi*b^2*n*csgn(I*c*x^n)^3-4*
b^2*ln(c)*n-4*b*a*n+8*a*b*ln(c)+4*b^2*ln(c)^2+4*I*Pi*a*b*csgn(I*x^n)*csgn(I
*c*x^n)^2-Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*c)*csgn(I*
c*x^n)^5-Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*x^n)*csgn
(I*c*x^n)^5+2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csg
n(I*c*x^n)^2+2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*b^2*n^2-4
*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3-2*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-2*I*
Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^
n)^2+4*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*c)*csgn
(I*c*x^n)^2-4*I*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b^2*n*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n))*ln(x^n)+1/16*x^2*(8*a^3-24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+24*I*Pi*ln(c)*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*a^
2*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(
I*c*x^n)^2+12*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+6*I*Pi*b
^3*n^2*csgn(I*c)*csgn(I*c*x^n)^2-6*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)*csgn(
I*c*x^n)^3-6*Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+12*Pi^2*b^3
*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-6*I*Pi*b^3*n^2*csgn(I*c*x^n)^3+12*
Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*ln(c)*b^3*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)^2*
```

```
csgn(I*c*x^n)^2+12*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+12*Pi
^2*a*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*a*b^2*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)^4+3*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x
^n)^2-3*I*Pi^3*b^3*csgn(I*x^n)*csgn(I*c*x^n)^8-12*I*Pi*ln(c)^2*b^3*csgn(I*c
*x^n)^3-12*I*Pi*a^2*b*csgn(I*c*x^n)^3+12*I*Pi*a*b^2*n*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+9*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^7+12*I*Pi*l
n(c)^2*b^3*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*ln(c)^2*b^3*csgn(I*x^n)*csgn(I
*c*x^n)^2-24*I*Pi*ln(c)*a*b^2*csgn(I*c*x^n)^3+12*I*Pi*a^2*b*csgn(I*c)*csgn(
I*c*x^n)^2+12*I*Pi*a^2*b*csgn(I*x^n)*csgn(I*c*x^n)^2+12*b^3*ln(c)*n^2-12*b^
3*ln(c)^2*n+12*a*b^2*n^2-12*a^2*b*n+24*a^2*b*ln(c)+24*a*b^2*ln(c)^2-6*Pi^2*
ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+12*Pi^2*ln(c)*b^3*csgn(
I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-I*Pi^3*b^3*csgn(I*c)^3*csgn(I*c*x^n)^6-3
*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^3*csgn(I*c*x^n)^4+9*I*Pi^3*b^3*csgn(I*c
)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^5-9*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn
(I*c*x^n)^6+3*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)^3*csgn(I*c*x^n)^5-9*I*Pi^3*b
^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^6+3*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*
c*x^n)^7-3*I*Pi^3*b^3*csgn(I*c)*csgn(I*c*x^n)^8-6*b^3*n^3-24*a*b^2*ln(c)*n+
8*b^3*ln(c)^3-12*I*Pi*ln(c)*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*a*b^2
*n*csgn(I*c)*csgn(I*c*x^n)^2-12*I*Pi*a*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+6*
I*Pi*b^3*n^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi^3*b^3*csgn(I*x^n)^3*csgn(I*c*
x^n)^6+3*I*Pi^3*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^7+12*Pi^2*ln(c)*b^3*csgn(I*
x^n)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*a*b^2
*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*Pi
^2*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+3*Pi^2*b^3*n*csgn(I*x^n)^2*csgn(I*c*x^
n)^4-6*Pi^2*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^5-6*Pi^2*b^3*n*csgn(I*c)*csgn(I
*c*x^n)^5-6*Pi^2*ln(c)*b^3*csgn(I*c*x^n)^6-6*Pi^2*a*b^2*csgn(I*c*x^n)^6+3*P
i^2*b^3*n*csgn(I*c*x^n)^6+I*Pi^3*b^3*csgn(I*c*x^n)^9-6*I*Pi*b^3*n^2*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)-12*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi^3*b^3*csgn(I*c
)^3*csgn(I*x^n)^3*csgn(I*c*x^n)^3+12*I*Pi*ln(c)*b^3*n*csgn(I*c*x^n)^3+12*I*
Pi*a*b^2*n*csgn(I*c*x^n)^3-3*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^2*csgn(I*c*
x^n)^4+3*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)*csgn(I*c*x^n)^5+3*Pi^2*b^3*n*cs
gn(I*c)^2*csgn(I*c*x^n)^4-6*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4+12*P
i^2*ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*ln(c)*b^3*csgn(I*x^n)^2*csgn
(I*c*x^n)^4)
```

<u>Maxima</u> **[A]**
time = 0.29, size = 135, normalized size = 1.75

$$\frac{1}{2}b^3x^2\log(cx^n)^3+\frac{3}{2}ab^2x^2\log(cx^n)^2-\frac{3}{4}a^2bnx^2+\frac{3}{2}a^2bx^2\log(cx^n)+\frac{1}{2}a^3x^2+\frac{3}{4}\left(n^2x^2-2nx^2\log(cx^n)\right)ab^2-\frac{3}{8}\left(2nx^2\log(cx^n)^2+\left(n^2x^2-2nx^2\log(cx^n)\right)n\right)b^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^n))^3,x, algorithm="maxima")
[Out] 1/2*b^3*x^2*log(c*x^n)^3 + 3/2*a*b^2*x^2*log(c*x^n)^2 - 3/4*a^2*b*n*x^2 + 3
```

```
/2*a^2*b*x^2*log(c*x^n) + 1/2*a^3*x^2 + 3/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*
a*b^2 - 3/8*(2*n*x^2*log(c*x^n)^2 + (n^2*x^2 - 2*n*x^2*log(c*x^n))*n)*b^3
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 222 vs. $2(69) = 138$.
time = 0.36, size = 222, normalized size = 2.88

$$\frac{1}{2}\,b^3n^3x^2\log\left(x\right)^3+\frac{1}{2}\,b^3x^2\log\left(c\right)^3-\frac{3}{4}\,(b^3n-2\,ab^2)x^2\log\left(c\right)^2+\frac{3}{4}\,(b^3n^2-2\,ab^2n+2\,a^2b)x^2\log\left(c\right)-\frac{1}{8}\,(3\,b^3n^3-6\,ab^2n^2+6\,a^2bn-4\,a^3)x^2+\frac{3}{4}\,(2\,b^3n^2x^2\log\left(c\right)-(b^3n^3-2\,ab^2n^2)x^2)\log\left(x\right)^2+\frac{3}{4}\,(2\,b^3nx^2\log\left(c\right)^2-2\,(b^3n^2-2\,ab^2n)x^2\log\left(c\right)+(b^3n^3-2\,ab^2n^2+2\,a^2bn)x^2)\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*b^3*n^3*x^2*log(x)^3 + 1/2*b^3*x^2*log(c)^3 - 3/4*(b^3*n - 2*a*b^2)*x^2
*log(c)^2 + 3/4*(b^3*n^2 - 2*a*b^2*n + 2*a^2*b)*x^2*log(c) - 1/8*(3*b^3*n^3
 - 6*a*b^2*n^2 + 6*a^2*b*n - 4*a^3)*x^2 + 3/4*(2*b^3*n^2*x^2*log(c) - (b^3*
n^3 - 2*a*b^2*n^2)*x^2)*log(x)^2 + 3/4*(2*b^3*n*x^2*log(c)^2 - 2*(b^3*n^2 -
 2*a*b^2*n)*x^2*log(c) + (b^3*n^3 - 2*a*b^2*n^2 + 2*a^2*b*n)*x^2)*log(x)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 167 vs. $2(75) = 150$.
time = 0.28, size = 167, normalized size = 2.17

$$\frac{a^3x^2}{2}-\frac{3a^2bnx^2}{4}+\frac{3a^2bx^2\log\left(cx^n\right)}{2}+\frac{3ab^2n^2x^2}{4}-\frac{3ab^2nx^2\log\left(cx^n\right)}{2}+\frac{3ab^2x^2\log\left(cx^n\right)^2}{2}-\frac{3b^3n^3x^2}{8}+\frac{3b^3n^2x^2\log\left(cx^n\right)}{4}-\frac{3b^3nx^2\log\left(cx^n\right)^2}{4}+\frac{b^3x^2\log\left(cx^n\right)^3}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a**3*x**2/2 - 3*a**2*b*n*x**2/4 + 3*a**2*b*x**2*log(c*x**n)/2 + 3*a*b**2*n*
*2*x**2/4 - 3*a*b**2*n*x**2*log(c*x**n)/2 + 3*a*b**2*x**2*log(c*x**n)**2/2
- 3*b**3*n**3*x**2/8 + 3*b**3*n**2*x**2*log(c*x**n)/4 - 3*b**3*n*x**2*log(c
*x**n)**2/4 + b**3*x**2*log(c*x**n)**3/2
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 262 vs. $2(69) = 138$.
time = 4.88, size = 262, normalized size = 3.40

$$\frac{1}{2}\,b^3n^3x^2\log\left(x\right)^3-\frac{3}{4}\,b^3n^3x^2\log\left(x\right)^2+\frac{3}{2}\,b^3n^2x^2\log\left(c\right)\log\left(x\right)^2+\frac{3}{4}\,b^3n^3x^2\log\left(x\right)-\frac{3}{2}\,b^3n^2x^2\log\left(c\right)\log\left(x\right)+\frac{3}{2}\,b^3nx^2\log\left(c\right)^2\log\left(x\right)+\frac{3}{2}\,ab^2n^2x^2\log\left(x\right)^2-\frac{3}{8}\,b^3n^3x^2+\frac{3}{4}\,b^3n^2x^2\log\left(c\right)-\frac{3}{4}\,b^3nx^2\log\left(c\right)^2+\frac{1}{2}\,b^3x^2\log\left(c\right)^3-\frac{3}{2}\,ab^2n^2x^2\log\left(x\right)+3\,ab^2nx^2\log\left(c\right)\log\left(x\right)+\frac{3}{4}\,ab^2n^2x^2-\frac{3}{2}\,ab^2nx^2\log\left(c\right)+\frac{3}{2}\,ab^2x^2\log\left(c\right)^2+\frac{3}{2}\,a^2bnx^2\log\left(x\right)-\frac{3}{4}\,a^2bnx^2+\frac{3}{2}\,a^2bx^2\log\left(c\right)+\frac{1}{2}\,a^3x^2$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*b^3*n^3*x^2*log(x)^3 - 3/4*b^3*n^3*x^2*log(x)^2 + 3/2*b^3*n^2*x^2*log(c
)*log(x)^2 + 3/4*b^3*n^3*x^2*log(x) - 3/2*b^3*n^2*x^2*log(c)*log(x) + 3/2*b
^3*n*x^2*log(c)^2*log(x) + 3/2*a*b^2*n^2*x^2*log(x)^2 - 3/8*b^3*n^3*x^2 + 3
/4*b^3*n^2*x^2*log(c) - 3/4*b^3*n*x^2*log(c)^2 + 1/2*b^3*x^2*log(c)^3 - 3/2
*a*b^2*n^2*x^2*log(x) + 3*a*b^2*n*x^2*log(c)*log(x) + 3/4*a*b^2*n^2*x^2 - 3
```

```
/2*a*b^2*n*x^2*log(c) + 3/2*a*b^2*x^2*log(c)^2 + 3/2*a^2*b*n*x^2*log(x) - 3
/4*a^2*b*n*x^2 + 3/2*a^2*b*x^2*log(c) + 1/2*a^3*x^2
```

Mupad [B]
time = 3.44, size = 110, normalized size = 1.43

$$x^2\left(\frac{a^3}{2}-\frac{3\,a^2\,b\,n}{4}+\frac{3\,a\,b^2\,n^2}{4}-\frac{3\,b^3\,n^3}{8}\right)+\frac{x^2\,\ln\left(c\,x^n\right)\,\left(3\,a^2\,b-3\,a\,b^2\,n+\frac{3\,b^3\,n^2}{2}\right)}{2}+\frac{x^2\,\ln\left(c\,x^n\right)^2\,\left(3\,a\,b^2-\frac{3\,b^3\,n}{2}\right)}{2}+\frac{b^3\,x^2\,\ln\left(c\,x^n\right)^3}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^2*(a^3/2 - (3*b^3*n^3)/8 + (3*a*b^2*n^2)/4 - (3*a^2*b*n)/4) + (x^2*log(c*
x^n)*(3*a^2*b + (3*b^3*n^2)/2 - 3*a*b^2*n))/2 + (x^2*log(c*x^n)^2*(3*a*b^2
- (3*b^3*n)/2))/2 + (b^3*x^2*log(c*x^n)^3)/2
```

3.60 $\int (a+b\log(cx^n))^3\,dx$

Optimal. Leaf size=66

$$6ab^2n^2x-6b^3n^3x+6b^3n^2x\log(cx^n)-3bnx(a+b\log(cx^n))^2+x(a+b\log(cx^n))^3$$

```
[Out] 6*a*b^2*n^2*x-6*b^3*n^3*x+6*b^3*n^2*x*ln(c*x^n)-3*b*n*x*(a+b*ln(c*x^n))^2+x
*(a+b*ln(c*x^n))^3
```

Rubi [A]
time = 0.02, antiderivative size = 66, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2333, 2332}

$$6ab^2n^2x-3bnx(a+b\log(cx^n))^2+x(a+b\log(cx^n))^3+6b^3n^2x\log(cx^n)-6b^3n^3x$$

Antiderivative was successfully verified.

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

```
[Out] 6*a*b^2*n^2*x - 6*b^3*n^3*x + 6*b^3*n^2*x*Log[c*x^n] - 3*b*n*x*(a + b*Log[c
*x^n])^2 + x*(a + b*Log[c*x^n])^3
```

Rule 2332

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

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rubi steps

$$\begin{aligned}\int (a+b\log(cx^n))^3\,dx &= x(a+b\log(cx^n))^3-(3bn)\int (a+b\log(cx^n))^2\,dx\\ &= -3bnx(a+b\log(cx^n))^2+x(a+b\log(cx^n))^3+\left(6b^2n^2\right)\int (a+b\log(cx^n))\,dx\\ &= 6ab^2n^2x-3bnx(a+b\log(cx^n))^2+x(a+b\log(cx^n))^3+\left(6b^3n^2\right)\int \log(cx^n)\,dx\\ &= 6ab^2n^2x-6b^3n^3x+6b^3n^2x\log(cx^n)-3bnx(a+b\log(cx^n))^2+x(a+b\log(cx^n))^3\end{aligned}$$

Mathematica [A]
time = 0.01, size = 50, normalized size = 0.76

$$x\left((a+b\log(cx^n))^3-3bn\left((a+b\log(cx^n))^2-2bn(a-bn+b\log(cx^n))\right)\right)$$

Antiderivative was successfully verified.

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

```
[Out] x*((a + b*Log[c*x^n])^3 - 3*b*n*((a + b*Log[c*x^n])^2 - 2*b*n*(a - b*n + b*
Log[c*x^n])))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 2641, normalized size = 40.02

method	result	size
risch	Expression too large to display	2641

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] x*b^3*ln(x^n)^3+3/2*b^2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi
*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I
*c*x^n)^3+2*b*ln(c)-2*b*n+2*a)*x*ln(x^n)^2+3/4*b*(-4*I*Pi*a*b*csgn(I*c*x^n)
^3+4*I*Pi*b^2*n*csgn(I*c*x^n)^3+4*a^2-Pi^2*b^2*csgn(I*c*x^n)^6-8*b^2*ln(c)*
n-8*b*a*n+8*a*b*ln(c)+4*b^2*ln(c)^2+4*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-
Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-P
i^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^
5-4*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-4*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*
x^n)^2+2*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^2+2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+8*b^2*n^2-4*I*Pi
*ln(c)*b^2*csgn(I*c*x^n)^3+4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2+4*I*P
i*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^
2+4*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*a*b*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)-4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
)*x*ln(x^n)+1/8*(8*a^3-24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+24*I*Pi*ln(c)*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*a^2*b*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)-12*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^3-12*Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+24*Pi^2*b^3*n*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+12*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n
)^2*csgn(I*c*x^n)^3-24*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4
-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+12*Pi^2*a*b^2*csgn(
I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+12*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)^2*cs
gn(I*c*x^n)^3-24*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+6*Pi^2*b^
3*n*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+24*I*Pi*b^3*n^2*csgn(I*c)*csg
```

```
n(I*c*x^n)^2-3*I*Pi^3*b^3*csgn(I*x^n)*csgn(I*c*x^n)^8-12*I*Pi*ln(c)^2*b^3*c
sgn(I*c*x^n)^3-12*I*Pi*a^2*b*csgn(I*c*x^n)^3+24*I*Pi*ln(c)*b^3*n*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+9*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^
7+12*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*ln(c)^2*b^3*csgn(I*
x^n)*csgn(I*c*x^n)^2-24*I*Pi*ln(c)*a*b^2*csgn(I*c*x^n)^3+12*I*Pi*a^2*b*csgn
(I*c)*csgn(I*c*x^n)^2+12*I*Pi*a^2*b*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*ln(
c)*b^3*n*csgn(I*c)*csgn(I*c*x^n)^2+48*b^3*ln(c)*n^2-24*b^3*ln(c)^2*n+48*a*b
^2*n^2-24*a^2*b*n+24*a^2*b*ln(c)+24*a*b^2*ln(c)^2-6*Pi^2*ln(c)*b^3*csgn(I*c
)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+12*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)
*csgn(I*c*x^n)^3-I*Pi^3*b^3*csgn(I*c)^3*csgn(I*c*x^n)^6-3*I*Pi^3*b^3*csgn(I
*c)^2*csgn(I*x^n)^3*csgn(I*c*x^n)^4+9*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^2*
csgn(I*c*x^n)^5-9*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^6+3*I*Pi
^3*b^3*csgn(I*c)*csgn(I*x^n)^3*csgn(I*c*x^n)^5-9*I*Pi^3*b^3*csgn(I*c)*csgn(
I*x^n)^2*csgn(I*c*x^n)^6-24*I*Pi*ln(c)*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2-24
*I*Pi*a*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-24*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-24*I*Pi*b^3*n^2*csgn(I*c*x^n)^3+3*I*Pi^3*b^3*csgn(I*c)^2*c
sgn(I*c*x^n)^7-3*I*Pi^3*b^3*csgn(I*c)*csgn(I*c*x^n)^8+24*I*Pi*a*b^2*n*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)-48*b^3*n^3-48*a*b^2*ln(c)*n+8*b^3*ln(c)^3-24
*I*Pi*a*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi^3*b^3*csgn(I*x^n)^3*csgn(I*c
*x^n)^6+3*I*Pi^3*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^7+12*Pi^2*ln(c)*b^3*csgn(I
*x^n)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*a*b^
2*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*P
i^2*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+6*Pi^2*b^3*n*csgn(I*x^n)^2*csgn(I*c*x
^n)^4-12*Pi^2*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^5-12*Pi^2*b^3*n*csgn(I*c)*csg
n(I*c*x^n)^5-6*Pi^2*ln(c)*b^3*csgn(I*c*x^n)^6-6*Pi^2*a*b^2*csgn(I*c*x^n)^6+
6*Pi^2*b^3*n*csgn(I*c*x^n)^6+I*Pi^3*b^3*csgn(I*c*x^n)^9+24*I*Pi*b^3*n^2*csg
n(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*ln(c)*b^3*n*csg
n(I*c*x^n)^3+24*I*Pi*a*b^2*n*csgn(I*c*x^n)^3+I*Pi^3*b^3*csgn(I*c)^3*csgn(I*
x^n)^3*csgn(I*c*x^n)^3-3*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^2*csgn(I*c*x^n)
^4+3*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)*csgn(I*c*x^n)^5+6*Pi^2*b^3*n*csgn(I
*c)^2*csgn(I*c*x^n)^4-6*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*
ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*ln(c)*b^3*csgn(I*x^n)^2*csgn(I*c
*x^n)^4)*x
```

Maxima [A]

time = 0.30, size = 113, normalized size = 1.71

$$b^3x\log(cx^n)^3+3\,ab^2x\log(cx^n)^2-3\,a^2bnx+3\,a^2bx\log(cx^n)+6\,(n^2x-nx\log(cx^n))ab^2-3\,(nx\log(cx^n)^2+2\,(n^2x-nx\log(cx^n))n)b^3+a^3x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^3*x*log(c*x^n)^3 + 3*a*b^2*x*log(c*x^n)^2 - 3*a^2*b*n*x + 3*a^2*b*x*log(c
*x^n) + 6*(n^2*x - n*x*log(c*x^n))*a*b^2 - 3*(n*x*log(c*x^n)^2 + 2*(n^2*x -
 n*x*log(c*x^n))*n)*b^3 + a^3*x
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 198 vs. $2(66) = 132$.
time = 0.39, size = 198, normalized size = 3.00

$$b^3n^3x\log(x)^3 + b^3x\log(c)^3 - 3\left(b^3n - ab^2\right)x\log(c)^2 + 3\left(2\,b^3n^2 - 2\,ab^2n + a^2b\right)x\log(c) + 3\left(b^3n^2x\log(c) - \left(b^3n^3 - ab^2n^2\right)x\right)\log(x)^2 - \left(6\,b^3n^3 - 6\,ab^2n^2 + 3\,a^2bn - a^3\right)x + 3\left(b^3nx\log(c)^2 - 2\left(b^3n^2 - ab^2n\right)x\log(c) + \left(2\,b^3n^3 - 2\,ab^2n^2 + a^2bn\right)x\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^3*n^3*x*log(x)^3 + b^3*x*log(c)^3 - 3*(b^3*n - a*b^2)*x*log(c)^2 + 3*(2*b
^3*n^2 - 2*a*b^2*n + a^2*b)*x*log(c) + 3*(b^3*n^2*x*log(c) - (b^3*n^3 - a*b
^2*n^2)*x)*log(x)^2 - (6*b^3*n^3 - 6*a*b^2*n^2 + 3*a^2*b*n - a^3)*x + 3*(b^
3*n*x*log(c)^2 - 2*(b^3*n^2 - a*b^2*n)*x*log(c) + (2*b^3*n^3 - 2*a*b^2*n^2
+ a^2*b*n)*x)*log(x)
```

Sympy [A]
time = 0.19, size = 133, normalized size = 2.02

$$a^3x - 3a^2bnx + 3a^2bx\log(cx^n) + 6ab^2n^2x - 6ab^2nx\log(cx^n) + 3ab^2x\log(cx^n)^2 - 6b^3n^3x + 6b^3n^2x\log(cx^n) - 3b^3nx\log(cx^n)^2 + b^3x\log(cx^n)^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a**3*x - 3*a**2*b*n*x + 3*a**2*b*x*log(c*x**n) + 6*a*b**2*n**2*x - 6*a*b**2
*n*x*log(c*x**n) + 3*a*b**2*x*log(c*x**n)**2 - 6*b**3*n**3*x + 6*b**3*n**2*
x*log(c*x**n) - 3*b**3*n*x*log(c*x**n)**2 + b**3*x*log(c*x**n)**3
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 219 vs. $2(66) = 132$.
time = 3.66, size = 219, normalized size = 3.32

$$b^3n^3x\log(x)^3 - 3\,b^3n^3x\log(x)^2 + 3\,b^3n^2x\log(c)\log(x)^2 + 6\,b^3n^3x\log(x) - 6\,b^3n^2x\log(c)\log(x) + 3\,b^3nx\log(c)^2\log(x) + 3\,ab^2n^2x\log(x)^2 - 6\,b^3n^3x + 6\,b^3n^2x\log(c) - 3\,b^3nx\log(c)^2 + b^3x\log(c)^3 - 6\,ab^2n^2x\log(x) + 6\,ab^2nx\log(c)\log(x) + 6\,ab^2n^2x - 6\,ab^2nx\log(c) + 3\,ab^2x\log(c)^2 + 3\,a^2bnx\log(x) - 3\,a^2bnx + 3\,a^2bx\log(c) + a^3x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^3*n^3*x*log(x)^3 - 3*b^3*n^3*x*log(x)^2 + 3*b^3*n^2*x*log(c)*log(x)^2 + 6
*b^3*n^3*x*log(x) - 6*b^3*n^2*x*log(c)*log(x) + 3*b^3*n*x*log(c)^2*log(x) +
 3*a*b^2*n^2*x*log(x)^2 - 6*b^3*n^3*x + 6*b^3*n^2*x*log(c) - 3*b^3*n*x*log(
c)^2 + b^3*x*log(c)^3 - 6*a*b^2*n^2*x*log(x) + 6*a*b^2*n*x*log(c)*log(x) +
6*a*b^2*n^2*x - 6*a*b^2*n*x*log(c) + 3*a*b^2*x*log(c)^2 + 3*a^2*b*n*x*log(x
) - 3*a^2*b*n*x + 3*a^2*b*x*log(c) + a^3*x
```

Mupad [B]
time = 3.66, size = 94, normalized size = 1.42

$$x\left(a^3 - 3\,a^2\,b\,n + 6\,a\,b^2\,n^2 - 6\,b^3\,n^3\right) + x\,\ln\left(c\,x^n\right)\,\left(3\,a^2\,b - 6\,a\,b^2\,n + 6\,b^3\,n^2\right) + b^3\,x\,\ln\left(c\,x^n\right)^3 + 3\,b^2\,x\,\ln\left(c\,x^n\right)^2\,(a - b\,n)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x*(a^3 - 6*b^3*n^3 + 6*a*b^2*n^2 - 3*a^2*b*n) + x*log(c*x^n)*(3*a^2*b + 6*b
^3*n^2 - 6*a*b^2*n) + b^3*x*log(c*x^n)^3 + 3*b^2*x*log(c*x^n)^2*(a - b*n)
```

3.61 $\int \frac{(a+b\log(cx^n))^3}{x}\,dx$

Optimal. Leaf size=22

$$\frac{(a+b\log(cx^n))^4}{4bn}$$

[Out] 1/4*(a+b*ln(c*x^n))^4/b/n

Rubi [A]
time = 0.01, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2339, 30}

$$\frac{(a+b\log(cx^n))^4}{4bn}$$

Antiderivative was successfully verified.

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

[Out] (a + b*Log[c*x^n])^4/(4*b*n)

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^3}{x}\,dx &= \frac{\text{Subst}\left(\int x^3\,dx, x, a+b\log(cx^n)\right)}{bn}\\ &= \frac{(a+b\log(cx^n))^4}{4bn}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 22, normalized size = 1.00

$$\frac{(a+b\log(cx^n))^4}{4bn}$$

Antiderivative was successfully verified.

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

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

Maple [A]
time = 0.22, size = 21, normalized size = 0.95

method	result	size
derivativedivides	$\frac{(a+b\ln(c\,x^n))^4}{4bn}$	21
default	$\frac{(a+b\ln(c\,x^n))^4}{4bn}$	21
risch	Expression too large to display	2945

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x,x,method=_RETURNVERBOSE)
```

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

Maxima [A]
time = 0.30, size = 20, normalized size = 0.91

$$\frac{(b\log(cx^n)+a)^4}{4\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 100 vs. $2(20) = 40$.
time = 0.45, size = 100, normalized size = 4.55

$$\frac{1}{4}\,b^3n^3\log(x)^4+\left(b^3n^2\log(c)+ab^2n^2\right)\log(x)^3+\frac{3}{2}\left(b^3n\log(c)^2+2\,ab^2n\log(c)+a^2bn\right)\log(x)^2+\left(b^3\log(c)^3+3\,ab^2\log(c)^2+3\,a^2b\log(c)+a^3\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*b^3*n^3*log(x)^4 + (b^3*n^2*log(c) + a*b^2*n^2)*log(x)^3 + 3/2*(b^3*n*l
og(c)^2 + 2*a*b^2*n*log(c) + a^2*b*n)*log(x)^2 + (b^3*log(c)^3 + 3*a*b^2*lo
g(c)^2 + 3*a^2*b*log(c) + a^3)*log(x)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 92 vs. $2(15) = 30$.

time = 14.14, size = 92, normalized size = 4.18

$$\begin{cases} \frac{a^3 \log(cx^n) + \frac{3a^2 b \log(cx^n)^2}{2} + ab^2 \log(cx^n)^3 + \frac{b^3 \log(cx^n)^4}{4}}{n} & \text{for } n \neq 0 \\ \left(a^3 + 3a^2 b \log(c) + 3ab^2 \log(c)^2 + b^3 \log(c)^3\right) \log(x) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise(((a**3*log(c*x**n) + 3*a**2*b*log(c*x**n)**2/2 + a*b**2*log(c*x**
n)**3 + b**3*log(c*x**n)**4/4)/n, Ne(n, 0)), ((a**3 + 3*a**2*b*log(c) + 3*a
*b**2*log(c)**2 + b**3*log(c)**3)*log(x), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 114 vs. 2(20) = 40.
time = 4.40, size = 114, normalized size = 5.18

$$\frac{1}{4} b^3 n^3 \log(x)^4 + b^3 n^2 \log(c) \log(x)^3 + \frac{3}{2} b^3 n \log(c)^2 \log(x)^2 + ab^2 n^2 \log(x)^3 + b^3 \log(c)^3 \log(x) + 3 ab^2 n \log(c) \log(x)^2 + 3 ab^2 \log(c)^2 \log(x) + \frac{3}{2} a^2 bn \log(x)^2 + 3 a^2 b \log(c) \log(x) + a^3 \log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [B]
time = 3.37, size = 56, normalized size = 2.55

$$a^3 \ln(x) + \frac{b^3 \ln(c\,x^n)^4}{4\,n} + \frac{3\,a^2\,b \ln(c\,x^n)^2}{2\,n} + \frac{a\,b^2 \ln(c\,x^n)^3}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.62 $\int \frac{(a+b\log(cx^n))^3}{x^2}\,dx$

Optimal. Leaf size=69

$$-\frac{6b^3n^3}{x}-\frac{6b^2n^2(a+b\log(cx^n))}{x}-\frac{3bn(a+b\log(cx^n))^2}{x}-\frac{(a+b\log(cx^n))^3}{x}$$

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

Rubi [A]
time = 0.04, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2342, 2341}

$$-\frac{6b^2n^2(a+b\log(cx^n))}{x}-\frac{3bn(a+b\log(cx^n))^2}{x}-\frac{(a+b\log(cx^n))^3}{x}-\frac{6b^3n^3}{x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/x^2,x]
```

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

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

Mathematica [A]
time = 0.01, size = 52, normalized size = 0.75

$$-\frac{(a+b\log(cx^n))^3+3bn\left((a+b\log(cx^n))^2+2bn(a+bn+b\log(cx^n))\right)}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^3/x^2,x]
```

```
[Out] -(((a + b*Log[c*x^n])^3 + 3*b*n*((a + b*Log[c*x^n])^2 + 2*b*n*(a + b*n + b*
Log[c*x^n])))/x)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 2674, normalized size = 38.75

method	result	size
risch	Expression too large to display	2674

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x^2,x,method=_RETURNVERBOSE)
```

```
[Out] -b^3/x*ln(x^n)^3-3/2*(-I*Pi*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b^
3*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b^3*c
sgn(I*c*x^n)^3+2*b^3*ln(c)+2*b^3*n+2*a*b^2)/x*ln(x^n)^2-3/4*(4*a^2*b+2*Pi^2
*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*Pi^2*b^3*csgn(I*c)*csgn(I*x^
n)^2*csgn(I*c*x^n)^3-4*I*Pi*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*n
*Pi*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*a*b^2*ln(c)+8*n*ln(c)*b^3+8*b
^3*n^2-Pi^2*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^3*csgn(I*c)*csgn(I*c*x
^n)^5-Pi^2*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^3*csgn(I*x^n)*csgn(I*
c*x^n)^5-4*I*Pi*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*a*b^2*
csgn(I*x^n)*csgn(I*c*x^n)^2+8*a*b^2*n+4*b^3*ln(c)^2-Pi^2*b^3*csgn(I*c)^2*cs
gn(I*x^n)^2*csgn(I*c*x^n)^2-4*Pi^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^
4-4*I*Pi*ln(c)*b^3*csgn(I*c*x^n)^3-4*I*Pi*a*b^2*csgn(I*c*x^n)^3-4*I*n*Pi*b^
3*csgn(I*c*x^n)^3-Pi^2*b^3*csgn(I*c*x^n)^6+4*I*n*Pi*b^3*csgn(I*c)*csgn(I*c*
x^n)^2+4*I*n*Pi*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*b^3*csgn(I*c)*
csgn(I*c*x^n)^2+4*I*Pi*ln(c)*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b^2*c
sgn(I*c)*csgn(I*c*x^n)^2)/x*ln(x^n)-1/8*(8*a^3-12*I*Pi*ln(c)^2*b^3*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+24*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*c*x^n)^2+2
4*I*Pi*ln(c)*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*ln(c)*b^3*n*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)-6*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c
*x^n)^2+12*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+12*Pi^2*b^3*n
*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)^4+I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^3*csgn(I*c*x^n)^3-3*I*
Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+3*I*Pi^3*b^3*csgn(I*c)^3
*csgn(I*x^n)*csgn(I*c*x^n)^5-6*Pi^2*b^3*n*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*
```

```
Pi^2*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^5-6*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*c*x^
n)^4-6*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*ln(c)*b^3*csgn(I*
c)*csgn(I*c*x^n)^5-6*Pi^2*ln(c)*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*Pi^2*l
n(c)*b^3*csgn(I*x^n)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*c*x^n)
^4+12*Pi^2*a*b^2*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*x^n)^2*csgn(
I*c*x^n)^4+12*Pi^2*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5-24*I*Pi*a*b^2*n*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)+24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2
+24*I*Pi*ln(c)*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*a^2*b*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)+48*b^3*ln(c)*n^2+24*b^3*ln(c)^2*n+48*a*b^2*n^2+24*a
^2*b*n+24*a^2*b*ln(c)+24*a*b^2*ln(c)^2-24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+48*b^3*n^3+48*a*b^2*ln(c)*n+8*b^3*ln(c)^3-I*Pi^3*b^3*cs
gn(I*c)^3*csgn(I*c*x^n)^6+12*Pi^2*b^3*n*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*ln
(c)*b^3*csgn(I*c*x^n)^6-6*Pi^2*a*b^2*csgn(I*c*x^n)^6-6*Pi^2*b^3*n*csgn(I*c*
x^n)^6+I*Pi^3*b^3*csgn(I*c*x^n)^9-12*I*Pi*a^2*b*csgn(I*c*x^n)^3-24*I*Pi*b^3
*n^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*c*
x^n)^7-3*I*Pi^3*b^3*csgn(I*c)*csgn(I*c*x^n)^8-I*Pi^3*b^3*csgn(I*x^n)^3*csgn
(I*c*x^n)^6+3*I*Pi^3*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^7-3*I*Pi^3*b^3*csgn(I*
x^n)*csgn(I*c*x^n)^8-12*I*Pi*ln(c)^2*b^3*csgn(I*c*x^n)^3-24*I*Pi*b^3*n^2*cs
gn(I*c*x^n)^3-6*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+12
*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+12*Pi^2*ln(c)*b^3*c
sgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)^4-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+
12*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+12*Pi^2*a*b^2*csgn(I*
c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)^4+24*I*Pi*a*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*n*Pi*a*b^2*csgn(
I*c)*csgn(I*c*x^n)^2+24*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*b^3*
n^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^3*csgn
(I*c*x^n)^4+9*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^5-9*I*Pi^3
*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^6+3*I*Pi^3*b^3*csgn(I*c)*csgn(I*
x^n)^3*csgn(I*c*x^n)^5-9*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^6
+9*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^7-24*I*Pi*ln(c)*b^3*n*csg
n(I*c*x^n)^3-24*I*Pi*a*b^2*n*csgn(I*c*x^n)^3+12*I*Pi*ln(c)^2*b^3*csgn(I*c)*
csgn(I*c*x^n)^2+12*I*Pi*ln(c)^2*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*ln(
c)*a*b^2*csgn(I*c*x^n)^3+12*I*Pi*a^2*b*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*a^
2*b*csgn(I*x^n)*csgn(I*c*x^n)^2)/x
```

Maxima [A]
time = 0.30, size = 133, normalized size = 1.93

$$-\frac{b^3 \log\left(cx^n\right)^3}{x} - 3\left(2\,n\left(\frac{n^2}{x} + \frac{n\log\left(cx^n\right)}{x}\right) + \frac{n\log\left(cx^n\right)^2}{x}\right)b^3 - 6\,ab^2\left(\frac{n^2}{x} + \frac{n\log\left(cx^n\right)}{x}\right) - \frac{3\,ab^2\log\left(cx^n\right)^2}{x} - \frac{3\,a^2bn}{x} - \frac{3\,a^2b\log\left(cx^n\right)}{x} - \frac{a^3}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^2,x, algorithm="maxima")
[Out] -b^3*log(c*x^n)^3/x - 3*(2*n*(n^2/x + n*log(c*x^n)/x) + n*log(c*x^n)^2/x)*b
```

```
^3 - 6*a*b^2*(n^2/x + n*log(c*x^n)/x) - 3*a*b^2*log(c*x^n)^2/x - 3*a^2*b*n/
x - 3*a^2*b*log(c*x^n)/x - a^3/x
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 180 vs. $2(69) = 138$.
time = 0.36, size = 180, normalized size = 2.61

$$-\frac{b^{3}n^{3}\log\left(x\right)^{3}+6\,b^{3}n^{3}+b^{3}\log\left(c\right)^{3}+6\,ab^{2}n^{2}+3\,a^{2}bn+a^{3}+3\,(b^{3}n+ab^{2})\log\left(c\right)^{2}+3\,(b^{3}n^{3}+b^{3}n^{2}\log\left(c\right)+ab^{2}n^{2})\log\left(x\right)^{2}+3\,(2\,b^{3}n^{2}+2\,ab^{2}n+a^{2}b)\log\left(c\right)+3\,\left(2\,b^{3}n^{3}+b^{3}n\log\left(c\right)^{2}+2\,ab^{2}n^{2}+a^{2}bn+2\,(b^{3}n^{2}+ab^{2}n)\log\left(c\right)\right)\log\left(x\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^2,x, algorithm="fricas")
```

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 134 vs. $2(63) = 126$.
time = 0.20, size = 134, normalized size = 1.94

$$-\frac{a^{3}}{x}-\frac{3a^{2}bn}{x}-\frac{3a^{2}b\log\left(cx^{n}\right)}{x}-\frac{6ab^{2}n^{2}}{x}-\frac{6ab^{2}n\log\left(cx^{n}\right)}{x}-\frac{3ab^{2}\log\left(cx^{n}\right)^{2}}{x}-\frac{6b^{3}n^{3}}{x}-\frac{6b^{3}n^{2}\log\left(cx^{n}\right)}{x}-\frac{3b^{3}n\log\left(cx^{n}\right)^{2}}{x}-\frac{b^{3}\log\left(cx^{n}\right)^{3}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/x**2,x)
```

```
[Out] -a**3/x - 3*a**2*b*n/x - 3*a**2*b*log(c*x**n)/x - 6*a*b**2*n**2/x - 6*a*b**
2*n*log(c*x**n)/x - 3*a*b**2*log(c*x**n)**2/x - 6*b**3*n**3/x - 6*b**3*n**2
*log(c*x**n)/x - 3*b**3*n*log(c*x**n)**2/x - b**3*log(c*x**n)**3/x
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 197 vs. $2(69) = 138$.
time = 4.55, size = 197, normalized size = 2.86

$$-\frac{b^{3}n^{3}\log\left(x\right)^{3}}{x}-\frac{3\,(b^{3}n^{3}+b^{3}n^{2}\log\left(c\right)+ab^{2}n^{2})\log\left(x\right)^{2}}{x}-\frac{3\,\left(2\,b^{3}n^{3}+2\,b^{3}n^{2}\log\left(c\right)+b^{3}n\log\left(c\right)^{2}+2\,ab^{2}n^{2}+2\,ab^{2}n\log\left(c\right)+a^{2}bn\right)\log\left(x\right)}{x}-\frac{6\,b^{3}n^{3}+6\,b^{3}n^{2}\log\left(c\right)+3\,b^{3}n\log\left(c\right)^{2}+b^{3}\log\left(c\right)^{3}+6\,ab^{2}n^{2}+6\,ab^{2}n\log\left(c\right)+3\,ab^{2}\log\left(c\right)^{2}+3\,a^{2}bn+3\,a^{2}b\log\left(c\right)+a^{3}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^2,x, algorithm="giac")
```

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

Mupad [B]
time = 3.37, size = 104, normalized size = 1.51

$$-\frac{a^3+3\,a^2\,b\,n+6\,a\,b^2\,n^2+6\,b^3\,n^3}{x}-\frac{\ln\left(c\,x^n\right)\,\left(3\,a^2\,b+6\,a\,b^2\,n+6\,b^3\,n^2\right)}{x}-\frac{b^3\,\ln\left(c\,x^n\right)^3}{x}-\frac{3\,b^2\,\ln\left(c\,x^n\right)^2\,\left(a+b\,n\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/x^2,x)
```

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

3.63 $\int \frac{(a+b\log(cx^n))^3}{x^3}\,dx$

Optimal. Leaf size=77

$$-\frac{3b^3n^3}{8x^2}-\frac{3b^2n^2(a+b\log(cx^n))}{4x^2}-\frac{3bn(a+b\log(cx^n))^2}{4x^2}-\frac{(a+b\log(cx^n))^3}{2x^2}$$

```
[Out] -3/8*b^3*n^3/x^2-3/4*b^2*n^2*(a+b*ln(c*x^n))/x^2-3/4*b*n*(a+b*ln(c*x^n))^2/
x^2-1/2*(a+b*ln(c*x^n))^3/x^2
```

Rubi [A]
time = 0.04, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2342, 2341}

$$-\frac{3b^2n^2(a+b\log(cx^n))}{4x^2}-\frac{3bn(a+b\log(cx^n))^2}{4x^2}-\frac{(a+b\log(cx^n))^3}{2x^2}-\frac{3b^3n^3}{8x^2}$$

Antiderivative was successfully verified.

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

```
[Out] (-3*b^3*n^3)/(8*x^2) - (3*b^2*n^2*(a + b*Log[c*x^n]))/(4*x^2) - (3*b*n*(a +
 b*Log[c*x^n])^2)/(4*x^2) - (a + b*Log[c*x^n])^3/(2*x^2)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{(a+b\log(cx^n))^3}{x^3}\,dx &= -\frac{(a+b\log(cx^n))^3}{2x^2}+\frac{1}{2}(3bn)\int \frac{(a+b\log(cx^n))^2}{x^3}\,dx\\
&= -\frac{3bn(a+b\log(cx^n))^2}{4x^2}-\frac{(a+b\log(cx^n))^3}{2x^2}+\frac{1}{2}\left(3b^2n^2\right)\int \frac{a+b\log(cx^n)}{x^3}\,dx\\
&= -\frac{3b^3n^3}{8x^2}-\frac{3b^2n^2(a+b\log(cx^n))}{4x^2}-\frac{3bn(a+b\log(cx^n))^2}{4x^2}-\frac{(a+b\log(cx^n))^3}{2x^2}
\end{aligned}$$

Mathematica [A]
time = 0.02, size = 60, normalized size = 0.78

$$-\frac{4(a+b\log(cx^n))^3+3bn\left(2(a+b\log(cx^n))^2+bn(2a+bn+2b\log(cx^n))\right)}{8x^2}$$

Antiderivative was successfully verified.

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

```
[Out] -1/8*(4*(a + b*Log[c*x^n])^3 + 3*b*n*(2*(a + b*Log[c*x^n])^2 + b*n*(2*a + b
*n + 2*b*Log[c*x^n])))/x^2
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.13, size = 2673, normalized size = 34.71

method	result	size
risch	Expression too large to display	2673

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*b^3/x^2*ln(x^n)^3-3/4*(-I*Pi*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I
*Pi*b^3*csgn(I*c)*csgn(I*c*x^n)^2+I*Pi*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi
*b^3*csgn(I*c*x^n)^3+2*b^3*ln(c)+b^3*n+2*a*b^2)/x^2*ln(x^n)^2-3/8*(4*a^2*b+
2*Pi^2*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*Pi^2*b^3*csgn(I*c)*csg
n(I*x^n)^2*csgn(I*c*x^n)^3-4*I*Pi*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+8*a*b^2*ln(c)+4*n*ln(c)*b^3+2*b^3*n^2-Pi^2*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4
+2*Pi^2*b^3*csgn(I*c)*csgn(I*c*x^n)^5-Pi^2*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^
4+2*Pi^2*b^3*csgn(I*x^n)*csgn(I*c*x^n)^5-2*I*n*Pi*b^3*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)-4*I*Pi*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*
a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*a*b^2*n+4*b^3*ln(c)^2-Pi^2*b^3*csgn(I*c
)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-4*Pi^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)^4-4*I*Pi*ln(c)*b^3*csgn(I*c*x^n)^3-4*I*Pi*a*b^2*csgn(I*c*x^n)^3-Pi^2*
b^3*csgn(I*c*x^n)^6-2*I*n*Pi*b^3*csgn(I*c*x^n)^3+4*I*Pi*ln(c)*b^3*csgn(I*c)
*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b^2*
csgn(I*c)*csgn(I*c*x^n)^2+2*I*n*Pi*b^3*csgn(I*c)*csgn(I*c*x^n)^2+2*I*n*Pi*b
^3*csgn(I*x^n)*csgn(I*c*x^n)^2)/x^2*ln(x^n)-1/16*(8*a^3+12*I*n*Pi*a*b^2*csg
n(I*c)*csgn(I*c*x^n)^2-12*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)-12*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12*I*Pi*a*b^2*n
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-3*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)^2
*csgn(I*c*x^n)^2+6*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+6*Pi^
2*b^3*n*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-12*Pi^2*b^3*n*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)^4+I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^3*csgn(I*c*x^n)
^3-3*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+3*I*Pi^3*b^3*csgn
(I*c)^3*csgn(I*x^n)*csgn(I*c*x^n)^5-6*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*x^n)*cs
```

```
gn(I*c*x^n)-3*Pi^2*b^3*n*csgn(I*x^n)^2*csgn(I*c*x^n)^4+6*Pi^2*b^3*n*csgn(I*
x^n)*csgn(I*c*x^n)^5-3*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*c*x^n)^4-6*Pi^2*ln(c)*
b^3*csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^5
-6*Pi^2*ln(c)*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*Pi^2*ln(c)*b^3*csgn(I*x^
n)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*a*b^2*c
sgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*a*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*Pi^2
*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+12*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*c*x
^n)^2+12*I*Pi*ln(c)*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2+12*I*Pi*a*b^2*n*csgn(
I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2+24*I*P
i*ln(c)*a*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-12*I*Pi*a^2*b*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+12*b^3*ln(c)*n^2+12*b^3*ln(c)^2*n+12*a*b^2*n^2+12*a^2*b*n+
24*a^2*b*ln(c)+24*a*b^2*ln(c)^2-24*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+6*b^3*n^3+24*a*b^2*ln(c)*n+8*b^3*ln(c)^3-I*Pi^3*b^3*csgn(I*c)^
3*csgn(I*c*x^n)^6+6*Pi^2*b^3*n*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*ln(c)*b^3*c
sgn(I*c*x^n)^6-6*Pi^2*a*b^2*csgn(I*c*x^n)^6-3*Pi^2*b^3*n*csgn(I*c*x^n)^6+I*
Pi^3*b^3*csgn(I*c*x^n)^9-12*I*Pi*a^2*b*csgn(I*c*x^n)^3-6*I*Pi*b^3*n^2*csgn(
I*c*x^n)^3+3*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*c*x^n)^7-3*I*Pi^3*b^3*csgn(I*c)*
csgn(I*c*x^n)^8-I*Pi^3*b^3*csgn(I*x^n)^3*csgn(I*c*x^n)^6+3*I*Pi^3*b^3*csgn(
I*x^n)^2*csgn(I*c*x^n)^7-3*I*Pi^3*b^3*csgn(I*x^n)*csgn(I*c*x^n)^8-12*I*Pi*l
n(c)^2*b^3*csgn(I*c*x^n)^3+6*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*c*x^n)^2+6*I*Pi*
b^3*n^2*csgn(I*x^n)*csgn(I*c*x^n)^2-6*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n
)^2*csgn(I*c*x^n)^2+12*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)
^3+12*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*ln(c)*
b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-6*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x
^n)^2*csgn(I*c*x^n)^2+12*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3
+12*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-24*Pi^2*a*b^2*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-3*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^3*csgn
(I*c*x^n)^4+9*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^5-9*I*Pi^3
*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^6+3*I*Pi^3*b^3*csgn(I*c)*csgn(I*
x^n)^3*csgn(I*c*x^n)^5-9*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^6
+9*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^7-12*I*Pi*ln(c)*b^3*n*csg
n(I*c*x^n)^3-12*I*Pi*a*b^2*n*csgn(I*c*x^n)^3+12*I*Pi*ln(c)^2*b^3*csgn(I*c)*
csgn(I*c*x^n)^2+12*I*Pi*ln(c)^2*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-24*I*Pi*ln(
c)*a*b^2*csgn(I*c*x^n)^3+12*I*Pi*a^2*b*csgn(I*c)*csgn(I*c*x^n)^2+12*I*Pi*a^
2*b*csgn(I*x^n)*csgn(I*c*x^n)^2)/x^2
```

Maxima [A]
time = 0.29, size = 135, normalized size = 1.75

$$-\frac{3}{8}\left(n\left(\frac{n^2}{x^2}+\frac{2\,n\log\left(cx^n\right)}{x^2}\right)+\frac{2\,n\log\left(cx^n\right)^2}{x^2}\right)b^3-\frac{3}{4}\,ab^2\left(\frac{n^2}{x^2}+\frac{2\,n\log\left(cx^n\right)}{x^2}\right)-\frac{b^3\log\left(cx^n\right)^3}{2\,x^2}-\frac{3\,ab^2\log\left(cx^n\right)^2}{2\,x^2}-\frac{3\,a^2bn}{4\,x^2}-\frac{3\,a^2b\log\left(cx^n\right)}{2\,x^2}-\frac{a^3}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^3,x, algorithm="maxima")
[Out] -3/8*(n*(n^2/x^2 + 2*n*log(c*x^n)/x^2) + 2*n*log(c*x^n)^2/x^2)*b^3 - 3/4*a*
```

```
b^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 1/2*b^3*log(c*x^n)^3/x^2 - 3/2*a*b^2*l
og(c*x^n)^2/x^2 - 3/4*a^2*b*n/x^2 - 3/2*a^2*b*log(c*x^n)/x^2 - 1/2*a^3/x^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 189 vs. $2(69) = 138$.
time = 0.39, size = 189, normalized size = 2.45

$$-\frac{4\,b^3n^3\log\left(x\right)^3+3\,b^3n^3+4\,b^3\log\left(c\right)^3+6\,ab^2n^2+6\,a^2bn+4\,a^3+6\,(b^3n+2\,ab^2)\log\left(c\right)^2+6\,(b^3n^3+2\,b^3n^2\log\left(c\right)+2\,ab^2n^2)\log\left(x\right)^2+6\,(b^3n^2+2\,ab^2n+2\,a^2b)\log\left(c\right)+6\,\left(b^3n^3+2\,b^3n\log\left(c\right)^2+2\,ab^2n^2+2\,a^2bn+2\,(b^3n^2+2\,ab^2n)\log\left(c\right)\right)\log\left(x\right)}{8\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/8*(4*b^3*n^3*log(x)^3 + 3*b^3*n^3 + 4*b^3*log(c)^3 + 6*a*b^2*n^2 + 6*a^2
*b*n + 4*a^3 + 6*(b^3*n + 2*a*b^2)*log(c)^2 + 6*(b^3*n^3 + 2*b^3*n^2*log(c)
 + 2*a*b^2*n^2)*log(x)^2 + 6*(b^3*n^2 + 2*a*b^2*n + 2*a^2*b)*log(c) + 6*(b^
3*n^3 + 2*b^3*n*log(c)^2 + 2*a*b^2*n^2 + 2*a^2*b*n + 2*(b^3*n^2 + 2*a*b^2*n
)*log(c))*log(x))/x^2
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(76) = 152$.
time = 0.27, size = 168, normalized size = 2.18

$$-\frac{a^3}{2x^2}-\frac{3a^2bn}{4x^2}-\frac{3a^2b\log\left(cx^n\right)}{2x^2}-\frac{3ab^2n^2}{4x^2}-\frac{3ab^2n\log\left(cx^n\right)}{2x^2}-\frac{3ab^2\log\left(cx^n\right)^2}{2x^2}-\frac{3b^3n^3}{8x^2}-\frac{3b^3n^2\log\left(cx^n\right)}{4x^2}-\frac{3b^3n\log\left(cx^n\right)^2}{4x^2}-\frac{b^3\log\left(cx^n\right)^3}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -a**3/(2*x**2) - 3*a**2*b*n/(4*x**2) - 3*a**2*b*log(c*x**n)/(2*x**2) - 3*a*
b**2*n**2/(4*x**2) - 3*a*b**2*n*log(c*x**n)/(2*x**2) - 3*a*b**2*log(c*x**n)
**2/(2*x**2) - 3*b**3*n**3/(8*x**2) - 3*b**3*n**2*log(c*x**n)/(4*x**2) - 3*
b**3*n*log(c*x**n)**2/(4*x**2) - b**3*log(c*x**n)**3/(2*x**2)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 203 vs. $2(69) = 138$.
time = 4.42, size = 203, normalized size = 2.64

$$-\frac{b^3n^3\log\left(x\right)^3}{2\,x^2}-\frac{3\,(b^3n^3+2\,b^3n^2\log\left(c\right)+2\,ab^2n^2)\log\left(x\right)^2}{4\,x^2}-\frac{3\,\left(b^3n^3+2\,b^3n^2\log\left(c\right)+2\,b^3n\log\left(c\right)^2+2\,ab^2n^2+4\,ab^2n\log\left(c\right)+2\,a^2bn\right)\log\left(x\right)}{4\,x^2}-\frac{3\,b^3n^3+6\,b^3n^2\log\left(c\right)+6\,b^3n\log\left(c\right)^2+4\,b^3\log\left(c\right)^3+6\,ab^2n^2+12\,ab^2n\log\left(c\right)+12\,ab^2\log\left(c\right)^2+6\,a^2bn+12\,a^2b\log\left(c\right)+4\,a^3}{8\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*b^3*n^3*log(x)^3/x^2 - 3/4*(b^3*n^3 + 2*b^3*n^2*log(c) + 2*a*b^2*n^2)*
log(x)^2/x^2 - 3/4*(b^3*n^3 + 2*b^3*n^2*log(c) + 2*b^3*n*log(c)^2 + 2*a*b^2
*n^2 + 4*a*b^2*n*log(c) + 2*a^2*b*n)*log(x)/x^2 - 1/8*(3*b^3*n^3 + 6*b^3*n^
2*log(c) + 6*b^3*n*log(c)^2 + 4*b^3*log(c)^3 + 6*a*b^2*n^2 + 12*a*b^2*n*log
(c) + 12*a*b^2*log(c)^2 + 6*a^2*b*n + 12*a^2*b*log(c) + 4*a^3)/x^2
```

Mupad [B]
time = 3.68, size = 111, normalized size = 1.44

$$-\frac{\frac{a^3}{2}+\frac{3\,a^2\,b\,n}{4}+\frac{3\,a\,b^2\,n^2}{4}+\frac{3\,b^3\,n^3}{8}}{x^2}-\frac{\ln\left(c\,x^n\right)\,\left(3\,a^2\,b+3\,a\,b^2\,n+\frac{3\,b^3\,n^2}{2}\right)}{2\,x^2}-\frac{{\ln\left(c\,x^n\right)}^2\,\left(\frac{3\,n\,b^3}{2}+3\,a\,b^2\right)}{2\,x^2}-\frac{b^3\,{\ln\left(c\,x^n\right)}^3}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] - (a^3/2 + (3*b^3*n^3)/8 + (3*a*b^2*n^2)/4 + (3*a^2*b*n)/4)/x^2 - (log(c*x^
n)*(3*a^2*b + (3*b^3*n^2)/2 + 3*a*b^2*n))/(2*x^2) - (log(c*x^n)^2*(3*a*b^2
+ (3*b^3*n)/2))/(2*x^2) - (b^3*log(c*x^n)^3)/(2*x^2)
```

3.64 $\int \frac{(a+b\log(cx^n))^3}{x^4}\,dx$

Optimal. Leaf size=77

$$-\frac{2b^3n^3}{27x^3}-\frac{2b^2n^2(a+b\log(cx^n))}{9x^3}-\frac{bn(a+b\log(cx^n))^2}{3x^3}-\frac{(a+b\log(cx^n))^3}{3x^3}$$

```
[Out] -2/27*b^3*n^3/x^3-2/9*b^2*n^2*(a+b*ln(c*x^n))/x^3-1/3*b*n*(a+b*ln(c*x^n))^2
/x^3-1/3*(a+b*ln(c*x^n))^3/x^3
```

Rubi [A]
time = 0.04, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2342, 2341}

$$-\frac{2b^2n^2(a+b\log(cx^n))}{9x^3}-\frac{bn(a+b\log(cx^n))^2}{3x^3}-\frac{(a+b\log(cx^n))^3}{3x^3}-\frac{2b^3n^3}{27x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^3/x^4,x]
```

```
[Out] (-2*b^3*n^3)/(27*x^3) - (2*b^2*n^2*(a + b*Log[c*x^n]))/(9*x^3) - (b*n*(a +
b*Log[c*x^n])^2)/(3*x^3) - (a + b*Log[c*x^n])^3/(3*x^3)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^3}{x^4}\,dx &= -\frac{(a+b\log(cx^n))^3}{3x^3}+(bn)\int \frac{(a+b\log(cx^n))^2}{x^4}\,dx\\ &= -\frac{bn(a+b\log(cx^n))^2}{3x^3}-\frac{(a+b\log(cx^n))^3}{3x^3}+\frac{1}{3}\left(2b^2n^2\right)\int \frac{a+b\log(cx^n)}{x^4}\,dx\\ &= -\frac{2b^3n^3}{27x^3}-\frac{2b^2n^2(a+b\log(cx^n))}{9x^3}-\frac{bn(a+b\log(cx^n))^2}{3x^3}-\frac{(a+b\log(cx^n))^3}{3x^3}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 60, normalized size = 0.78

$$-\frac{9(a+b\log(cx^n))^3+bn\big(9(a+b\log(cx^n))^2+2bn(3a+bn+3b\log(cx^n))\big)}{27x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^3/x^4,x]
```

```
[Out] -1/27*(9*(a + b*Log[c*x^n])^3 + b*n*(9*(a + b*Log[c*x^n])^2 + 2*b*n*(3*a +
b*n + 3*b*Log[c*x^n])))/x^3
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.14, size = 2674, normalized size = 34.73

method	result	size
risch	Expression too large to display	2674

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^3/x^4,x,method=_RETURNVERBOSE)
```

```
[Out] -1/3*b^3/x^3*ln(x^n)^3-1/6*(-3*I*Pi*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+3*I*Pi*b^3*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi*b^3*csgn(I*x^n)*csgn(I*c*x^n)^
2-3*I*Pi*b^3*csgn(I*c*x^n)^3+6*b^3*ln(c)+2*b^3*n+6*a*b^2)/x^3*ln(x^n)^2-1/3
6*(36*a^2*b+18*Pi^2*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+18*Pi^2*b^3
*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3+72*a*b^2*ln(c)+24*n*ln(c)*b^3+8*b^
3*n^2-9*Pi^2*b^3*csgn(I*c)^2*csgn(I*c*x^n)^4+18*Pi^2*b^3*csgn(I*c)*csgn(I*c
*x^n)^5-9*Pi^2*b^3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+18*Pi^2*b^3*csgn(I*x^n)*cs
gn(I*c*x^n)^5+24*a*b^2*n+36*b^3*ln(c)^2-36*I*Pi*a*b^2*csgn(I*c*x^n)^3-12*I*
n*Pi*b^3*csgn(I*c*x^n)^3-36*I*Pi*ln(c)*b^3*csgn(I*c*x^n)^3-9*Pi^2*b^3*csgn(
I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2-36*Pi^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)^4-9*Pi^2*b^3*csgn(I*c*x^n)^6-12*I*n*Pi*b^3*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-36*I*Pi*ln(c)*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-36*I*Pi
*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+12*I*n*Pi*b^3*csgn(I*x^n)*csgn(I
*c*x^n)^2+36*I*Pi*ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*ln(c)*b^3*csg
n(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*a*
b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+12*I*n*Pi*b^3*csgn(I*c)*csgn(I*c*x^n)^2)/x^
3*ln(x^n)-1/216*(72*a^3-24*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-108*I*Pi*ln(c)^2*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-18*Pi^2*b^3*n*csg
n(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+36*Pi^2*b^3*n*csgn(I*c)^2*csgn(I*x^n
)*csgn(I*c*x^n)^3+36*Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-72*
Pi^2*b^3*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+72*I*Pi*a*b^2*n*csgn(I*x^n
)*csgn(I*c*x^n)^2+72*I*n*Pi*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2-18*Pi^2*b^3*n*c
sgn(I*x^n)^2*csgn(I*c*x^n)^4+36*Pi^2*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^5-18*P
i^2*b^3*n*csgn(I*c)^2*csgn(I*c*x^n)^4-54*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*
```

```
c*x^n)^4+108*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I*c*x^n)^5-72*I*Pi*ln(c)*b^3*n*c
sgn(I*c*x^n)^3-72*I*Pi*a*b^2*n*csgn(I*c*x^n)^3-54*Pi^2*ln(c)*b^3*csgn(I*x^n
)^2*csgn(I*c*x^n)^4+108*Pi^2*ln(c)*b^3*csgn(I*x^n)*csgn(I*c*x^n)^5-54*Pi^2*
a*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+108*Pi^2*a*b^2*csgn(I*c)*csgn(I*c*x^n)^5-
54*Pi^2*a*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+108*Pi^2*a*b^2*csgn(I*x^n)*csgn
(I*c*x^n)^5+216*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*c*x^n)^2+216*I*Pi*ln(c)*a
*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-108*I*Pi*a^2*b*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+48*b^3*ln(c)*n^2+72*b^3*ln(c)^2*n+48*a*b^2*n^2+72*a^2*b*n+216*a^2*
b*ln(c)+216*a*b^2*ln(c)^2-216*I*Pi*ln(c)*a*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)-72*I*Pi*a*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+16*b^3*n^3+144*
a*b^2*ln(c)*n+72*b^3*ln(c)^3+72*I*Pi*ln(c)*b^3*n*csgn(I*c)*csgn(I*c*x^n)^2+
72*I*Pi*ln(c)*b^3*n*csgn(I*x^n)*csgn(I*c*x^n)^2-72*I*Pi*ln(c)*b^3*n*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+36*Pi^2*b^3*n*csgn(I*c)*csgn(I*c*x^n)^5-54*Pi^
2*ln(c)*b^3*csgn(I*c*x^n)^6-54*Pi^2*a*b^2*csgn(I*c*x^n)^6-18*Pi^2*b^3*n*csg
n(I*c*x^n)^6-24*I*Pi*b^3*n^2*csgn(I*c*x^n)^3-9*I*Pi^3*b^3*csgn(I*c)^3*csgn(
I*c*x^n)^6+27*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*c*x^n)^7-27*I*Pi^3*b^3*csgn(I*c
)*csgn(I*c*x^n)^8-9*I*Pi^3*b^3*csgn(I*x^n)^3*csgn(I*c*x^n)^6+27*I*Pi^3*b^3*
csgn(I*x^n)^2*csgn(I*c*x^n)^7-27*I*Pi^3*b^3*csgn(I*x^n)*csgn(I*c*x^n)^8+9*I
*Pi^3*b^3*csgn(I*c*x^n)^9-108*I*Pi*ln(c)^2*b^3*csgn(I*c*x^n)^3-108*I*Pi*a^2
*b*csgn(I*c*x^n)^3+81*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^5-
81*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^6+27*I*Pi^3*b^3*csgn(I*
c)*csgn(I*x^n)^3*csgn(I*c*x^n)^5-81*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)^2*csgn
(I*c*x^n)^6-54*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+108
*Pi^2*ln(c)*b^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+108*Pi^2*ln(c)*b^3*
csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-216*Pi^2*ln(c)*b^3*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)^4-54*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)
^2+108*Pi^2*a*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+108*Pi^2*a*b^2*cs
gn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-216*Pi^2*a*b^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)^4+108*I*Pi*ln(c)^2*b^3*csgn(I*x^n)*csgn(I*c*x^n)^2-216*I*Pi*l
n(c)*a*b^2*csgn(I*c*x^n)^3+108*I*Pi*a^2*b*csgn(I*c)*csgn(I*c*x^n)^2+108*I*P
i*a^2*b*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*b^3*n^2*csgn(I*c)*csgn(I*c*x^n)
^2+81*I*Pi^3*b^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^7+108*I*Pi*ln(c)^2*b^3
*csgn(I*c)*csgn(I*c*x^n)^2+24*I*Pi*b^3*n^2*csgn(I*x^n)*csgn(I*c*x^n)^2+9*I*
Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)^3*csgn(I*c*x^n)^3-27*I*Pi^3*b^3*csgn(I*c)^
3*csgn(I*x^n)^2*csgn(I*c*x^n)^4+27*I*Pi^3*b^3*csgn(I*c)^3*csgn(I*x^n)*csgn(
I*c*x^n)^5-27*I*Pi^3*b^3*csgn(I*c)^2*csgn(I*x^n)^3*csgn(I*c*x^n)^4)/x^3
```

Maxima [A]
time = 0.29, size = 136, normalized size = 1.77

$$-\frac{1}{27}\left(2n\left(\frac{n^2}{x^3}+\frac{3n\log\left(cx^n\right)}{x^3}\right)+\frac{9n\log\left(cx^n\right)^2}{x^3}\right)b^3-\frac{2}{9}ab^2\left(\frac{n^2}{x^3}+\frac{3n\log\left(cx^n\right)}{x^3}\right)-\frac{b^3\log\left(cx^n\right)^3}{3x^3}-\frac{ab^2\log\left(cx^n\right)^2}{x^3}-\frac{a^2bn}{3x^3}-\frac{a^2b\log\left(cx^n\right)}{x^3}-\frac{a^3}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^4,x, algorithm="maxima")
```

```
[Out] -1/27*(2*n*(n^2/x^3 + 3*n*log(c*x^n)/x^3) + 9*n*log(c*x^n)^2/x^3)*b^3 - 2/9
*a*b^2*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - 1/3*b^3*log(c*x^n)^3/x^3 - a*b^2*lo
g(c*x^n)^2/x^3 - 1/3*a^2*b*n/x^3 - a^2*b*log(c*x^n)/x^3 - 1/3*a^3/x^3
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 191 vs. 2(69) = 138.
time = 0.36, size = 191, normalized size = 2.48

$$-\frac{9\,b^3n^3\log\left(x\right)^3+2\,b^3n^3+9\,b^3\log\left(c\right)^3+6\,ab^2n^2+9\,a^2bn+9\,a^3+9\,(b^3n+3\,ab^2)\log\left(c\right)^2+9\,(b^3n^3+3\,b^3n^2\log\left(c\right)+3\,ab^2n^2)\log\left(x\right)^2+3\,(2\,b^3n^2+6\,ab^2n+9\,a^2b)\log\left(c\right)+3\,\left(2\,b^3n^3+9\,b^3n\log\left(c\right)^2+6\,ab^2n^2+9\,a^2bn+6\,(b^3n^2+3\,ab^2n)\log\left(c\right)\right)\log\left(x\right)}{27\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^4,x, algorithm="fricas")
```

```
[Out] -1/27*(9*b^3*n^3*log(x)^3 + 2*b^3*n^3 + 9*b^3*log(c)^3 + 6*a*b^2*n^2 + 9*a^
2*b*n + 9*a^3 + 9*(b^3*n + 3*a*b^2)*log(c)^2 + 9*(b^3*n^3 + 3*b^3*n^2*log(c
) + 3*a*b^2*n^2)*log(x)^2 + 3*(2*b^3*n^2 + 6*a*b^2*n + 9*a^2*b)*log(c) + 3*
(2*b^3*n^3 + 9*b^3*n*log(c)^2 + 6*a*b^2*n^2 + 9*a^2*b*n + 6*(b^3*n^2 + 3*a*
b^2*n)*log(c))*log(x))/x^3
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 158 vs. 2(75) = 150.
time = 0.36, size = 158, normalized size = 2.05

$$-\frac{a^3}{3x^3}-\frac{a^2bn}{3x^3}-\frac{a^2b\log\left(cx^n\right)}{x^3}-\frac{2ab^2n^2}{9x^3}-\frac{2ab^2n\log\left(cx^n\right)}{3x^3}-\frac{ab^2\log\left(cx^n\right)^2}{x^3}-\frac{2b^3n^3}{27x^3}-\frac{2b^3n^2\log\left(cx^n\right)}{9x^3}-\frac{b^3n\log\left(cx^n\right)^2}{3x^3}-\frac{b^3\log\left(cx^n\right)^3}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**3/x**4,x)
```

```
[Out] -a**3/(3*x**3) - a**2*b*n/(3*x**3) - a**2*b*log(c*x**n)/x**3 - 2*a*b**2*n**
2/(9*x**3) - 2*a*b**2*n*log(c*x**n)/(3*x**3) - a*b**2*log(c*x**n)**2/x**3 -
 2*b**3*n**3/(27*x**3) - 2*b**3*n**2*log(c*x**n)/(9*x**3) - b**3*n*log(c*x*
*n)**2/(3*x**3) - b**3*log(c*x**n)**3/(3*x**3)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 204 vs. 2(69) = 138.
time = 3.65, size = 204, normalized size = 2.65

$$-\frac{b^3n^3\log\left(x\right)^3}{3\,x^3}-\frac{(b^3n^3+3\,b^3n^2\log\left(c\right)+3\,ab^2n^2)\log\left(x\right)^2}{3\,x^3}-\frac{(2\,b^3n^3+6\,b^3n^2\log\left(c\right)+9\,b^3n\log\left(c\right)^2+6\,ab^2n^2+18\,ab^2n\log\left(c\right)+9\,a^2bn)\log\left(x\right)}{9\,x^3}-\frac{2\,b^3n^3+6\,b^3n^2\log\left(c\right)+9\,b^3n\log\left(c\right)^2+9\,b^3\log\left(c\right)^3+6\,ab^2n^2+18\,ab^2n\log\left(c\right)+27\,ab^2\log\left(c\right)^2+9\,a^2bn+27\,a^2b\log\left(c\right)+9\,a^3}{27\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^3/x^4,x, algorithm="giac")
```

```
[Out] -1/3*b^3*n^3*log(x)^3/x^3 - 1/3*(b^3*n^3 + 3*b^3*n^2*log(c) + 3*a*b^2*n^2)*
log(x)^2/x^3 - 1/9*(2*b^3*n^3 + 6*b^3*n^2*log(c) + 9*b^3*n*log(c)^2 + 6*a*b
^2*n^2 + 18*a*b^2*n*log(c) + 9*a^2*b*n)*log(x)/x^3 - 1/27*(2*b^3*n^3 + 6*b^
```

```
3*n^2*log(c) + 9*b^3*n*log(c)^2 + 9*b^3*log(c)^3 + 6*a*b^2*n^2 + 18*a*b^2*n
*log(c) + 27*a*b^2*log(c)^2 + 9*a^2*b*n + 27*a^2*b*log(c) + 9*a^3)/x^3
```

Mupad [B]
time = 3.59, size = 110, normalized size = 1.43

$$-\frac{\frac{a^3}{3}+\frac{a^2\,b\,n}{3}+\frac{2\,a\,b^2\,n^2}{9}+\frac{2\,b^3\,n^3}{27}}{x^3}-\frac{\ln\left(c\,x^n\right)\,\left(3\,a^2\,b+2\,a\,b^2\,n+\frac{2\,b^3\,n^2}{3}\right)}{3\,x^3}-\frac{{\ln\left(c\,x^n\right)}^2\,\left(\frac{n\,b^3}{3}+a\,b^2\right)}{x^3}-\frac{b^3\,{\ln\left(c\,x^n\right)}^3}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^3/x^4,x)
```

```
[Out] - (a^3/3 + (2*b^3*n^3)/27 + (2*a*b^2*n^2)/9 + (a^2*b*n)/3)/x^3 - (log(c*x^n
)*(3*a^2*b + (2*b^3*n^2)/3 + 2*a*b^2*n))/(3*x^3) - (log(c*x^n)^2*(a*b^2 + (
b^3*n)/3))/x^3 - (b^3*log(c*x^n)^3)/(3*x^3)
```

3.65 $\int \frac{x^3}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=51

$$\frac{e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{bn}$$

```
[Out] x^4*Ei(4*(a+b*ln(c*x^n))/b/n)/b/exp(4*a/b/n)/n/((c*x^n)^(4/n))
```

Rubi [A]
time = 0.04, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2209}

$$\frac{x^4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

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

```
[Out] (x^4*ExpIntegralEi[(4*(a + b*Log[c*x^n]))/(b*n)])/(b*E^((4*a)/(b*n))*n*(c*x
^n)^(4/n))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{a+b\log(cx^n)}\,dx &= \frac{\left(x^4(cx^n)^{-4/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{n}\\
&= \frac{e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{bn}
\end{aligned}$$

Mathematica [A]
time = 0.05, size = 51, normalized size = 1.00

$$\frac{e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\,\mathrm{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

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

```
[Out] (x^4*ExpIntegralEi[(4*(a + b*Log[c*x^n]))/(b*n)])/(b*E^((4*a)/(b*n))*n*(c*x
^n)^(4/n))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 242, normalized size = 4.75

method	result
risch	$-\frac{x^4 c^{-\frac{4}{n}}(x^n)^{-\frac{4}{n}}\mathrm{e}^{-\frac{2\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2a\right)}{bn}}\ \mathrm{expInteg}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] -1/b/n*x^4*c^(-4/n)*(x^n)^(-4/n)*exp(-2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-4*ln(x)-2*(-I*b*Pi*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*c
sgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/
b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^3/(b*log(c*x^n) + a), x)
```

Fricas [A]
time = 0.33, size = 42, normalized size = 0.82

$$\frac{e^{\left(-\frac{4\,(b\log(c)+a)}{bn}\right)}\,\mathrm{log\_integral}\left(x^4e^{\left(\frac{4\,(b\log(c)+a)}{bn}\right)}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{a + b\log\left(cx^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**3/(a + b*log(c*x**n)), x)
```

Giac [A]
time = 4.03, size = 48, normalized size = 0.94

$$\frac{\mathrm{Ei}\left(\frac{4\,\log\left(c\right)}{n} + \frac{4\,a}{bn} + 4\,\log\left(x\right)\right)e^{\left(-\frac{4\,a}{bn}\right)}}{bc^{\frac{4}{n}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x^3}{a + b\,\ln\left(c\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x^3/(a + b*log(c*x^n)), x)
```

3.66 $\int \frac{x^2}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=51

$$\frac{e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\mathrm{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{bn}$$

```
[Out] x^3*Ei(3*(a+b*ln(c*x^n))/b/n)/b/exp(3*a/b/n)/n/((c*x^n)^(3/n))
```

Rubi [A]
time = 0.04, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2209}

$$\frac{x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\mathrm{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

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

```
[Out] (x^3*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(b*n)])/(b*E^((3*a)/(b*n))*n*(c*x
^n)^(3/n))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x^2}{a+b\log(cx^n)}\,dx &= \frac{\left(x^3(cx^n)^{-3/n}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{3x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{n}\\ &= \frac{e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\mathrm{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{bn}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 51, normalized size = 1.00

$$\frac{e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

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

```
[Out] (x^3*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(b*n)])/(b*E^((3*a)/(b*n))*n*(c*x
^n)^(3/n))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 242, normalized size = 4.75

method	result
risch	$-\frac{x^3 c^{-\frac{3}{n}}(x^n)^{-\frac{3}{n}}\mathrm{e}^{-\frac{3\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2a\right)}{2bn}}\,\mathrm{expInte}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/b/n*x^3*c^(-3/n)*(x^n)^(-3/n)*exp(-3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-3*ln(x)-3/2*(-I*b*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2
*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^2/(b*log(c*x^n) + a), x)
```

Fricas [A]
time = 0.34, size = 42, normalized size = 0.82

$$\frac{e^{\left(-\frac{3\,(b\log(c)+a)}{bn}\right)}\operatorname{log\_integral}\left(x^3e^{\left(\frac{3\,(b\log(c)+a)}{bn}\right)}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] e^(-3*(b*log(c) + a)/(b*n))*log_integral(x^3*e^(3*(b*log(c) + a)/(b*n)))/(b
*n)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{a + b\log\left(cx^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2/(a + b*log(c*x**n)), x)
```

Giac [A]
time = 5.03, size = 48, normalized size = 0.94

$$\frac{\mathrm{Ei}\left(\frac{3\,\log\left(c\right)}{n} + \frac{3\,a}{bn} + 3\,\log\left(x\right)\right)e^{\left(-\frac{3\,a}{bn}\right)}}{bc^{\frac{3}{n}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Ei(3*log(c)/n + 3*a/(b*n) + 3*log(x))*e^(-3*a/(b*n))/(b*c^(3/n)*n)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x^2}{a + b\,\ln\left(c\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.67 $\int \frac{x}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=51

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

```
[Out] x^2*Ei(2*(a+b*ln(c*x^n))/b/n)/b/exp(2*a/b/n)/n/((c*x^n)^(2/n))
```

Rubi [A]

time = 0.03, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2347, 2209}

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

Antiderivative was successfully verified.

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

```
[Out] (x^2*ExpIntegralEi[(2*(a + b*Log[c*x^n]))/(b*n)])/(b*E^((2*a)/(b*n))*n*(c*x
^n)^(2/n))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x}{a+b\log(cx^n)}\,dx &= \frac{\left(x^2(cx^n)^{-2/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{2x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{n}\\
&= \frac{e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\operatorname{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{bn}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 51, normalized size = 1.00

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

Antiderivative was successfully verified.

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 242, normalized size = 4.75

method	result
risch	$-\frac{x^2 c^{-\frac{2}{n}}(x^n)^{-\frac{2}{n}}\mathrm{e}^{-\frac{-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2a}{bn}}\,\mathrm{expIntegral}(}{}$

Verification of antiderivative is not currently implemented for this CAS.

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

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.34, size = 42, normalized size = 0.82

$$\frac{e^{\left(-\frac{2\,(b\log(c)+a)}{bn}\right)}\operatorname{log\_integral}\left(x^2e^{\left(\frac{2\,(b\log(c)+a)}{bn}\right)}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x/(a + b*log(c*x**n)), x)
```

Giac [**A**]
time = 3.40, size = 48, normalized size = 0.94

$$\frac{\mathrm{Ei}\left(\frac{2\,\log(c)}{n} + \frac{2\,a}{bn} + 2\,\log\left(x\right)\right)e^{\left(-\frac{2\,a}{bn}\right)}}{bc^{\frac{2}{n}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x}{a + b\,\ln\left(c\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.68 $\int \frac{1}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=48

$$\frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{bn}$$

```
[Out] x*Ei((a+b*ln(c*x^n))/b/n)/b/exp(a/b/n)/n/((c*x^n)^(1/n))
```

Rubi [A]
time = 0.03, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2337, 2209}

$$\frac{xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^(-1),x]
```

```
[Out] (x*ExpIntegralEi[(a + b*Log[c*x^n])/(b*n)])/(b*E^(a/(b*n))*n*(c*x^n)^n^(-1)
)
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{a+b\log(cx^n)}\,dx &= \frac{\left(x(cx^n)^{-1/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{n}\\ &= \frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{bn}\end{aligned}$$

Mathematica [**A**]
time = 0.03, size = 48, normalized size = 1.00

$$\frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\operatorname{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^(-1),x]
```

```
[Out] (x*ExpIntegralEi[(a + b*Log[c*x^n])/(b*n)])/(b*E^(a/(b*n))*n*(c*x^n)^n^(-1)
)
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 240, normalized size = 5.00

method	result
risch	$-\frac{x\,c^{-\frac{1}{n}}\,(x^n)^{-\frac{1}{n}}\,\mathrm{e}^{-\frac{-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2a}{2bn}}\ \mathrm{expIntegral}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] -1/b/n*x*c^(-1/n)*(x^n)^(-1/n)*exp(-1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-ln(x)-1/2*(-I*b*Pi*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*c
sgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/
b/n)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/(b*log(c*x^n) + a), x)
```

Fricas [**A**]
time = 0.35, size = 39, normalized size = 0.81

$$\frac{e^{\left(-\frac{b\log(c)+a}{bn}\right)}\operatorname{log\_integral}\left(xe^{\left(\frac{b\log(c)+a}{bn}\right)}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n)),x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{a+b\log\left(cx^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(1/(a + b*log(c*x**n)), x)
```

Giac [A]
time = 5.82, size = 42, normalized size = 0.88

$$\frac{\mathrm{Ei}\left(\frac{\log(c)}{n}+\frac{a}{bn}+\log\left(x\right)\right)e^{\left(-\frac{a}{bn}\right)}}{bc^{\left(\frac{1}{n}\right)}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n)),x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{a+b\,\ln\left(c\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a + b*log(c*x^n)),x)
```

```
[Out] int(1/(a + b*log(c*x^n)), x)
```

3.69 $\int \frac{1}{x(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=18

$$\frac{\log\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] ln(a+b*ln(c*x^n))/b/n
```

Rubi [A]
time = 0.02, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2339, 29}

$$\frac{\log\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*(a + b*Log[c*x^n])),x]
```

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

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\left(a+b\log\left(cx^n\right)\right)}\,dx &= \frac{\text{Subst}\left(\int \frac{1}{x}\,dx, x, a+b\log\left(cx^n\right)\right)}{bn}\\ &= \frac{\log\left(a+b\log\left(cx^n\right)\right)}{bn}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 18, normalized size = 1.00

$$\frac{\log\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*(a + b*Log[c*x^n])),x]
```

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

Maple [A]
time = 0.04, size = 19, normalized size = 1.06

method	result
derivativedivides	$\frac{\ln(a+b\ln(c\,x^n))}{bn}$
default	$\frac{\ln(a+b\ln(c\,x^n))}{bn}$
norman	$\frac{\ln\left(a+b\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)\right)}{bn}$
risch	$\frac{\ln\left(\ln(x^n)-\frac{ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2-ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2+ib\pi\mathrm{csgn}(ic\,x^n)^3-2b\ln(c)-2a}{2b}\right)}{bn}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] ln(a+b*ln(c*x^n))/b/n
```

Maxima [A]
time = 0.30, size = 18, normalized size = 1.00

$$\frac{\log\left(b\log\left(cx^n\right)+a\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.39, size = 19, normalized size = 1.06

$$\frac{\log\left(bn\log\left(x\right)+b\log\left(c\right)+a\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] log(b*n*log(x) + b*log(c) + a)/(b*n)
```

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 32 vs. $2(14) = 28$.

time = 0.37, size = 32, normalized size = 1.78

$$\begin{cases} \frac{\log(x)}{a} & \text{for } b = 0 \wedge n = 0 \\ \frac{\log(x)}{a+b\log(c)} & \text{for } n = 0 \\ \frac{\log(x)}{a} & \text{for } b = 0 \\ \frac{\log\left(\frac{a}{b}+\log(cx^n)\right)}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*ln(c*x**n)),x)
```

```
[Out] Piecewise((log(x)/a, Eq(b, 0) & Eq(n, 0)), (log(x)/(a + b*log(c)), Eq(n, 0)
), (log(x)/a, Eq(b, 0)), (log(a/b + log(c*x**n))/(b*n), True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(18) = 36.
time = 3.50, size = 45, normalized size = 2.50

$$\frac{\log\left(\frac{1}{4}\left(\pi bn(\operatorname{sgn}(x)-1)+\pi b(\operatorname{sgn}(c)-1)\right)^2+\left(bn\log(|x|)+b\log(|c|)+a\right)^2\right)}{2\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*log(c*x^n)),x, algorithm="giac")
```

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

Mupad [B]
time = 3.56, size = 18, normalized size = 1.00

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(a + b*log(c*x^n))),x)
```

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

3.70 $\int \frac{1}{x^2(a+b\log(cx^n))} dx$

Optimal. Leaf size=48

$$\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{bnx}$$

```
[Out] exp(a/b/n)*(c*x^n)^(1/n)*Ei((-a-b*ln(c*x^n))/b/n)/b/n/x
```

Rubi [A]

time = 0.03, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2209}

$$\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{bnx}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-((a + b*Log[c*x^n])/(b*n))])/(b*
n*x)
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x^2\left(a+b\log\left(cx^n\right)\right)}\,dx &= \frac{\left(cx^n\right)^{\frac{1}{n}}\operatorname{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{nx}\\ &= \frac{e^{\frac{a}{bn}}\left(cx^n\right)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{bnx}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 48, normalized size = 1.00

$$\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\mathrm{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{bnx}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-((a + b*Log[c*x^n])/(b*n))])/(b*
n*x)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 236, normalized size = 4.92

method	result
risch	$-\frac{c^{\frac{1}{n}}(x^n)^{\frac{1}{n}}\,\mathrm{e}^{\frac{-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2a}{2bn}}\,\mathrm{expIntegral}\Big(1,\ln(}{b}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/b/n/x*c^(1/n)*(x^n)^(1/n)*exp(1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-
I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,ln(x)-1/2*(I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2+I*b*Pi*csgn(I*c*x^n)^3-2*b*ln(c)-2*b*(ln(x^n)-n*ln(x))-2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/((b*log(c*x^n) + a)*x^2), x)
```

Fricas [A]
time = 0.34, size = 41, normalized size = 0.85

$$\frac{e^{\left(\frac{b\log(c)+a}{bn}\right)}\,\mathrm{log\_integral}\left(\frac{e^{\left(-\frac{b\log(c)+a}{bn}\right)}}{x}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2 (a + b\log (cx^n))}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(1/(x**2*(a + b*log(c*x**n))), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x^2\, (a + b\, \ln (c\, x^n))}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*(a + b*log(c*x^n))),x)
```

```
[Out] int(1/(x^2*(a + b*log(c*x^n))), x)
```

3.71 $\int \frac{1}{x^3(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=51

$$\frac{e^{\frac{2a}{bn}}(cx^n)^{2/n}\operatorname{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{bnx^2}$$

```
[Out] exp(2*a/b/n)*(c*x^n)^(2/n)*Ei(-2*(a+b*ln(c*x^n))/b/n)/b/n/x^2
```

Rubi [A]
time = 0.03, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2209}

$$\frac{e^{\frac{2a}{bn}}(cx^n)^{2/n}\operatorname{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{bnx^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*(a + b*Log[c*x^n])),x]
```

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

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x^3\left(a+b\log\left(cx^n\right)\right)}\,dx &= \frac{\left(cx^n\right)^{2/n}\operatorname{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{a+bx}\,dx,x,\log\left(cx^n\right)\right)}{nx^2}\\ &= \frac{e^{\frac{2a}{bn}}\left(cx^n\right)^{2/n}\operatorname{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{bnx^2}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 51, normalized size = 1.00

$$\frac{e^{\frac{2a}{bn}}(cx^n)^{2/n}\operatorname{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{bnx^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*(a + b*Log[c*x^n])),x]
```

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 241, normalized size = 4.73

method	result
risch	$-\frac{c^{\frac{2}{n}}(x^n)^{\frac{2}{n}}\mathrm{e}^{\frac{-ib\pi\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)+ib\pi\operatorname{csgn}(ic)\operatorname{csgn}(icx^n)^2+ib\pi\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2-ib\pi\operatorname{csgn}(icx^n)^3+2a}{bn}}\operatorname{expIntegral}\left(1,2\ln(\right.}{bn}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] -1/b/n/x^2*c^(2/n)*(x^n)^(2/n)*exp((-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*
x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*
b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,2*ln(x)-(I*b*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2+I*b*Pi*csgn(I*c*x^n)^3-2*b*ln(c)-2*b*(ln(x^n)-n*ln(x))-2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)*x^3), x)
```

Fricas [A]
time = 0.39, size = 42, normalized size = 0.82

$$\frac{e^{\left(\frac{2\,(b\log(c)+a)}{bn}\right)}\operatorname{log\_integral}\left(\frac{e^{\left(-\frac{2\,(b\log(c)+a)}{bn}\right)}}{x^2}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n)),x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3 (a + b \log (cx^n))} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(1/(x**3*(a + b*log(c*x**n))), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x^3 \left(a + b \ln (c\, x^n)\right)} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*(a + b*log(c*x^n))),x)
```

```
[Out] int(1/(x^3*(a + b*log(c*x^n))), x)
```

3.72 $\int \frac{1}{x^4(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=51

$$\frac{e^{\frac{3a}{bn}}(cx^n)^{3/n}\operatorname{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{bnx^3}$$

```
[Out] exp(3*a/b/n)*(c*x^n)^(3/n)*Ei(-3*(a+b*ln(c*x^n))/b/n)/b/n/x^3
```

Rubi [A]
time = 0.03, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2209}

$$\frac{e^{\frac{3a}{bn}}(cx^n)^{3/n}\operatorname{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{bnx^3}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^((3*a)/(b*n))*(c*x^n)^(3/n)*ExpIntegralEi[(-3*(a + b*Log[c*x^n]))/(b*n)]
)/(b*n*x^3)
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x^4(a+b\log(cx^n))}\,dx &= \frac{(cx^n)^{3/n}\operatorname{Subst}\left(\int \frac{e^{-\frac{3x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{nx^3}\\ &= \frac{e^{\frac{3a}{bn}}(cx^n)^{3/n}\operatorname{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{bnx^3}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 51, normalized size = 1.00

$$\frac{e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{bnx^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^4*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^((3*a)/(b*n))*(c*x^n)^(3/n)*ExpIntegralEi[(-3*(a + b*Log[c*x^n]))/(b*n)]
)/(b*n*x^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 242, normalized size = 4.75

method	result
risch	$-\frac{c^{\frac{3}{n}}(x^n)^{\frac{3}{n}}\,\mathrm{e}^{\frac{-\frac{3ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)}{2}+\frac{3ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2}{2}+\frac{3ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2}{2}-\frac{3ib\pi\text{csgn}(ic\,x^n)^3}{2}+3a}{bn}}\,\text{expIntegra}}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^4/(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] -1/b/n/x^3*c^(3/n)*(x^n)^(3/n)*exp(3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^
2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,3*ln(x)-3/2*(I*b*Pi*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)-I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*x^n)*cs
gn(I*c*x^n)^2+I*b*Pi*csgn(I*c*x^n)^3-2*b*ln(c)-2*b*(ln(x^n)-n*ln(x))-2*a)/b
/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)*x^4), x)
```

Fricas [A]
time = 0.38, size = 42, normalized size = 0.82

$$\frac{e^{\left(\frac{3\,(b\log(c)+a)}{bn}\right)}\,\text{log\_integral}\left(\frac{e^{\left(-\frac{3\,(b\log(c)+a)}{bn}\right)}}{x^3}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] e^(3*(b*log(c) + a)/(b*n))*log_integral(e^(-3*(b*log(c) + a)/(b*n))/x^3)/(b
*n)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^4 (a + b \log (cx^n))} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(1/(x**4*(a + b*log(c*x**n))), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x^4 \ (a + b \ \ln (c \, x^n))} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^4*(a + b*log(c*x^n))),x)
```

```
[Out] int(1/(x^4*(a + b*log(c*x^n))), x)
```

3.73 $\int \frac{x^3}{(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=76

$$\frac{4e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^4}{bn\left(a+b\log\left(cx^n\right)\right)}$$

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

Rubi [A]
time = 0.05, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}=0.188$, Rules used = {2343, 2347, 2209}

$$\frac{4x^4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^4}{bn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/(a + b*Log[c*x^n])^2,x]
```

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

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^3}{(a+b\log(cx^n))^2}\,dx = -\frac{x^4}{bn\,(a+b\log(cx^n))} + \frac{4\int \frac{x^3}{a+b\log(cx^n)}\,dx}{bn}$$

$$= -\frac{x^4}{bn\,(a+b\log(cx^n))} + \frac{\left(4x^4(cx^n)^{-4/n}\right)\text{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{bn^2}$$

$$= \frac{4e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\,\text{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{b^2n^2} - \frac{x^4}{bn\,(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.09, size = 70, normalized size = 0.92

$$\frac{x^4\left(4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\,\text{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right) - \frac{bn}{a+b\log(cx^n)}\right)}{b^2n^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/(a + b*Log[c*x^n])^2,x]
[Out] (x^4*((4*ExpIntegralEi[(4*(a + b*Log[c*x^n]))/(b*n)])/(E^((4*a)/(b*n))*(c*x
^n)^(4/n)) - (b*n)/(a + b*Log[c*x^n])))/(b^2*n^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 354, normalized size = 4.66

method	result
risch	$-\frac{2x^4}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi\text{csgn}(ic\,x^n)^3\right)}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
[Out] -2*x^4/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/b/n-4/b^2/n^2*x^4*c^(-4/n)*(x^n)^(-4/n)*exp(-2*(-I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-4*ln(x)
-2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x
^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2
*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

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

Fricas [A]
time = 0.34, size = 101, normalized size = 1.33

$$-\frac{\left(bnx^{4}e^{\left(\frac{4\,(b\log(c)+a)}{bn}\right)}-4\,(bn\log(x)+b\log(c)+a)\,\mathrm{log\_integral}\left(x^{4}e^{\left(\frac{4\,(b\log(c)+a)}{bn}\right)}\right)\right)e^{\left(-\frac{4\,(b\log(c)+a)}{bn}\right)}}{b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{x^{3}}{\left(a+b\log\left(cx^{n}\right)\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(x**3/(a + b*log(c*x**n))**2, x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 261 vs. 2(77) = 154.
time = 3.11, size = 261, normalized size = 3.43

$$-\frac{bnx^{4}}{b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2}}+\frac{4\,bn\mathrm{Ei}\left(\frac{4\log(c)}{n}+\frac{4\,a}{bn}+4\,\log(x)\right)e^{\left(-\frac{4\,a}{bn}\right)}\log(x)}{(b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2})c^{\frac{4}{n}}}+\frac{4\,b\mathrm{Ei}\left(\frac{4\log(c)}{n}+\frac{4\,a}{bn}+4\,\log(x)\right)e^{\left(-\frac{4\,a}{bn}\right)}\log(c)}{(b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2})c^{\frac{4}{n}}}+\frac{4\,a\mathrm{Ei}\left(\frac{4\log(c)}{n}+\frac{4\,a}{bn}+4\,\log(x)\right)e^{\left(-\frac{4\,a}{bn}\right)}}{(b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2})c^{\frac{4}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3}{\left(a + b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(a + b*log(c*x^n))^2,x)
```

```
[Out] int(x^3/(a + b*log(c*x^n))^2, x)
```

3.74 $\int \frac{x^2}{(a+b\log(cx^n))^2} dx$

Optimal. Leaf size=76

$$\frac{3e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^3}{bn\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 3*x^3*Ei(3*(a+b*ln(c*x^n))/b/n)/b^2/exp(3*a/b/n)/n^2/((c*x^n)^(3/n))-x^3/b/
n/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$\frac{3x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^3}{bn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

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

```
[Out] (3*x^3*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(b*n)])/(b^2*E^((3*a)/(b*n))*n^
2*(c*x^n)^(3/n)) - x^3/(b*n*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^2}{(a+b\log(cx^n))^2}\,dx = -\frac{x^3}{bn(a+b\log(cx^n))}+\frac{3\int \frac{x^2}{a+b\log(cx^n)}\,dx}{bn}$$

$$= -\frac{x^3}{bn(a+b\log(cx^n))}+\frac{\left(3x^3(cx^n)^{-3/n}\right)\text{Subst}\left(\int \frac{e^{\frac{3x}{n}}}{a+bx}\,dx,x,\log(cx^n)\right)}{bn^2}$$

$$= \frac{3e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\text{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^3}{bn(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.09, size = 70, normalized size = 0.92

$$\frac{x^3\left(3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\text{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)-\frac{bn}{a+b\log(cx^n)}\right)}{b^2n^2}$$

Antiderivative was successfully verified.

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

```
[Out] (x^3*((3*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(b*n)])/(E^((3*a)/(b*n))*(c*x
^n)^(3/n)) - (b*n)/(a + b*Log[c*x^n])))/(b^2*n^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 354, normalized size = 4.66

method	result
risch	$-\frac{2x^3}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(icx^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(icx^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(icx^n)^2-ib\pi\text{csgn}(icx^n)^3\right)}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*x^3/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/b/n-3/b^2/n^2*x^3*c^(-3/n)*(x^n)^(-3/n)*exp(-3/2*(-I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-3*ln(
x)-3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I
*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(
c)+2*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -x^3/(b^2*n*log(c) + b^2*n*log(x^n) + a*b*n) + 3*integrate(x^2/(b^2*n*log(c
) + b^2*n*log(x^n) + a*b*n), x)
```

Fricas [A]
time = 0.36, size = 101, normalized size = 1.33

$$-\frac{\left(bnx^{3}e^{\left(\frac{3\,(b\log(c)+a)}{bn}\right)}-3\,(bn\log(x)+b\log(c)+a)\,\mathrm{log\_integral}\left(x^{3}e^{\left(\frac{3\,(b\log(c)+a)}{bn}\right)}\right)\right)e^{\left(-\frac{3\,(b\log(c)+a)}{bn}\right)}}{b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{x^{2}}{\left(a+b\log(cx^{n})\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2/(a + b*log(c*x**n))**2, x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 261 vs. 2(77) = 154.
time = 2.01, size = 261, normalized size = 3.43

$$-\frac{bnx^{3}}{b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2}}+\frac{3\,bn\mathrm{Ei}\left(\frac{3\log(c)}{n}+\frac{3\,a}{bn}+3\log(x)\right)e^{\left(-\frac{3\,a}{bn}\right)}\log(x)}{(b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2})c^{\frac{3}{n}}}+\frac{3\,b\mathrm{Ei}\left(\frac{3\log(c)}{n}+\frac{3\,a}{bn}+3\log(x)\right)e^{\left(-\frac{3\,a}{bn}\right)}\log(c)}{(b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2})c^{\frac{3}{n}}}+\frac{3\,a\mathrm{Ei}\left(\frac{3\log(c)}{n}+\frac{3\,a}{bn}+3\log(x)\right)e^{\left(-\frac{3\,a}{bn}\right)}}{(b^{3}n^{3}\log(x)+b^{3}n^{2}\log(c)+ab^{2}n^{2})c^{\frac{3}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2}{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.75 $\int \frac{x}{(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=76

$$\frac{2e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\mathrm{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^2}{bn\,(a+b\log\,(cx^n))}$$

```
[Out] 2*x^2*Ei(2*(a+b*ln(c*x^n))/b/n)/b^2/exp(2*a/b/n)/n^2/((c*x^n)^(2/n))-x^2/b/
n/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.04, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.214, Rules used = {2343, 2347, 2209}

$$\frac{2x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\,\mathrm{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{b^2n^2}-\frac{x^2}{bn\,(a+b\log\,(cx^n))}$$

Antiderivative was successfully verified.

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

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

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x}{(a+b\log(cx^n))^2}\,dx = -\frac{x^2}{bn(a+b\log(cx^n))} + \frac{2\int \frac{x}{a+b\log(cx^n)}\,dx}{bn}$$
$$= -\frac{x^2}{bn(a+b\log(cx^n))} + \frac{\left(2x^2(cx^n)^{-2/n}\right)\text{Subst}\left(\int \frac{e^{\frac{2x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{bn^2}$$
$$= \frac{2e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\text{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{b^2n^2} - \frac{x^2}{bn(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.08, size = 70, normalized size = 0.92

$$\frac{x^2\left(2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\,\text{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right) - \frac{bn}{a+b\log(cx^n)}\right)}{b^2n^2}$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 354, normalized size = 4.66

method	result
risch	$-\frac{2x^2}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi\text{csgn}(ic\,x^n)^3\right)}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*x^2/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/b/n-2/b^2/n^2*x^2*c^(-2/n)*(x^n)^(-2/n)*exp(-(-I*b*Pi*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-2*ln(x)-(
-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^
2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(
ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.40, size = 101, normalized size = 1.33

$$-\frac{\left(bnx^2e^{\left(\frac{2\,(b\log(c)+a)}{bn}\right)}-2\,(bn\log{(x)}+b\log{(c)}+a)\operatorname{log\_integral}\left(x^2e^{\left(\frac{2\,(b\log(c)+a)}{bn}\right)}\right)\right)e^{\left(-\frac{2\,(b\log(c)+a)}{bn}\right)}}{b^3n^3\log{(x)}+b^3n^2\log{(c)}+ab^2n^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\left(a+b\log{(cx^n)}\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x/(a + b*log(c*x**n))**2, x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 261 vs. 2(77) = 154.
time = 2.15, size = 261, normalized size = 3.43

$$-\frac{bnx^2}{b^3n^3\log{(x)}+b^3n^2\log{(c)}+ab^2n^2}+\frac{2\,bn\operatorname{Ei}\left(\frac{2\,\log(c)}{n}+\frac{2\,a}{bn}+2\,\log{(x)}\right)e^{\left(-\frac{2\,a}{bn}\right)}\log{(x)}}{(b^3n^3\log{(x)}+b^3n^2\log{(c)}+ab^2n^2)c^{\frac{2}{n}}}+\frac{2\,b\operatorname{Ei}\left(\frac{2\,\log(c)}{n}+\frac{2\,a}{bn}+2\,\log{(x)}\right)e^{\left(-\frac{2\,a}{bn}\right)}\log{(c)}}{(b^3n^3\log{(x)}+b^3n^2\log{(c)}+ab^2n^2)c^{\frac{2}{n}}}+\frac{2\,a\operatorname{Ei}\left(\frac{2\,\log(c)}{n}+\frac{2\,a}{bn}+2\,\log{(x)}\right)e^{\left(-\frac{2\,a}{bn}\right)}}{(b^3n^3\log{(x)}+b^3n^2\log{(c)}+ab^2n^2)c^{\frac{2}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.76 $\int \frac{1}{(a+b\log(cx^n))^2} dx$

Optimal. Leaf size=70

$$\frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\operatorname{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{b^2n^2}-\frac{x}{bn\left(a+b\log\left(cx^n\right)\right)}$$

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

Rubi [A]
time = 0.03, antiderivative size = 70, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {2334, 2337, 2209}

$$\frac{xe^{-\frac{a}{bn}}\left(cx^n\right)^{-1/n}\operatorname{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{b^2n^2}-\frac{x}{bn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

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

```
[Out] (x*ExpIntegralEi[(a + b*Log[c*x^n])/(b*n)])/(b^2*E^(a/(b*n))*n^2*(c*x^n)^n^
(-1)) - x/(b*n*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2334

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Simp[x*((a + b
*Log[c*x^n])^(p + 1)/(b*n*(p + 1))), x] - Dist[1/(b*n*(p + 1)), Int[(a + b*
Log[c*x^n])^(p + 1), x], x] /; FreeQ[{a, b, c, n}, x] && LtQ[p, -1] && Inte
gerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\int \frac{1}{(a+b\log(cx^n))^2}\,dx = -\frac{x}{bn(a+b\log(cx^n))} + \frac{\int \frac{1}{a+b\log(cx^n)}\,dx}{bn}$$
$$= -\frac{x}{bn(a+b\log(cx^n))} + \frac{\left(x(cx^n)^{-1/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{bn^2}$$
$$= \frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{b^2n^2} - \frac{x}{bn(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.07, size = 66, normalized size = 0.94

$$\frac{x\left(e^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right) - \frac{bn}{a+b\log(cx^n)}\right)}{b^2n^2}$$

Antiderivative was successfully verified.

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

```
[Out] (x*(ExpIntegralEi[(a + b*Log[c*x^n])/(b*n)]/(E^(a/(b*n))*(c*x^n)^n^(-1)) -
(b*n)/(a + b*Log[c*x^n])))/(b^2*n^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 350, normalized size = 5.00

method	result
risch	$-\frac{2x}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi\text{csgn}(ic\,x^n)^3\right)}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*cs
gn(I*c*x^n)^3)/b/n*x-1/b^2/n^2*x*c^(-1/n)*(x^n)^(-1/n)*exp(-1/2*(-I*b*Pi*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-ln(x)-1/2
*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n
)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b
*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.33, size = 95, normalized size = 1.36

$$-\frac{\left(bnxe^{\left(\frac{b\log(c)+a}{bn}\right)}-(bn\log(x)+b\log(c)+a)\,\mathrm{log\_integral}\left(xe^{\left(\frac{b\log(c)+a}{bn}\right)}\right)\right)e^{\left(-\frac{b\log(c)+a}{bn}\right)}}{b^3n^3\log(x)+b^3n^2\log(c)+ab^2n^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{(a+b\log(cx^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral((a + b*log(c*x**n))**(-2), x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 238 vs. 2(69) = 138.
time = 4.33, size = 238, normalized size = 3.40

$$\frac{bn\mathrm{Ei}\left(\frac{\log(c)}{n}+\frac{a}{bn}+\log(x)\right)e^{\left(-\frac{a}{bn}\right)}\log(x)}{(b^3n^3\log(x)+b^3n^2\log(c)+ab^2n^2)c^{\left(\frac{1}{n}\right)}}-\frac{bnx}{b^3n^3\log(x)+b^3n^2\log(c)+ab^2n^2}+\frac{b\mathrm{Ei}\left(\frac{\log(c)}{n}+\frac{a}{bn}+\log(x)\right)e^{\left(-\frac{a}{bn}\right)}\log(c)}{(b^3n^3\log(x)+b^3n^2\log(c)+ab^2n^2)c^{\left(\frac{1}{n}\right)}}+\frac{a\mathrm{Ei}\left(\frac{\log(c)}{n}+\frac{a}{bn}+\log(x)\right)e^{\left(-\frac{a}{bn}\right)}}{(b^3n^3\log(x)+b^3n^2\log(c)+ab^2n^2)c^{\left(\frac{1}{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a + b*log(c*x^n))^2,x)
```

```
[Out] int(1/(a + b*log(c*x^n))^2, x)
```

3.77 $\int \frac{1}{x(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=20

$$-\frac{1}{bn\left(a+b\log\left(cx^n\right)\right)}$$

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

Rubi [A]
time = 0.02, antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2339, 30}

$$-\frac{1}{bn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -(1/(b*n*(a + b*Log[c*x^n])))
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

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

Mathematica [A]
time = 0.00, size = 20, normalized size = 1.00

$$-\frac{1}{bn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*(a + b*Log[c*x^n])^2),x]
[Out] -(1/(b*n*(a + b*Log[c*x^n])))
```

Maple [A]
time = 0.03, size = 21, normalized size = 1.05

method	result
derivativedivides	$-\frac{1}{bn(a+b\ln(c\,x^{n}))}$
default	$-\frac{1}{bn(a+b\ln(c\,x^{n}))}$
risch	$-\frac{2}{bn\left(2a+2b\ln(c)+2\ln(x^{n})b-i b\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^{n})\mathrm{csgn}(ic\,x^{n})+i b\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^{n})^{2}+i b\pi\,\mathrm{csgn}(ix^{n})\mathrm{csgn}(ic\,x^{n})^{2}-ib\right.}$

Verification of antiderivative is not currently implemented for this CAS.

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

Maxima [A]
time = 0.30, size = 20, normalized size = 1.00

$$-\frac{1}{(b\log(cx^{n})+a)bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.36, size = 25, normalized size = 1.25

$$-\frac{1}{b^{2}n^{2}\log(x)+b^{2}n\log(c)+abn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 39 vs. $2(15) = 30$.
time = 0.94, size = 39, normalized size = 1.95

$$\begin{cases}\frac{\log(x)}{a^{2}} & \text{for } b=0\wedge(b=0\vee n=0)\\ \frac{\log(x)}{(a+b\log(c))^{2}} & \text{for } n=0\\ -\frac{1}{abn+b^{2}n\log(cx^{n})} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Piecewise((log(x)/a**2, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)/(a + b*l
og(c))**2, Eq(n, 0)), (-1/(a*b*n + b**2*n*log(c*x**n)), True))
```

Giac [A]
time = 2.54, size = 21, normalized size = 1.05

$$-\frac{1}{(bn\log(x) + b\log(c) + a)bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

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

Mupad [B]
time = 3.27, size = 20, normalized size = 1.00

$$-\frac{1}{n\,\ln\left(c\,x^n\right)\,b^2 + a\,n\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(a + b*log(c*x^n))^2),x)
```

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

3.78 $\int \frac{1}{x^2(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=73

$$-\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{b^2n^2x}-\frac{1}{bnx\,(a+b\log\,(cx^n))}$$

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

Rubi [A]
time = 0.05, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188, Rules used = {2343, 2347, 2209}

$$-\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{b^2n^2x}-\frac{1}{bnx\,(a+b\log\,(cx^n))}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -((E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-((a + b*Log[c*x^n])/(b*n))])/(
b^2*n^2*x)) - 1/(b*n*x*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^2 (a+b\log(cx^n))^2} dx = -\frac{1}{bnx(a+b\log(cx^n))} - \frac{\int \frac{1}{x^2(a+b\log(cx^n))} dx}{bn}$$
$$= -\frac{1}{bnx(a+b\log(cx^n))} - \frac{(cx^n)^{\frac{1}{n}} \operatorname{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{a+bx} dx, x, \log(cx^n)\right)}{bn^2 x}$$
$$= -\frac{e^{\frac{a}{bn}} (cx^n)^{\frac{1}{n}} \operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{b^2n^2x} - \frac{1}{bnx(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.07, size = 76, normalized size = 1.04

$$-\frac{bn + e^{\frac{a}{bn}} (cx^n)^{\frac{1}{n}} \operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))}{b^2n^2x(a+b\log(cx^n))}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -((b*n + E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-((a + b*Log[c*x^n])/(b*n
))]*(a + b*Log[c*x^n]))/(b^2*n^2*x*(a + b*Log[c*x^n])))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.18, size = 343, normalized size = 4.70

method	result
risch	$-\frac{2i}{bnx\left(b\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)-b\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2-b\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2+b\pi\operatorname{csgn}(ic\,x^n)^3+2ib\ln(c)+2ib\ln(x^n)+\right.}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*I/b/n/x/(b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-b*Pi*csgn(I*c)*csgn(I*
c*x^n)^2-b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+b*Pi*csgn(I*c*x^n)^3+2*I*b*ln(c)+
2*I*b*ln(x^n)+2*I*a)+1/b^2/n^2/x*c^(1/n)*(x^n)^(1/n)*exp(1/2*(-I*b*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,ln(x)-1/2*I*(
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-b*Pi*csgn(I*c)*csgn(I*c*x^n)^2-b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2+b*Pi*csgn(I*c*x^n)^3+2*I*b*ln(c)+2*I*b*(ln(x^
n)-n*ln(x))+2*I*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.36, size = 88, normalized size = 1.21

$$-\frac{(bnx\log{(x)}+bx\log{(c)}+ax)e^{\left(\frac{b\log(c)+a}{bn}\right)}\,\text{log\_integral}\left(\frac{e^{\left(-\frac{b\log(c)+a}{bn}\right)}}{x}\right)+bn}{b^3n^3x\log{(x)}+b^3n^2x\log{(c)}+ab^2n^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{x^2\left(a+b\log{(cx^n)}\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(1/(x**2*(a + b*log(c*x**n))**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)^2*x^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*(a + b*log(c*x^n))^2),x)
[Out] int(1/(x^2*(a + b*log(c*x^n))^2), x)
```

3.79 $\int \frac{1}{x^3(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=76

$$-\frac{2e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{b^2n^2x^2}-\frac{1}{bnx^2\left(a+b\log\left(cx^n\right)\right)}$$

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

Rubi [A]
time = 0.05, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$-\frac{2e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{b^2n^2x^2}-\frac{1}{bnx^2\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*(a + b*Log[c*x^n])^2),x]
```

```
[Out] (-2*E^((2*a)/(b*n))*(c*x^n)^(2/n)*ExpIntegralEi[(-2*(a + b*Log[c*x^n]))/(b*
n)])/(b^2*n^2*x^2) - 1/(b*n*x^2*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^3 (a + b \log(cx^n))^2} dx = -\frac{1}{bnx^2 (a + b \log(cx^n))} - \frac{2 \int \frac{1}{x^3 (a+b\log(cx^n))} dx}{bn}$$
$$= -\frac{1}{bnx^2 (a + b \log(cx^n))} - \frac{\left(2(cx^n)^{2/n}\right) \text{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{a+bx} dx, x, \log(cx^n)\right)}{bn^2x^2}$$
$$= -\frac{2e^{\frac{2a}{bn}} (cx^n)^{2/n} \text{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{b^2n^2x^2} - \frac{1}{bnx^2 (a + b \log(cx^n))}$$

Mathematica [A]
time = 0.07, size = 80, normalized size = 1.05

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

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*(a + b*Log[c*x^n])^2),x]
```

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 352, normalized size = 4.63

method	result
risch	$-\frac{2}{x^2 \left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+ib\pi \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2+ib\pi \operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-ib\pi\operatorname{csgn}(ic\,x^n)\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/x^2/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/b/n+2/b^2/n^2/x^2*c^(2/n)*(x^n)^(2/n)*exp((-I*b*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,2*ln(x)+(-I*b
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*
b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x
^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] -1/(b^2*n*x^2*log(x^n) + (b^2*n*log(c) + a*b*n)*x^2) - 2*integrate(1/(b^2*n
*x^3*log(x^n) + (b^2*n*log(c) + a*b*n)*x^3), x)
```

Fricas [A]
time = 0.41, size = 102, normalized size = 1.34

$$-\frac{2\left(bnx^2\log\left(x\right)+bx^2\log\left(c\right)+ax^2\right)e^{\left(\frac{2\left(b\log(c)+a\right)}{bn}\right)}\mathrm{log\_integral}\left(\frac{e^{\left(-\frac{2\left(b\log(c)+a\right)}{bn}\right)}}{x^2}\right)+bn}{b^3n^3x^2\log\left(x\right)+b^3n^2x^2\log\left(c\right)+ab^2n^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{x^3\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(1/(x**3*(a + b*log(c*x**n))**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)^2*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^3 \left(a + b \ln \left(c\, x^n\right)\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*(a + b*log(c*x^n))^2),x)
[Out] int(1/(x^3*(a + b*log(c*x^n))^2), x)
```

3.80 $\int \frac{1}{x^4(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=76

$$-\frac{3e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{b^2n^2x^3}-\frac{1}{bnx^3\,(a+b\log\,(cx^n))}$$

```
[Out] -3*exp(3*a/b/n)*(c*x^n)^(3/n)*Ei(-3*(a+b*ln(c*x^n))/b/n)/b^2/n^2/x^3-1/b/n/
x^3/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.05, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188, Rules used = {2343, 2347, 2209}

$$-\frac{3e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{b^2n^2x^3}-\frac{1}{bnx^3\,(a+b\log\,(cx^n))}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(a + b*Log[c*x^n])^2),x]
```

```
[Out] (-3*E^((3*a)/(b*n))*(c*x^n)^(3/n)*ExpIntegralEi[(-3*(a + b*Log[c*x^n]))/(b*
n)])/(b^2*n^2*x^3) - 1/(b*n*x^3*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^4 (a+b\log(cx^n))^2}\,dx = -\frac{1}{bnx^3(a+b\log(cx^n))} - \frac{3\int \frac{1}{x^4(a+b\log(cx^n))}\,dx}{bn}$$
$$= -\frac{1}{bnx^3(a+b\log(cx^n))} - \frac{\left(3(cx^n)^{3/n}\right)\text{Subst}\left(\int \frac{e^{-\frac{3x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{bn^2x^3}$$
$$= -\frac{3e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{b^2n^2x^3} - \frac{1}{bnx^3(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.07, size = 80, normalized size = 1.05

$$-\frac{bn + 3e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))}{b^2n^2x^3(a+b\log(cx^n))}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^4*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -((b*n + 3*E^((3*a)/(b*n))*(c*x^n)^(3/n)*ExpIntegralEi[(-3*(a + b*Log[c*x^n
]))/(b*n)]*(a + b*Log[c*x^n]))/(b^2*n^2*x^3*(a + b*Log[c*x^n])))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.18, size = 354, normalized size = 4.66

method	result
risch	$-\frac{2}{x^3\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(icx^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(icx^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(icx^n)^2-ib\pi\text{csgn}(icx\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^4/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/x^3/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/b/n+3/b^2/n^2/x^3*c^(3/n)*(x^n)^(3/n)*exp(3/2*(-I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*
csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,3*ln(x)+3
/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x
^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2
*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

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

Fricas [**A**]
time = 0.34, size = 102, normalized size = 1.34

$$-\frac{3\left(bnx^3\log\left(x\right)+bx^3\log\left(c\right)+ax^3\right)e^{\left(\frac{3\left(b\log(c)+a\right)}{bn}\right)}\operatorname{log\_integral}\left(\frac{e^{\left(-\frac{3\left(b\log(c)+a\right)}{bn}\right)}}{x^3}\right)+bn}{b^3n^3x^3\log\left(x\right)+b^3n^2x^3\log\left(c\right)+ab^2n^2x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

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

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{x^4\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(1/(x**4*(a + b*log(c*x**n))**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((b*log(c*x^n) + a)^2*x^4), x)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^4\,(a+b\,\ln\left(c\,x^n\right))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^4*(a + b*log(c*x^n))^2),x)
[Out] int(1/(x^4*(a + b*log(c*x^n))^2), x)
```

3.81 $\int \frac{x^3}{(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=101

$$\frac{8e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{b^3n^3}-\frac{x^4}{2bn\left(a+b\log\left(cx^n\right)\right)^2}-\frac{2x^4}{b^2n^2\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 8*x^4*Ei(4*(a+b*ln(c*x^n))/b/n)/b^3/exp(4*a/b/n)/n^3/((c*x^n)^(4/n))-1/2*x^
4/b/n/(a+b*ln(c*x^n))^2-2*x^4/b^2/n^2/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 101, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$\frac{8x^4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\operatorname{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{b^3n^3}-\frac{2x^4}{b^2n^2\left(a+b\log\left(cx^n\right)\right)}-\frac{x^4}{2bn\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

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

```
[Out] (8*x^4*ExpIntegralEi[(4*(a + b*Log[c*x^n]))/(b*n)])/(b^3*E^((4*a)/(b*n))*n^
3*(c*x^n)^(4/n)) - x^4/(2*b*n*(a + b*Log[c*x^n])^2) - (2*x^4)/(b^2*n^2*(a +
 b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^3}{(a+b\log(cx^n))^3}\,dx = -\frac{x^4}{2bn(a+b\log(cx^n))^2} + \frac{2\int \frac{x^3}{(a+b\log(cx^n))^2}\,dx}{bn}$$

$$= -\frac{x^4}{2bn(a+b\log(cx^n))^2} - \frac{2x^4}{b^2n^2(a+b\log(cx^n))} + \frac{8\int \frac{x^3}{a+b\log(cx^n)}\,dx}{b^2n^2}$$

$$= -\frac{x^4}{2bn(a+b\log(cx^n))^2} - \frac{2x^4}{b^2n^2(a+b\log(cx^n))} + \frac{\left(8x^4(cx^n)^{-4/n}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{a+bx}\right.}{b^2n^3}$$

$$= \frac{8e^{-\frac{4a}{bn}}x^4(cx^n)^{-4/n}\,\mathrm{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right)}{b^3n^3} - \frac{x^4}{2bn(a+b\log(cx^n))^2} - \frac{2x^4}{b^2n^2(a+b\log(cx}$$

Mathematica [A]
time = 0.10, size = 89, normalized size = 0.88

$$\frac{x^4\left(16e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\,\mathrm{Ei}\left(\frac{4(a+b\log(cx^n))}{bn}\right) - \frac{bn(4a+bn+4b\log(cx^n))}{(a+b\log(cx^n))^2}\right)}{2b^3n^3}$$

Antiderivative was successfully verified.

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

```
[Out] (x^4*((16*ExpIntegralEi[(4*(a + b*Log[c*x^n]))/(b*n)])/(E^((4*a)/(b*n))*(c*
x^n)^(4/n)) - (b*n*(4*a + b*n + 4*b*Log[c*x^n]))/(a + b*Log[c*x^n])^2))/(2*
b^3*n^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 476, normalized size = 4.71

method	result
risch	$-\frac{2\left(bn\,x^4-2i\pi b\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+2i\pi b\,x^4\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+2i\pi b\,x^4\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-2i\pi b\,x^4\mathrm{csgn}(ic\,x^n)^3\right.}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] -2*(b*n*x^4-2*I*Pi*b*x^4*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+2*I*Pi*b*x^4*c
sgn(I*c)*csgn(I*c*x^n)^2+2*I*Pi*b*x^4*csgn(I*x^n)*csgn(I*c*x^n)^2-2*I*Pi*b*
x^4*csgn(I*c*x^n)^3+4*ln(c)*b*x^4+4*x^4*b*ln(x^n)+4*a*x^4)/(2*a+2*b*ln(c)+2
```

```
*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn
(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3)^2/b^
2/n^2-8/b^3/n^3*x^4*c^(-4/n)*(x^n)^(-4/n)*exp(-2*(-I*b*Pi*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-4*ln(x)-2*(-I*b*Pi*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(
x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(4*b*x^4*log(x^n) + (b*(n + 4*log(c)) + 4*a)*x^4)/(b^4*n^2*log(c)^2 +
b^4*n^2*log(x^n)^2 + 2*a*b^3*n^2*log(c) + a^2*b^2*n^2 + 2*(b^4*n^2*log(c) +
 a*b^3*n^2)*log(x^n)) + 8*integrate(x^3/(b^3*n^2*log(c) + b^3*n^2*log(x^n)
+ a*b^2*n^2), x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 211 vs. 2(100) = 200.
time = 0.34, size = 211, normalized size = 2.09

$$-\frac{\left(\left(4\,b^{2}n^{2}x^{4}\log\left(x\right)+4\,b^{2}nx^{4}\log\left(c\right)+\left(b^{2}n^{2}+4\,abn\right)x^{4}\right)e^{\left(\frac{4\,\left(b\log\left(c\right)+a\right)}{bn}\right)}-16\,\left(b^{2}n^{2}\log\left(x\right)^{2}+b^{2}\log\left(c\right)^{2}+2\,ab\log\left(c\right)+a^{2}+2\,\left(b^{2}n\log\left(c\right)+abn\right)\log\left(x\right)\right)\mathrm{log\_integral}\left(x^{4}e^{\left(\frac{4\,\left(b\log\left(c\right)+a\right)}{bn}\right)}\right)\right)e^{\left(-\frac{4\,\left(b\log\left(c\right)+a\right)}{bn}\right)}}{2\,\left(b^{5}n^{5}\log\left(x\right)^{2}+b^{5}n^{3}\log\left(c\right)^{2}+2\,ab^{4}n^{3}\log\left(c\right)+a^{2}b^{3}n^{3}+2\,\left(b^{5}n^{4}\log\left(c\right)+ab^{4}n^{4}\right)\log\left(x\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*((4*b^2*n^2*x^4*log(x) + 4*b^2*n*x^4*log(c) + (b^2*n^2 + 4*a*b*n)*x^4)
*e^(4*(b*log(c) + a)/(b*n)) - 16*(b^2*n^2*log(x)^2 + b^2*log(c)^2 + 2*a*b*l
og(c) + a^2 + 2*(b^2*n*log(c) + a*b*n)*log(x))*log_integral(x^4*e^(4*(b*log
(c) + a)/(b*n))))*e^(-4*(b*log(c) + a)/(b*n))/(b^5*n^5*log(x)^2 + b^5*n^3*l
og(c)^2 + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3 + 2*(b^5*n^4*log(c) + a*b^4*n^4)
*log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^{3}}{\left(a+b\log\left(cx^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**3/(a + b*log(c*x**n))**3, x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 1029 vs. $2(100) = 200$.
time = 5.68, size = 1029, normalized size = 10.19

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*b^2*n^2*x^4*log(x)/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3
*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) - 1/2*b^
2*n^2*x^4/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 +
2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) - 2*b^2*n*x^4*log(c)
/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n
^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) - 2*a*b*n*x^4/(b^5*n^5*log(x)
^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*
b^4*n^3*log(c) + a^2*b^3*n^3) + 8*b^2*n^2*Ei(4*log(c)/n + 4*a/(b*n) + 4*log
(x))*e^(-4*a/(b*n))*log(x)^2/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) +
 b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*
c^(4/n)) + 16*b^2*n*Ei(4*log(c)/n + 4*a/(b*n) + 4*log(x))*e^(-4*a/(b*n))*lo
g(c)*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2
 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(4/n)) + 8*b^2*
Ei(4*log(c)/n + 4*a/(b*n) + 4*log(x))*e^(-4*a/(b*n))*log(c)^2/((b^5*n^5*log
(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2
*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(4/n)) + 16*a*b*n*Ei(4*log(c)/n + 4*a/(b
*n) + 4*log(x))*e^(-4*a/(b*n))*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)
*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*
b^3*n^3)*c^(4/n)) + 16*a*b*Ei(4*log(c)/n + 4*a/(b*n) + 4*log(x))*e^(-4*a/(b
*n))*log(c)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2
 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(4/n)) + 8*a^2*
Ei(4*log(c)/n + 4*a/(b*n) + 4*log(x))*e^(-4*a/(b*n))/((b^5*n^5*log(x)^2 + 2
*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^
3*log(c) + a^2*b^3*n^3)*c^(4/n))
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3}{\left(a+b\,\ln\left(c\,x^n\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x^3/(a + b*log(c*x^n))^3, x)
```

3.82 $\int \frac{x^2}{(a+b\log(cx^n))^3} dx$

Optimal. Leaf size=105

$$\frac{9e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\mathrm{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{2b^3n^3}-\frac{x^3}{2bn\left(a+b\log\left(cx^n\right)\right)^2}-\frac{3x^3}{2b^2n^2\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 9/2*x^3*Ei(3*(a+b*ln(c*x^n))/b/n)/b^3/exp(3*a/b/n)/n^3/((c*x^n)^(3/n))-1/2*
x^3/b/n/(a+b*ln(c*x^n))^2-3/2*x^3/b^2/n^2/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$\frac{9x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\mathrm{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{2b^3n^3}-\frac{3x^3}{2b^2n^2\left(a+b\log\left(cx^n\right)\right)}-\frac{x^3}{2bn\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/(a + b*Log[c*x^n])^3,x]
```

```
[Out] (9*x^3*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(b*n)])/(2*b^3*E^((3*a)/(b*n))*
n^3*(c*x^n)^(3/n)) - x^3/(2*b*n*(a + b*Log[c*x^n])^2) - (3*x^3)/(2*b^2*n^2*
(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^2}{(a+b\log(cx^n))^3}\,dx = -\frac{x^3}{2bn(a+b\log(cx^n))^2} + \frac{3\int \frac{x^2}{(a+b\log(cx^n))^2}\,dx}{2bn}$$

$$= -\frac{x^3}{2bn(a+b\log(cx^n))^2} - \frac{3x^3}{2b^2n^2(a+b\log(cx^n))} + \frac{9\int \frac{x^2}{a+b\log(cx^n)}\,dx}{2b^2n^2}$$

$$= -\frac{x^3}{2bn(a+b\log(cx^n))^2} - \frac{3x^3}{2b^2n^2(a+b\log(cx^n))} + \frac{\left(9x^3(cx^n)^{-3/n}\right)\text{Subst}\left(\int \frac{e^{\frac{3x}{n}}}{a+b}\right.}{2b^2n^3}$$

$$= \frac{9e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\text{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right)}{2b^3n^3} - \frac{x^3}{2bn(a+b\log(cx^n))^2} - \frac{3x^3}{2b^2n^2(a+b\log(c}$$

Mathematica [A]
time = 0.10, size = 89, normalized size = 0.85

$$\frac{x^3\left(9e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\text{Ei}\left(\frac{3(a+b\log(cx^n))}{bn}\right) - \frac{bn(3a+bn+3b\log(cx^n))}{(a+b\log(cx^n))^2}\right)}{2b^3n^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/(a + b*Log[c*x^n])^3,x]
```

```
[Out] (x^3*((9*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(b*n)])/(E^((3*a)/(b*n))*(c*x
^n)^(3/n)) - (b*n*(3*a + b*n + 3*b*Log[c*x^n]))/(a + b*Log[c*x^n])^2))/(2*b
^3*n^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.18, size = 477, normalized size = 4.54

method	result
risch	$-\frac{2bn\,x^3-3i\pi b\,x^3\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+3i\pi b\,x^3\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+3i\pi b\,x^3\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-3i\pi b\,x^3\text{csgn}(ic\,x^n)^3+}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi c\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] -(2*b*n*x^3-3*I*Pi*b*x^3*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+3*I*Pi*b*x^3*c
sgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi*b*x^3*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi*b*
x^3*csgn(I*c*x^n)^3+6*ln(c)*b*x^3+6*x^3*b*ln(x^n)+6*x^3*a)/(2*a+2*b*ln(c)+2
```

```
*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn
(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3)^2/b^
2/n^2-9/2/b^3/n^3*x^3*c^(-3/n)*(x^n)^(-3/n)*exp(-3/2*(-I*b*Pi*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-3*ln(x)-3/2*(-I*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)
-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 211 vs. 2(100) = 200.
time = 0.36, size = 211, normalized size = 2.01

$$-\frac{\left(\left(3\,b^{2}n^{2}x^{3}\log\left(x\right)+3\,b^{2}nx^{3}\log\left(c\right)+\left(b^{2}n^{2}+3\,abn\right)x^{3}\right)e^{\left(\frac{3\,\left(b\log\left(c\right)+a\right)}{bn}\right)}-9\,\left(b^{2}n^{2}\log\left(x\right)^{2}+b^{2}\log\left(c\right)^{2}+2\,ab\log\left(c\right)+a^{2}+2\,\left(b^{2}n\log\left(c\right)+abn\right)\log\left(x\right)\right)\operatorname{log\_integral}\left(x^{3}e^{\left(\frac{3\,\left(b\log\left(c\right)+a\right)}{bn}\right)}\right)\right)e^{\left(-\frac{3\,\left(b\log\left(c\right)+a\right)}{bn}\right)}}{2\,\left(b^{5}n^{5}\log\left(x\right)^{2}+b^{5}n^{3}\log\left(c\right)^{2}+2\,ab^{4}n^{3}\log\left(c\right)+a^{2}b^{3}n^{3}+2\,\left(b^{5}n^{4}\log\left(c\right)+ab^{4}n^{4}\right)\log\left(x\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] -1/2*((3*b^2*n^2*x^3*log(x) + 3*b^2*n*x^3*log(c) + (b^2*n^2 + 3*a*b*n)*x^3)
*e^(3*(b*log(c) + a)/(b*n)) - 9*(b^2*n^2*log(x)^2 + b^2*log(c)^2 + 2*a*b*lo
g(c) + a^2 + 2*(b^2*n*log(c) + a*b*n)*log(x))*log_integral(x^3*e^(3*(b*log(
c) + a)/(b*n))))*e^(-3*(b*log(c) + a)/(b*n))/(b^5*n^5*log(x)^2 + b^5*n^3*lo
g(c)^2 + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3 + 2*(b^5*n^4*log(c) + a*b^4*n^4)*
log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^{2}}{\left(a+b\log\left(cx^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(a+b*ln(c*x**n))**3,x)
```

```
[Out] Integral(x**2/(a + b*log(c*x**n))**3, x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 1029 vs. $2(100) = 200$.
time = 4.49, size = 1029, normalized size = 9.80

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] -3/2*b^2*n^2*x^3*log(x)/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n
^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) - 1/2*
b^2*n^2*x^3/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2
+ 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) - 3/2*b^2*n*x^3*lo
g(c)/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b
^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) + 9/2*b^2*n^2*Ei(3*log(c)
/n + 3*a/(b*n) + 3*log(x))*e^(-3*a/(b*n))*log(x)^2/((b^5*n^5*log(x)^2 + 2*b
^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*
log(c) + a^2*b^3*n^3)*c^(3/n)) - 3/2*a*b*n*x^3/(b^5*n^5*log(x)^2 + 2*b^5*n^
4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c
) + a^2*b^3*n^3) + 9*b^2*n*Ei(3*log(c)/n + 3*a/(b*n) + 3*log(x))*e^(-3*a/(b
*n))*log(c)*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*l
og(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(3/n)) +
 9/2*b^2*Ei(3*log(c)/n + 3*a/(b*n) + 3*log(x))*e^(-3*a/(b*n))*log(c)^2/((b^
5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*l
og(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(3/n)) + 9*a*b*n*Ei(3*log(c)/n
+ 3*a/(b*n) + 3*log(x))*e^(-3*a/(b*n))*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^
4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c
) + a^2*b^3*n^3)*c^(3/n)) + 9*a*b*Ei(3*log(c)/n + 3*a/(b*n) + 3*log(x))*e^(
-3*a/(b*n))*log(c)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*l
og(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(3/n)) +
 9/2*a^2*Ei(3*log(c)/n + 3*a/(b*n) + 3*log(x))*e^(-3*a/(b*n))/((b^5*n^5*log
(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2
*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(3/n))
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2}{\left(a+b\,\ln\left(c\,x^n\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(a + b*log(c*x^n))^3,x)
```

```
[Out] int(x^2/(a + b*log(c*x^n))^3, x)
```

3.83 $\int \frac{x}{(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=101

$$\frac{2e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\operatorname{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{b^3n^3}-\frac{x^2}{2bn\left(a+b\log\left(cx^n\right)\right)^2}-\frac{x^2}{b^2n^2\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x^2*Ei(2*(a+b*ln(c*x^n))/b/n)/b^3/exp(2*a/b/n)/n^3/((c*x^n)^(2/n))-1/2*x^
2/b/n/(a+b*ln(c*x^n))^2-x^2/b^2/n^2/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 101, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {2343, 2347, 2209}

$$\frac{2x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{b^3n^3}-\frac{x^2}{b^2n^2\left(a+b\log\left(cx^n\right)\right)}-\frac{x^2}{2bn\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

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

```
[Out] (2*x^2*ExpIntegralEi[(2*(a + b*Log[c*x^n]))/(b*n)])/(b^3*E^((2*a)/(b*n))*n^
3*(c*x^n)^(2/n)) - x^2/(2*b*n*(a + b*Log[c*x^n])^2) - x^2/(b^2*n^2*(a + b*L
og[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x}{(a+b\log(cx^n))^3}\,dx = -\frac{x^2}{2bn(a+b\log(cx^n))^2} + \frac{\int \frac{x}{(a+b\log(cx^n))^2}\,dx}{bn}$$
$$= -\frac{x^2}{2bn(a+b\log(cx^n))^2} - \frac{x^2}{b^2n^2(a+b\log(cx^n))} + \frac{2\int \frac{x}{a+b\log(cx^n)}\,dx}{b^2n^2}$$
$$= -\frac{x^2}{2bn(a+b\log(cx^n))^2} - \frac{x^2}{b^2n^2(a+b\log(cx^n))} + \frac{\left(2x^2(cx^n)^{-2/n}\right)\text{Subst}\left(\int \frac{e^{\frac{2x}{n}}}{a+bx}$$
$$= \frac{2e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\text{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right)}{b^3n^3} - \frac{x^2}{2bn(a+b\log(cx^n))^2} - \frac{x^2}{b^2n^2(a+b\log(cx$$

Mathematica [A]
time = 0.09, size = 89, normalized size = 0.88

$$\frac{x^2\left(4e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\,\text{Ei}\left(\frac{2(a+b\log(cx^n))}{bn}\right) - \frac{bn(2a+bn+2b\log(cx^n))}{(a+b\log(cx^n))^2}\right)}{2b^3n^3}$$

Antiderivative was successfully verified.

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

```
[Out] (x^2*((4*ExpIntegralEi[(2*(a + b*Log[c*x^n]))/(b*n)])/(E^((2*a)/(b*n))*(c*x
^n)^(2/n)) - (b*n*(2*a + b*n + 2*b*Log[c*x^n]))/(a + b*Log[c*x^n])^2))/(2*b
^3*n^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.17, size = 476, normalized size = 4.71

method	result
risch	$-\frac{2\left(bn\,x^2 - i\pi b\,x^2\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n) + i\pi b\,x^2\text{csgn}(ic)\text{csgn}(ic\,x^n)^2 + i\pi b\,x^2\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2 - i\pi b\,x^2\text{csgn}(ic\,x^n)^3 + 2\ln}{\left(2a+2b\ln(c)+2\ln(x^n)b - ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n) + ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2 + ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2 - ib\pi\text{cs}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] -2*(b*n*x^2-I*Pi*b*x^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*x^2*csgn(
I*c)*csgn(I*c*x^n)^2+I*Pi*b*x^2*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*x^2*csgn
(I*c*x^n)^3+2*ln(c)*b*x^2+2*x^2*b*ln(x^n)+2*x^2*a)/(2*a+2*b*ln(c)+2*ln(x^n)
*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n
)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3)^2/b^2/n^2-2/
```

```
b^3/n^3*x^2*c^(-2/n)*(x^n)^(-2/n)*exp(-(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(
I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^
2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-2*ln(x)-(-I*b*Pi*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/b/n
)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 211 vs. $2(100) = 200$.
time = 0.40, size = 211, normalized size = 2.09

$$-\frac{\left((2\,b^2n^2x^2\log\left(x\right)+2\,b^2nx^2\log\left(c\right)+(b^2n^2+2\,abn)x^2)e^{\left(\frac{2\,(b\log(c)+a)}{bn}\right)}-4\left(b^2n^2\log\left(x\right)^2+b^2\log\left(c\right)^2+2\,ab\log\left(c\right)+a^2+2\left(b^2n\log\left(c\right)+abn\right)\log\left(x\right)\right)\operatorname{log\_integral}\left(x^2e^{\left(\frac{2\,(b\log(c)+a)}{bn}\right)}\right)\right)e^{\left(-\frac{2\,(b\log(c)+a)}{bn}\right)}}{2\left(b^5n^5\log\left(x\right)^2+b^5n^3\log\left(c\right)^2+2\,ab^4n^3\log\left(c\right)+a^2b^3n^3+2\left(b^5n^4\log\left(c\right)+ab^4n^4\right)\log\left(x\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*((2*b^2*n^2*x^2*log(x) + 2*b^2*n*x^2*log(c) + (b^2*n^2 + 2*a*b*n)*x^2)
*e^(2*(b*log(c) + a)/(b*n)) - 4*(b^2*n^2*log(x)^2 + b^2*log(c)^2 + 2*a*b*lo
g(c) + a^2 + 2*(b^2*n*log(c) + a*b*n)*log(x))*log_integral(x^2*e^(2*(b*log(
c) + a)/(b*n))))*e^(-2*(b*log(c) + a)/(b*n))/(b^5*n^5*log(x)^2 + b^5*n^3*lo
g(c)^2 + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3 + 2*(b^5*n^4*log(c) + a*b^4*n^4)*
log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\left(a+b\log\left(cx^n\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x/(a + b*log(c*x**n))**3, x)
```

Giac [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1029 vs. $2(100) = 200$.
time = 5.25, size = 1029, normalized size = 10.19

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -b^2*n^2*x^2*log(x)/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*l
og(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) + 2*b^2*n^
2*Ei(2*log(c)/n + 2*a/(b*n) + 2*log(x))*e^(-2*a/(b*n))*log(x)^2/((b^5*n^5*l
og(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) +
 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(2/n)) - 1/2*b^2*n^2*x^2/(b^5*n^5*log(
x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*
a*b^4*n^3*log(c) + a^2*b^3*n^3) - b^2*n*x^2*log(c)/(b^5*n^5*log(x)^2 + 2*b^
5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*l
og(c) + a^2*b^3*n^3) + 4*b^2*n*Ei(2*log(c)/n + 2*a/(b*n) + 2*log(x))*e^(-2*
a/(b*n))*log(c)*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n
^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(2/n
)) - a*b*n*x^2/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)
^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) + 2*b^2*Ei(2*lo
g(c)/n + 2*a/(b*n) + 2*log(x))*e^(-2*a/(b*n))*log(c)^2/((b^5*n^5*log(x)^2 +
 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*
n^3*log(c) + a^2*b^3*n^3)*c^(2/n)) + 4*a*b*n*Ei(2*log(c)/n + 2*a/(b*n) + 2*
log(x))*e^(-2*a/(b*n))*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x)
+ b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)
*c^(2/n)) + 4*a*b*Ei(2*log(c)/n + 2*a/(b*n) + 2*log(x))*e^(-2*a/(b*n))*log(
c)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^
4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(2/n)) + 2*a^2*Ei(2*log(
c)/n + 2*a/(b*n) + 2*log(x))*e^(-2*a/(b*n))/((b^5*n^5*log(x)^2 + 2*b^5*n^4*
log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c)
+ a^2*b^3*n^3)*c^(2/n))
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\left(a + b\,\ln\left(c\,x^n\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x/(a + b*log(c*x^n))^3, x)
```

3.84 $\int \frac{1}{(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=98

$$\frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\mathrm{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{2b^3n^3}-\frac{x}{2bn\,(a+b\log\,(cx^n))^2}-\frac{x}{2b^2n^2\,(a+b\log\,(cx^n))}$$

```
[Out] 1/2*x*Ei((a+b*ln(c*x^n))/b/n)/b^3/exp(a/b/n)/n^3/((c*x^n)^(1/n))-1/2*x/b/n/
(a+b*ln(c*x^n))^2-1/2*x/b^2/n^2/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.04, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2334, 2337, 2209}

$$\frac{xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\mathrm{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{2b^3n^3}-\frac{x}{2b^2n^2\,(a+b\log\,(cx^n))}-\frac{x}{2bn\,(a+b\log\,(cx^n))^2}$$

Antiderivative was successfully verified.

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

```
[Out] (x*ExpIntegralEi[(a + b*Log[c*x^n])/(b*n)])/(2*b^3*E^(a/(b*n))*n^3*(c*x^n)^
n^(-1)) - x/(2*b*n*(a + b*Log[c*x^n])^2) - x/(2*b^2*n^2*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2334

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Simp[x*((a + b
*Log[c*x^n])^(p + 1)/(b*n*(p + 1))), x] - Dist[1/(b*n*(p + 1)), Int[(a + b*
Log[c*x^n])^(p + 1), x], x] /; FreeQ[{a, b, c, n}, x] && LtQ[p, -1] && Inte
gerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\int \frac{1}{(a+b\log(cx^n))^3}\,dx = -\frac{x}{2bn(a+b\log(cx^n))^2} + \frac{\int \frac{1}{(a+b\log(cx^n))^2}\,dx}{2bn}$$

$$= -\frac{x}{2bn(a+b\log(cx^n))^2} - \frac{x}{2b^2n^2(a+b\log(cx^n))} + \frac{\int \frac{1}{a+b\log(cx^n)}\,dx}{2b^2n^2}$$

$$= -\frac{x}{2bn(a+b\log(cx^n))^2} - \frac{x}{2b^2n^2(a+b\log(cx^n))} + \frac{\left(x(cx^n)^{-1/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{n}}}{a+bx}\right.}{2b^2n^3}$$

$$= \frac{e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right)}{2b^3n^3} - \frac{x}{2bn(a+b\log(cx^n))^2} - \frac{x}{2b^2n^2(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.09, size = 82, normalized size = 0.84

$$\frac{x\left(e^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{bn}\right) - \frac{bn(a+bn+b\log(cx^n))}{(a+b\log(cx^n))^2}\right)}{2b^3n^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^(-3),x]
```

```
[Out] (x*(ExpIntegralEi[(a + b*Log[c*x^n])/(b*n)]/(E^(a/(b*n))*(c*x^n)^n^(-1)) -
(b*n*(a + b*n + b*Log[c*x^n]))/(a + b*Log[c*x^n])^2))/(2*b^3*n^3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.18, size = 459, normalized size = 4.68

method	result
risch	$-\frac{-i\pi bx\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+i\pi bx\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+i\pi bx\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-i\pi bx\text{csgn}(ic\,x^n)^3+2\ln(c)bx+2bx\ln}{b^2n^2\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi\text{csg}\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] -(-I*Pi*b*x*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*b*x*csgn(I*c)*csgn(I*c
*x^n)^2+I*Pi*b*x*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*b*x*csgn(I*c*x^n)^3+2*ln(
c)*b*x+2*b*x*ln(x^n)+2*a*x+2*b*n*x)/b^2/n^2/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*
Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3)^2-1/2/b^3/n^3*x*c^(
-1/n)*(x^n)^(-1/n)*exp(-1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*
```

```
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*cs
gn(I*c*x^n)^3+2*a)/b/n)*Ei(1,-ln(x)-1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)
^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

```
[Out] -1/2*(b*x*log(x^n) + (b*(n + log(c)) + a)*x)/(b^4*n^2*log(c)^2 + b^4*n^2*lo
g(x^n)^2 + 2*a*b^3*n^2*log(c) + a^2*b^2*n^2 + 2*(b^4*n^2*log(c) + a*b^3*n^2
)*log(x^n)) + integrate(1/2/(b^3*n^2*log(c) + b^3*n^2*log(x^n) + a*b^2*n^2)
, x)
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 198 vs. 2(91) = 182.
time = 0.37, size = 198, normalized size = 2.02

$$-\frac{\left((b^2n^2x\log(x) + b^2nx\log(c) + (b^2n^2 + abn)x)e^{\left(\frac{b\log(c)+a}{bn}\right)} - (b^2n^2\log(x)^2 + b^2\log(c)^2 + 2\,ab\log(c) + a^2 + 2\,(b^2n\log(c) + abn)\log(x))\,\mathrm{log\_integral}\left(xe^{\left(\frac{b\log(c)+a}{bn}\right)}\right)\right)e^{\left(-\frac{b\log(c)+a}{bn}\right)}}{2\left(b^5n^5\log(x)^2 + b^5n^3\log(c)^2 + 2\,ab^4n^3\log(c) + a^2b^3n^3 + 2\,(b^5n^4\log(c) + ab^4n^4)\log(x)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] -1/2*((b^2*n^2*x*log(x) + b^2*n*x*log(c) + (b^2*n^2 + a*b*n)*x)*e^((b*log(c
) + a)/(b*n)) - (b^2*n^2*log(x)^2 + b^2*log(c)^2 + 2*a*b*log(c) + a^2 + 2*(
b^2*n*log(c) + a*b*n)*log(x))*log_integral(x*e^((b*log(c) + a)/(b*n))))*e^(
-(b*log(c) + a)/(b*n))/(b^5*n^5*log(x)^2 + b^5*n^3*log(c)^2 + 2*a*b^4*n^3*l
og(c) + a^2*b^3*n^3 + 2*(b^5*n^4*log(c) + a*b^4*n^4)*log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\left(a + b\log\left(cx^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*ln(c*x**n))**3,x)
```

```
[Out] Integral((a + b*log(c*x**n))**(-3), x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 982 vs. 2(91) = 182.
time = 2.13, size = 982, normalized size = 10.02

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] 1/2*b^2*n^2*Ei(log(c)/n + a/(b*n) + log(x))*e^(-a/(b*n))*log(x)^2/((b^5*n^5
*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x)
 + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(1/n)) - 1/2*b^2*n^2*x*log(x)/(b^5*n
^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(
x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) + b^2*n*Ei(log(c)/n + a/(b*n) + log(
x))*e^(-a/(b*n))*log(c)*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x)
 + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3
)*c^(1/n)) - 1/2*b^2*n^2*x/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^
5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) - 1
/2*b^2*n*x*log(c)/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log
(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) + 1/2*b^2*Ei
(log(c)/n + a/(b*n) + log(x))*e^(-a/(b*n))*log(c)^2/((b^5*n^5*log(x)^2 + 2*
b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3
*log(c) + a^2*b^3*n^3)*c^(1/n)) + a*b*n*Ei(log(c)/n + a/(b*n) + log(x))*e^(
-a/(b*n))*log(x)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log
(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(1/n)) - 1
/2*a*b*n*x/(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 +
 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3) + a*b*Ei(log(c)/n +
 a/(b*n) + log(x))*e^(-a/(b*n))*log(c)/((b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c
)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^4*log(x) + 2*a*b^4*n^3*log(c) + a^2
*b^3*n^3)*c^(1/n)) + 1/2*a^2*Ei(log(c)/n + a/(b*n) + log(x))*e^(-a/(b*n))/(
(b^5*n^5*log(x)^2 + 2*b^5*n^4*log(c)*log(x) + b^5*n^3*log(c)^2 + 2*a*b^4*n^
4*log(x) + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3)*c^(1/n))
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{(a+b\ln(c\,x^n))^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a + b*log(c*x^n))^3,x)
```

```
[Out] int(1/(a + b*log(c*x^n))^3, x)
```

3.85 $\int \frac{1}{x(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=22

$$-\frac{1}{2bn\left(a+b\log\left(cx^n\right)\right)^2}$$

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

Rubi [A]
time = 0.02, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2339, 30}

$$-\frac{1}{2bn\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*(a + b*Log[c*x^n])^3),x]
```

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

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\left(a+b\log\left(cx^n\right)\right)^3}\,dx &= \frac{\text{Subst}\left(\int \frac{1}{x^3}\,dx, x, a+b\log\left(cx^n\right)\right)}{bn}\\ &= -\frac{1}{2bn\left(a+b\log\left(cx^n\right)\right)^2}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 22, normalized size = 1.00

$$-\frac{1}{2bn\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*(a + b*Log[c*x^n])^3),x]
```

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

Maple [A]
time = 0.03, size = 21, normalized size = 0.95

method	result
derivativedivides	$-\frac{1}{2bn(a+b\ln(c\,x^n))^2}$
default	$-\frac{1}{2bn(a+b\ln(c\,x^n))^2}$
risch	$-\frac{2}{bn\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

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

Maxima [A]
time = 0.29, size = 20, normalized size = 0.91

$$-\frac{1}{2\,(b\log{(cx^n)}+a)^2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 62 vs. 2(20) = 40.
time = 0.37, size = 62, normalized size = 2.82

$$-\frac{1}{2\left(b^3n^3\log{(x)}^2+b^3n\log{(c)}^2+2\,ab^2n\log{(c)}+a^2bn+2\,(b^3n^2\log{(c)}+ab^2n^2)\log{(x)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 61 vs. $2(19) = 38$.
time = 2.10, size = 61, normalized size = 2.77

$$\begin{cases} \frac{\log(x)}{a^3} & \text{for } b = 0 \wedge (b = 0 \vee n = 0) \\ \frac{\log(x)}{(a+b\log(c))^3} & \text{for } n = 0 \\ -\frac{1}{2a^2bn+4ab^2n\log(cx^n)+2b^3n\log(cx^n)^2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*ln(c*x**n))**3,x)
```

```
[Out] Piecewise((log(x)/a**3, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)/(a + b*l
og(c))**3, Eq(n, 0)), (-1/(2*a**2*b*n + 4*a*b**2*n*log(c*x**n) + 2*b**3*n*l
og(c*x**n)**2), True))
```

Giac [A]
time = 5.34, size = 21, normalized size = 0.95

$$-\frac{1}{2(bn\log(x) + b\log(c) + a)^2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*log(c*x^n))^3,x, algorithm="giac")
```

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

Mupad [B]
time = 3.53, size = 39, normalized size = 1.77

$$-\frac{1}{2\,n\,a^2\,b + 4\,n\,a\,b^2\,\ln(c\,x^n) + 2\,n\,b^3\ln(c\,x^n)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(a + b*log(c*x^n))^3),x)
```

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

3.86 $\int \frac{1}{x^2(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=102

$$\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{2b^3n^3x}-\frac{1}{2bnx\left(a+b\log\left(cx^n\right)\right)^2}+\frac{1}{2b^2n^2x\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 1/2*exp(a/b/n)*(c*x^n)^(1/n)*Ei((-a-b*ln(c*x^n))/b/n)/b^3/n^3/x-1/2/b/n/x/(
a+b*ln(c*x^n))^2+1/2/b^2/n^2/x/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\operatorname{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{2b^3n^3x}+\frac{1}{2b^2n^2x\left(a+b\log\left(cx^n\right)\right)}-\frac{1}{2bnx\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*(a + b*Log[c*x^n])^3),x]
```

```
[Out] (E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-((a + b*Log[c*x^n])/(b*n))])/(2*
b^3*n^3*x) - 1/(2*b*n*x*(a + b*Log[c*x^n])^2) + 1/(2*b^2*n^2*x*(a + b*Log[c
*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^2 (a+b\log(cx^n))^3}\,dx = -\frac{1}{2bnx(a+b\log(cx^n))^2} - \frac{\int \frac{1}{x^2(a+b\log(cx^n))^2}\,dx}{2bn}$$

$$= -\frac{1}{2bnx(a+b\log(cx^n))^2} + \frac{1}{2b^2n^2x(a+b\log(cx^n))} + \frac{\int \frac{1}{x^2(a+b\log(cx^n))}\,dx}{2b^2n^2}$$

$$= -\frac{1}{2bnx(a+b\log(cx^n))^2} + \frac{1}{2b^2n^2x(a+b\log(cx^n))} + \frac{(cx^n)^{\frac{1}{n}}\,\mathrm{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{a+bx}\,dx,\right.}{2b^2n^3x}$$

$$= \frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\mathrm{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)}{2b^3n^3x} - \frac{1}{2bnx(a+b\log(cx^n))^2} + \frac{1}{2b^2n^2x(a+b\log(cx^n)}$$

Mathematica [A]
time = 0.07, size = 94, normalized size = 0.92

$$\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\mathrm{Ei}\left(-\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^2 + bn(a-bn+b\log(cx^n))}{2b^3n^3x(a+b\log(cx^n))^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*(a + b*Log[c*x^n])^3),x]
```

```
[Out] (E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-((a + b*Log[c*x^n])/(b*n))]*(a +
 b*Log[c*x^n])^2 + b*n*(a - b*n + b*Log[c*x^n]))/(2*b^3*n^3*x*(a + b*Log[c*
x^n])^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 449, normalized size = 4.40

method	result
risch	$\frac{-2bn+2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3\right)^2 b^2}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] (-2*b*n+2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2-I*b*Pi*csgn(I*c*x^n)^3)^2/b^2/n^2/x-1/2/b^3/n^3/x*c^(1/n)*(x^n)^(1/n
```

```
)*exp(1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)
/b/n)*Ei(1,ln(x)+1/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*
x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 192 vs. 2(95) = 190.
time = 0.36, size = 192, normalized size = 1.88

$$\frac{b^2n^2\log(x) - b^2n^2 + b^2n\log(c) + abn + \left(b^2n^2x\log(x)^2 + b^2x\log(c)^2 + 2\,abx\log(c) + a^2x + 2\left(b^2nx\log(c) + abnx\right)\log(x)\right)e^{\left(\frac{b\log(c)+a}{bn}\right)}\operatorname{log\_integral}\left(\frac{e^{\left(-\frac{b\log(c)+a}{bn}\right)}}{x}\right)}{2\left(b^5n^5x\log(x)^2 + b^5n^3x\log(c)^2 + 2\,ab^4n^3x\log(c) + a^2b^3n^3x + 2\left(b^5n^4x\log(c) + ab^4n^4x\right)\log(x)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] 1/2*(b^2*n^2*log(x) - b^2*n^2 + b^2*n*log(c) + a*b*n + (b^2*n^2*x*log(x)^2
+ b^2*x*log(c)^2 + 2*a*b*x*log(c) + a^2*x + 2*(b^2*n*x*log(c) + a*b*n*x)*lo
g(x))*e^((b*log(c) + a)/(b*n))*log_integral(e^(-(b*log(c) + a)/(b*n))/x))/(
b^5*n^5*x*log(x)^2 + b^5*n^3*x*log(c)^2 + 2*a*b^4*n^3*x*log(c) + a^2*b^3*n^
3*x + 2*(b^5*n^4*x*log(c) + a*b^4*n^4*x)*log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2\left(a + b\log(cx^n)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*ln(c*x**n))**3,x)
```

```
[Out] Integral(1/(x**2*(a + b*log(c*x**n))**3), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*log(c*x^n))^3,x, algorithm="giac")
[Out] integrate(1/((b*log(c*x^n) + a)^3*x^2), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^2\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*(a + b*log(c*x^n))^3),x)
[Out] int(1/(x^2*(a + b*log(c*x^n))^3), x)
```

3.87 $\int \frac{1}{x^3(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=100

$$\frac{2e^{\frac{2a}{bn}}(cx^n)^{2/n}\operatorname{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{b^3n^3x^2}-\frac{1}{2bnx^2\left(a+b\log\left(cx^n\right)\right)^2}+\frac{1}{b^2n^2x^2\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*exp(2*a/b/n)*(c*x^n)^(2/n)*Ei(-2*(a+b*ln(c*x^n))/b/n)/b^3/n^3/x^2-1/2/b/n
/x^2/(a+b*ln(c*x^n))^2+1/b^2/n^2/x^2/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$\frac{2e^{\frac{2a}{bn}}(cx^n)^{2/n}\operatorname{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{b^3n^3x^2}+\frac{1}{b^2n^2x^2\left(a+b\log\left(cx^n\right)\right)}-\frac{1}{2bnx^2\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*(a + b*Log[c*x^n])^3),x]
```

```
[Out] (2*E^((2*a)/(b*n))*(c*x^n)^(2/n)*ExpIntegralEi[(-2*(a + b*Log[c*x^n]))/(b*n
)])/(b^3*n^3*x^2) - 1/(2*b*n*x^2*(a + b*Log[c*x^n])^2) + 1/(b^2*n^2*x^2*(a
+ b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^3 (a+b\log(cx^n))^3}\,dx = -\frac{1}{2bnx^2 (a+b\log(cx^n))^2} - \frac{\int \frac{1}{x^3(a+b\log(cx^n))^2}\,dx}{bn}$$

$$= -\frac{1}{2bnx^2 (a+b\log(cx^n))^2} + \frac{1}{b^2n^2x^2 (a+b\log(cx^n))} + \frac{2\int \frac{1}{x^3(a+b\log(cx^n))}\,dx}{b^2n^2}$$

$$= -\frac{1}{2bnx^2 (a+b\log(cx^n))^2} + \frac{1}{b^2n^2x^2 (a+b\log(cx^n))} + \frac{\left(2(cx^n)^{2/n}\right) \text{Subst}\left(\int \frac{e^{-}}{a+}\right.}{b^2n^3x}$$

$$= \frac{2e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right)}{b^3n^3x^2} - \frac{1}{2bnx^2 (a+b\log(cx^n))^2} + \frac{1}{b^2n^2x^2 (a+b\log}$$

Mathematica [A]
time = 0.09, size = 89, normalized size = 0.89

$$\frac{4e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{Ei}\left(-\frac{2(a+b\log(cx^n))}{bn}\right) + \frac{bn(2a-bn+2b\log(cx^n))}{(a+b\log(cx^n))^2}}{2b^3n^3x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*(a + b*Log[c*x^n])^3),x]
```

```
[Out] (4*E^((2*a)/(b*n))*(c*x^n)^(2/n)*ExpIntegralEi[(-2*(a + b*Log[c*x^n]))/(b*n
)] + (b*n*(2*a - b*n + 2*b*Log[c*x^n]))/(a + b*Log[c*x^n])^2)/(2*b^3*n^3*x^
2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.19, size = 454, normalized size = 4.54

method	result
risch	$\frac{-2bn+4a+4b\ln(c)+4\ln(x^n)b-2ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+2ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+2ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-2ib\pi\text{csgn}(i}{\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi\text{csgn}(ic\,x^n)^3\right)^2 b}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] 2*(-b*n+2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3)/(2*a+2*b*ln(c)+2*ln(x^n)*b-I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2-I*b*Pi*csgn(I*c*x^n)^3)^2/b^2/n^2/x^2-2/b^3/n^3/x^2*c^(2/n)*(x^n)^(2
```

```
/n)*exp((-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*a)/b
/n)*Ei(1,2*ln(x)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)
^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 221 vs. 2(97) = 194.
time = 0.36, size = 221, normalized size = 2.21

$$\frac{2\,b^{2}n^{2}\log\left(x\right)-b^{2}n^{2}+2\,b^{2}n\log\left(c\right)+2\,abn+4\,\left(b^{2}n^{2}x^{2}\log\left(x\right)^{2}+b^{2}x^{2}\log\left(c\right)^{2}+2\,abx^{2}\log\left(c\right)+a^{2}x^{2}+2\,\left(b^{2}nx^{2}\log\left(c\right)+abnx^{2}\right)\log\left(x\right)\right)e^{\left(\frac{2\,\left(b\log\left(c\right)+a\right)}{bn}\right)}\operatorname{log\_integral}\left(\frac{e^{\left(-\frac{2\,\left(b\log\left(c\right)+a\right)}{bn}\right)}}{x^{2}}\right)}{2\,\left(b^{5}n^{5}x^{2}\log\left(x\right)^{2}+b^{5}n^{3}x^{2}\log\left(c\right)^{2}+2\,ab^{4}n^{3}x^{2}\log\left(c\right)+a^{2}b^{3}n^{3}x^{2}+2\,\left(b^{5}n^{4}x^{2}\log\left(c\right)+ab^{4}n^{4}x^{2}\right)\log\left(x\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] 1/2*(2*b^2*n^2*log(x) - b^2*n^2 + 2*b^2*n*log(c) + 2*a*b*n + 4*(b^2*n^2*x^2
*log(x)^2 + b^2*x^2*log(c)^2 + 2*a*b*x^2*log(c) + a^2*x^2 + 2*(b^2*n*x^2*lo
g(c) + a*b*n*x^2)*log(x))*e^(2*(b*log(c) + a)/(b*n))*log_integral(e^(-2*(b*
log(c) + a)/(b*n))/x^2))/(b^5*n^5*x^2*log(x)^2 + b^5*n^3*x^2*log(c)^2 + 2*a
*b^4*n^3*x^2*log(c) + a^2*b^3*n^3*x^2 + 2*(b^5*n^4*x^2*log(c) + a*b^4*n^4*x
^2)*log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{x^{3}\left(a+b\log\left(cx^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/(a+b*ln(c*x**n))**3,x)
```

```
[Out] Integral(1/(x**3*(a + b*log(c*x**n))**3), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/(a+b*log(c*x^n))^3,x, algorithm="giac")
[Out] integrate(1/((b*log(c*x^n) + a)^3*x^3), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^3\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*(a + b*log(c*x^n))^3),x)
[Out] int(1/(x^3*(a + b*log(c*x^n))^3), x)
```

3.88 $\int \frac{1}{x^4(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=105

$$\frac{9e^{\frac{3a}{bn}}(cx^n)^{3/n}\operatorname{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{2b^3n^3x^3}-\frac{1}{2bnx^3\left(a+b\log\left(cx^n\right)\right)^2}+\frac{3}{2b^2n^2x^3\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 9/2*exp(3*a/b/n)*(c*x^n)^(3/n)*Ei(-3*(a+b*ln(c*x^n))/b/n)/b^3/n^3/x^3-1/2/b
/n/x^3/(a+b*ln(c*x^n))^2+3/2/b^2/n^2/x^3/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.07, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2343, 2347, 2209}

$$\frac{9e^{\frac{3a}{bn}}(cx^n)^{3/n}\operatorname{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{2b^3n^3x^3}+\frac{3}{2b^2n^2x^3\left(a+b\log\left(cx^n\right)\right)}-\frac{1}{2bnx^3\left(a+b\log\left(cx^n\right)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^4*(a + b*Log[c*x^n])^3),x]
```

```
[Out] (9*E^((3*a)/(b*n))*(c*x^n)^(3/n)*ExpIntegralEi[(-3*(a + b*Log[c*x^n]))/(b*n
)])/(2*b^3*n^3*x^3) - 1/(2*b*n*x^3*(a + b*Log[c*x^n])^2) + 3/(2*b^2*n^2*x^3
*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^4 (a+b\log(cx^n))^3}\,dx = -\frac{1}{2bnx^3 (a+b\log(cx^n))^2} - \frac{3\int \frac{1}{x^4(a+b\log(cx^n))^2}\,dx}{2bn}$$

$$= -\frac{1}{2bnx^3 (a+b\log(cx^n))^2} + \frac{3}{2b^2n^2x^3 (a+b\log(cx^n))} + \frac{9\int \frac{1}{x^4(a+b\log(cx^n))}\,dx}{2b^2n^2}$$

$$= -\frac{1}{2bnx^3 (a+b\log(cx^n))^2} + \frac{3}{2b^2n^2x^3 (a+b\log(cx^n))} + \frac{\left(9(cx^n)^{3/n}\right) \text{Subst}\left(\int \frac{e}{a}\right.}{2b^2n^3}$$

$$= \frac{9e^{\frac{3a}{bn}} (cx^n)^{3/n} \text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right)}{2b^3n^3x^3} - \frac{1}{2bnx^3 (a+b\log(cx^n))^2} + \frac{3}{2b^2n^2x^3 (a+b\log}$$

Mathematica [A]
time = 0.09, size = 89, normalized size = 0.85

$$\frac{9e^{\frac{3a}{bn}} (cx^n)^{3/n} \text{Ei}\left(-\frac{3(a+b\log(cx^n))}{bn}\right) + \frac{bn(3a-bn+3b\log(cx^n))}{(a+b\log(cx^n))^2}}{2b^3n^3x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^4*(a + b*Log[c*x^n])^3),x]
```

```
[Out] (9*E^((3*a)/(b*n))*(c*x^n)^(3/n)*ExpIntegralEi[(-3*(a + b*Log[c*x^n]))/(b*n
)] + (b*n*(3*a - b*n + 3*b*Log[c*x^n]))/(a + b*Log[c*x^n])^2)/(2*b^3*n^3*x^
3)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.20, size = 455, normalized size = 4.33

method	result
risch	$\frac{6a+6b\ln(c)+6\ln(x^n)b-3ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+3ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+3ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-3ib\pi\text{csgn}(ic\,x^n)^3}{b^2n^2\left(2a+2b\ln(c)+2\ln(x^n)b-ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(ic\,x^n)+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,x^n)^2+ib\pi\,\text{csgn}(ix^n)\text{csgn}(ic\,x^n)^2-ib\pi\text{csgn}(ic\,x^n)^3\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^4/(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

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

```
*(x^n)^(3/n)*exp(3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*
x^n)^3+2*a)/b/n)*Ei(1,3*ln(x)+3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b
*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*b*(ln(x^n)-n*ln(x))+2*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 221 vs. 2(98) = 196.
time = 0.38, size = 221, normalized size = 2.10

$$\frac{3\,b^{2}n^{2}\log\left(x\right)-b^{2}n^{2}+3\,b^{2}n\log\left(c\right)+3\,abn+9\,\left(b^{2}n^{2}x^{3}\log\left(x\right)^{2}+b^{2}x^{3}\log\left(c\right)^{2}+2\,abx^{3}\log\left(c\right)+a^{2}x^{3}+2\,\left(b^{2}nx^{3}\log\left(c\right)+abnx^{3}\right)\log\left(x\right)\right)e^{\left(\frac{3\,\left(b\log\left(c\right)+a\right)}{bn}\right)}\operatorname{log\_integral}\left(\frac{e^{\left(-\frac{3\,\left(b\log\left(c\right)+a\right)}{bn}\right)}}{x^{3}}\right)}{2\,\left(b^{5}n^{5}x^{3}\log\left(x\right)^{2}+b^{5}n^{3}x^{3}\log\left(c\right)^{2}+2\,ab^{4}n^{3}x^{3}\log\left(c\right)+a^{2}b^{3}n^{3}x^{3}+2\,\left(b^{5}n^{4}x^{3}\log\left(c\right)+ab^{4}n^{4}x^{3}\right)\log\left(x\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] 1/2*(3*b^2*n^2*log(x) - b^2*n^2 + 3*b^2*n*log(c) + 3*a*b*n + 9*(b^2*n^2*x^3
*log(x)^2 + b^2*x^3*log(c)^2 + 2*a*b*x^3*log(c) + a^2*x^3 + 2*(b^2*n*x^3*lo
g(c) + a*b*n*x^3)*log(x))*e^(3*(b*log(c) + a)/(b*n))*log_integral(e^(-3*(b*
log(c) + a)/(b*n))/x^3))/(b^5*n^5*x^3*log(x)^2 + b^5*n^3*x^3*log(c)^2 + 2*a
*b^4*n^3*x^3*log(c) + a^2*b^3*n^3*x^3 + 2*(b^5*n^4*x^3*log(c) + a*b^4*n^4*x
^3)*log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^{4}\left(a+b\log\left(cx^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**4/(a+b*ln(c*x**n))**3,x)
```

```
[Out] Integral(1/(x**4*(a + b*log(c*x**n))**3), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^4/(a+b*log(c*x^n))^3,x, algorithm="giac")
[Out] integrate(1/((b*log(c*x^n) + a)^3*x^4), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^4\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^4*(a + b*log(c*x^n))^3),x)
[Out] int(1/(x^4*(a + b*log(c*x^n))^3), x)
```

3.89 $\int (dx)^{5/2} (a + b \log (cx^n)) \, dx$

Optimal. Leaf size=41

$$-\frac{4bn(dx)^{7/2}}{49d} + \frac{2(dx)^{7/2} (a + b \log (cx^n))}{7d}$$

```
[Out] -4/49*b*n*(d*x)^(7/2)/d+2/7*(d*x)^(7/2)*(a+b*ln(c*x^n))/d
```

Rubi [A]
time = 0.01, antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = $\{2341\}$

$$\frac{2(dx)^{7/2} (a + b \log (cx^n))}{7d} - \frac{4bn(dx)^{7/2}}{49d}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(5/2)*(a + b*Log[c*x^n]),x]
[Out] (-4*b*n*(d*x)^(7/2))/(49*d) + (2*(d*x)^(7/2)*(a + b*Log[c*x^n]))/(7*d)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (dx)^{5/2} (a + b \log (cx^n)) \, dx = -\frac{4bn(dx)^{7/2}}{49d} + \frac{2(dx)^{7/2} (a + b \log (cx^n))}{7d}$$

Mathematica [A]
time = 0.01, size = 29, normalized size = 0.71

$$\frac{2}{49} x (dx)^{5/2} (7a - 2bn + 7b \log (cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(5/2)*(a + b*Log[c*x^n]),x]
[Out] (2*x*(d*x)^(5/2)*(7*a - 2*b*n + 7*b*Log[c*x^n]))/49
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.07, size = 128, normalized size = 3.12

method	result
risch	$\frac{2d^3x^4b\ln(x^n)}{7\sqrt{dx}}+\frac{d^3\left(-7ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)+7ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+7ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2-7ib\pi\mathrm{csgn}(icx^n)^3+\right.}{49\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 2/7*d^3*x^4*b/(d*x)^(1/2)*ln(x^n)+1/49*d^3*(-7*I*b*Pi*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+7*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+7*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-7*I*b*Pi*csgn(I*c*x^n)^3+14*b*ln(c)-4*b*n+14*a)*x^4/(d*x)^(1/2)
```

Maxima [A]
time = 0.29, size = 41, normalized size = 1.00

$$-\frac{4\,(dx)^{\frac{7}{2}}\,bn}{49\,d}+\frac{2\,(dx)^{\frac{7}{2}}\,b\log\left(cx^n\right)}{7\,d}+\frac{2\,(dx)^{\frac{7}{2}}\,a}{7\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -4/49*(d*x)^(7/2)*b*n/d + 2/7*(d*x)^(7/2)*b*log(c*x^n)/d + 2/7*(d*x)^(7/2)*
a/d
```

Fricas [A]
time = 0.39, size = 50, normalized size = 1.22

$$\frac{2}{49}\left(7\,bd^2nx^3\log\left(x\right)+7\,bd^2x^3\log\left(c\right)-\left(2\,bd^2n-7\,ad^2\right)x^3\right)\sqrt{dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 2/49*(7*b*d^2*n*x^3*log(x) + 7*b*d^2*x^3*log(c) - (2*b*d^2*n - 7*a*d^2)*x^3
)*sqrt(d*x)
```

Sympy [A]
time = 18.86, size = 48, normalized size = 1.17

$$\frac{2ax(dx)^{\frac{5}{2}}}{7}-\frac{4bnx(dx)^{\frac{5}{2}}}{49}+\frac{2bx(dx)^{\frac{5}{2}}\log\left(cx^n\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(5/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] 2*a*x*(d*x)**(5/2)/7 - 4*b*n*x*(d*x)**(5/2)/49 + 2*b*x*(d*x)**(5/2)*log(c*x
**n)/7
```

Giac [C] Result contains complex when optimal does not.
time = 2.33, size = 117, normalized size = 2.85

$$\left(\frac{1}{7}i+\frac{1}{7}\right)\sqrt{2}\,bd^2nx^{\frac{7}{2}}\sqrt{|d|}\,\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log(x)-\left(\frac{1}{7}i-\frac{1}{7}\right)\sqrt{2}\,bd^2nx^{\frac{7}{2}}\sqrt{|d|}\,\log(x)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-\left(\frac{2}{49}i+\frac{2}{49}\right)\sqrt{2}\,bd^2nx^{\frac{7}{2}}\sqrt{|d|}\,\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(\frac{2}{49}i-\frac{2}{49}\right)\sqrt{2}\,bd^2nx^{\frac{7}{2}}\sqrt{|d|}\,\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\frac{2}{7}bd^{\frac{5}{2}}x^{\frac{7}{2}}\log(c)+\frac{2}{7}ad^{\frac{5}{2}}x^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] (1/7*I + 1/7)*sqrt(2)*b*d^2*n*x^(7/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))*log(x
) - (1/7*I - 1/7)*sqrt(2)*b*d^2*n*x^(7/2)*sqrt(abs(d))*log(x)*sin(1/4*pi*sg
n(d)) - (2/49*I + 2/49)*sqrt(2)*b*d^2*n*x^(7/2)*sqrt(abs(d))*cos(1/4*pi*sgn
(d)) + (2/49*I - 2/49)*sqrt(2)*b*d^2*n*x^(7/2)*sqrt(abs(d))*sin(1/4*pi*sgn(
d)) + 2/7*b*d^(5/2)*x^(7/2)*log(c) + 2/7*a*d^(5/2)*x^(7/2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (d\,x)^{5/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int((d*x)^(5/2)*(a + b*log(c*x^n)), x)
```

3.90 $\int (dx)^{3/2} (a + b\log(cx^n)) \, dx$

Optimal. Leaf size=41

$$-\frac{4bn(dx)^{5/2}}{25d} + \frac{2(dx)^{5/2}(a + b\log(cx^n))}{5d}$$

```
[Out] -4/25*b*n*(d*x)^(5/2)/d+2/5*(d*x)^(5/2)*(a+b*ln(c*x^n))/d
```

Rubi [A]
time = 0.01, antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2341}

$$\frac{2(dx)^{5/2}(a + b\log(cx^n))}{5d} - \frac{4bn(dx)^{5/2}}{25d}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(3/2)*(a + b*Log[c*x^n]),x]
[Out] (-4*b*n*(d*x)^(5/2))/(25*d) + (2*(d*x)^(5/2)*(a + b*Log[c*x^n]))/(5*d)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (dx)^{3/2}(a + b\log(cx^n)) \, dx = -\frac{4bn(dx)^{5/2}}{25d} + \frac{2(dx)^{5/2}(a + b\log(cx^n))}{5d}$$

Mathematica [A]
time = 0.01, size = 29, normalized size = 0.71

$$\frac{2}{25}x(dx)^{3/2}(5a - 2bn + 5b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(3/2)*(a + b*Log[c*x^n]),x]
[Out] (2*x*(d*x)^(3/2)*(5*a - 2*b*n + 5*b*Log[c*x^n]))/25
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.07, size = 128, normalized size = 3.12

method	result
risch	$\frac{2d^2x^3b\ln(x^n)}{5\sqrt{dx}}+\frac{d^2\left(-5ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+5ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+5ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-5ib\pi\mathrm{csgn}(ic\,x^n)\right.}{25\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

```
[Out] 2/5*d^2*x^3*b/(d*x)^(1/2)*ln(x^n)+1/25*d^2*(-5*I*b*Pi*csgn(I*c)*csgn(I*x^n)
*csgn(I*c*x^n)+5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+5*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-5*I*b*Pi*csgn(I*c*x^n)^3+10*b*ln(c)-4*b*n+10*a)*x^3/(d*x)^(1/2)
```

Maxima [A]
time = 0.28, size = 41, normalized size = 1.00

$$-\frac{4\,(dx)^{\frac{5}{2}}\,bn}{25\,d}+\frac{2\,(dx)^{\frac{5}{2}}\,b\log\left(cx^n\right)}{5\,d}+\frac{2\,(dx)^{\frac{5}{2}}\,a}{5\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -4/25*(d*x)^(5/2)*b*n/d + 2/5*(d*x)^(5/2)*b*log(c*x^n)/d + 2/5*(d*x)^(5/2)*
a/d
```

Fricas [A]
time = 0.42, size = 42, normalized size = 1.02

$$\frac{2}{25}\left(5\,bdnx^2\log\left(x\right)+5\,bdx^2\log\left(c\right)-\left(2\,bdn-5\,ad\right)x^2\right)\sqrt{dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] 2/25*(5*b*d*n*x^2*log(x) + 5*b*d*x^2*log(c) - (2*b*d*n - 5*a*d)*x^2)*sqrt(d
*x)
```

Sympy [A]
time = 2.61, size = 48, normalized size = 1.17

$$\frac{2ax(dx)^{\frac{3}{2}}}{5}-\frac{4bnx(dx)^{\frac{3}{2}}}{25}+\frac{2bx(dx)^{\frac{3}{2}}\log\left(cx^n\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)*(a+b*ln(c*x**n)),x)
```

```
[Out] 2*a*x*(d*x)**(3/2)/5 - 4*b*n*x*(d*x)**(3/2)/25 + 2*b*x*(d*x)**(3/2)*log(c*x
**n)/5
```

Giac [C] Result contains complex when optimal does not.
time = 3.36, size = 108, normalized size = 2.63

$$-\frac{1}{25}\left(-(5i+5)\sqrt{2}\,bnx^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log(x)+(5i-5)\sqrt{2}\,bnx^{\frac{5}{2}}\sqrt{|d|}\log(x)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+(2i+2)\sqrt{2}\,bnx^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-(2i-2)\sqrt{2}\,bnx^{\frac{5}{2}}\sqrt{|d|}\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-10\,b\sqrt{d}\,x^{\frac{5}{2}}\log(c)-10\,a\sqrt{d}\,x^{\frac{5}{2}}\right)d$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] -1/25*(-(5*I + 5)*sqrt(2)*b*n*x^(5/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))*log(x
) + (5*I - 5)*sqrt(2)*b*n*x^(5/2)*sqrt(abs(d))*log(x)*sin(1/4*pi*sgn(d)) +
(2*I + 2)*sqrt(2)*b*n*x^(5/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d)) - (2*I - 2)*s
qrt(2)*b*n*x^(5/2)*sqrt(abs(d))*sin(1/4*pi*sgn(d)) - 10*b*sqrt(d)*x^(5/2)*l
og(c) - 10*a*sqrt(d)*x^(5/2))*d
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (d\,x)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a + b*log(c*x^n)),x)
```

```
[Out] int((d*x)^(3/2)*(a + b*log(c*x^n)), x)
```

3.91 $\int \sqrt{dx}\,(a+b\log(cx^n))\,dx$

Optimal. Leaf size=41

$$-\frac{4bn(dx)^{3/2}}{9d}+\frac{2(dx)^{3/2}(a+b\log(cx^n))}{3d}$$

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

Rubi [A]
time = 0.01, antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2341}

$$\frac{2(dx)^{3/2}(a+b\log(cx^n))}{3d}-\frac{4bn(dx)^{3/2}}{9d}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[d*x]*(a + b*Log[c*x^n]),x]
[Out] (-4*b*n*(d*x)^(3/2))/(9*d) + (2*(d*x)^(3/2)*(a + b*Log[c*x^n]))/(3*d)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \sqrt{dx}\,(a+b\log(cx^n))\,dx=-\frac{4bn(dx)^{3/2}}{9d}+\frac{2(dx)^{3/2}(a+b\log(cx^n))}{3d}$$

Mathematica [A]
time = 0.01, size = 29, normalized size = 0.71

$$\frac{2}{9}x\sqrt{dx}\,(3a-2bn+3b\log(cx^n))$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[d*x]*(a + b*Log[c*x^n]),x]
[Out] (2*x*Sqrt[d*x]*(3*a - 2*b*n + 3*b*Log[c*x^n]))/9
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 124, normalized size = 3.02

method	result
risch	$\frac{2db\,x^2\ln(x^n)}{3\sqrt{dx}}+\frac{d\left(-3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+3ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-3ib\pi\mathrm{csgn}(ic\,x^n)^3+6\right.}{9\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [A]
time = 0.28, size = 41, normalized size = 1.00

$$-\frac{4\,(dx)^{\frac{3}{2}}\,bn}{9\,d}+\frac{2\,(dx)^{\frac{3}{2}}\,b\log\left(cx^n\right)}{3\,d}+\frac{2\,(dx)^{\frac{3}{2}}\,a}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.44, size = 32, normalized size = 0.78

$$\frac{2}{9}\left(3\,bnx\log\left(x\right)+3\,bx\log\left(c\right)-(2\,bn-3\,a)x\right)\sqrt{dx}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [A]
time = 0.23, size = 48, normalized size = 1.17

$$\frac{2ax\sqrt{dx}}{3}-\frac{4bnx\sqrt{dx}}{9}+\frac{2bx\sqrt{dx}\,\log\left(cx^n\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)*(a+b*ln(c*x**n)),x)
```

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

Giac [C] Result contains complex when optimal does not.
time = 3.36, size = 105, normalized size = 2.56

$$\left(\frac{1}{3}i+\frac{1}{3}\right)\sqrt{2}\,bnx^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log\left(x\right)-\left(\frac{1}{3}i-\frac{1}{3}\right)\sqrt{2}\,bnx^{\frac{3}{2}}\sqrt{|d|}\log\left(x\right)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-\left(\frac{2}{9}i+\frac{2}{9}\right)\sqrt{2}\,bnx^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(\frac{2}{9}i-\frac{2}{9}\right)\sqrt{2}\,bnx^{\frac{3}{2}}\sqrt{|d|}\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\frac{2}{3}\,b\sqrt{d}\,x^{\frac{3}{2}}\log\left(c\right)+\frac{2}{3}\,a\sqrt{d}\,x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (1/3*I + 1/3)*sqrt(2)*b*n*x^(3/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))*log(x) -
(1/3*I - 1/3)*sqrt(2)*b*n*x^(3/2)*sqrt(abs(d))*log(x)*sin(1/4*pi*sgn(d)) -
(2/9*I + 2/9)*sqrt(2)*b*n*x^(3/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d)) + (2/9*I
- 2/9)*sqrt(2)*b*n*x^(3/2)*sqrt(abs(d))*sin(1/4*pi*sgn(d)) + 2/3*b*sqrt(d)*
x^(3/2)*log(c) + 2/3*a*sqrt(d)*x^(3/2)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \sqrt{d\,x}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)*(a + b*log(c*x^n)),x)
```

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

3.92 $\int \frac{a+b\log(cx^n)}{\sqrt{dx}}\,dx$

Optimal. Leaf size=37

$$-\frac{4bn\sqrt{dx}}{d}+\frac{2\sqrt{dx}\,(a+b\log(cx^n))}{d}$$

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

Rubi [A]
time = 0.01, antiderivative size = 37, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2341}

$$\frac{2\sqrt{dx}\,(a+b\log(cx^n))}{d}-\frac{4bn\sqrt{dx}}{d}$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{\sqrt{dx}}\,dx=-\frac{4bn\sqrt{dx}}{d}+\frac{2\sqrt{dx}\,(a+b\log(cx^n))}{d}$$

Mathematica [A]
time = 0.01, size = 24, normalized size = 0.65

$$\frac{2x(a-2bn+b\log(cx^n))}{\sqrt{dx}}$$

Antiderivative was successfully verified.

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

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

Maple [A]
time = 0.05, size = 36, normalized size = 0.97

method	result
derivativedivides	$\frac{2\sqrt{dx}\,a+2\sqrt{dx}\,b\ln(c\,x^n)-4bn\sqrt{dx}}{d}$
default	$\frac{2\sqrt{dx}\,a+2\sqrt{dx}\,b\ln(c\,x^n)-4bn\sqrt{dx}}{d}$
risch	$\frac{2bx\ln(x^n)}{\sqrt{dx}}+\frac{\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x}{\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [A]
time = 0.29, size = 41, normalized size = 1.11

$$-\frac{4\sqrt{dx}\,bn}{d}+\frac{2\sqrt{dx}\,b\log\left(cx^n\right)}{d}+\frac{2\sqrt{dx}\,a}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.42, size = 25, normalized size = 0.68

$$\frac{2\left(bn\log\left(x\right)-2\,bn+b\log\left(c\right)+a\right)\sqrt{dx}}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a+b*log(c*x^n))/(d*x)^(1/2),x, algorithm="fricas")

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

Sympy [A]
time = 0.24, size = 42, normalized size = 1.14

$$\frac{2ax}{\sqrt{dx}}-\frac{4bnx}{\sqrt{dx}}+\frac{2bx\log\left(cx^n\right)}{\sqrt{dx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d*x)**(1/2),x)
[Out] 2*a*x/sqrt(d*x) - 4*b*n*x/sqrt(d*x) + 2*b*x*log(c*x**n)/sqrt(d*x)
```

Giac [**A**]
time = 1.56, size = 41, normalized size = 1.11

$$\frac{2\left(\left(\sqrt{dx}\,\log\left(x\right)-2\,\sqrt{dx}\right)bn+\sqrt{dx}\,b\log\left(c\right)+\sqrt{dx}\,a\right)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{d\,x}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d*x)^(1/2),x)
[Out] int((a + b*log(c*x^n))/(d*x)^(1/2), x)
```

3.93 $\int \frac{a+b\log(cx^n)}{(dx)^{3/2}}\,dx$

Optimal. Leaf size=37

$$-\frac{4bn}{d\sqrt{dx}}-\frac{2(a+b\log(cx^n))}{d\sqrt{dx}}$$

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

Rubi [A]
time = 0.01, antiderivative size = 37, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = $\{2341\}$

$$-\frac{2(a+b\log(cx^n))}{d\sqrt{dx}}-\frac{4bn}{d\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d*x)^(3/2),x]
[Out] (-4*b*n)/(d*Sqrt[d*x]) - (2*(a + b*Log[c*x^n]))/(d*Sqrt[d*x])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(dx)^{3/2}}\,dx=-\frac{4bn}{d\sqrt{dx}}-\frac{2(a+b\log(cx^n))}{d\sqrt{dx}}$$

Mathematica [A]
time = 0.01, size = 24, normalized size = 0.65

$$-\frac{2x(a+2bn+b\log(cx^n))}{(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d*x)^(3/2),x]
[Out] (-2*x*(a + 2*b*n + b*Log[c*x^n]))/(d*x)^(3/2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 122, normalized size = 3.30

method	result
risch	$-\frac{2b\ln(x^n)}{d\sqrt{dx}}-\frac{-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(ic\,x^n)^3+2b\ln(c)+4}{d\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d*x)^(3/2),x,method=_RETURNVERBOSE)
```

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

Maxima [A]
time = 0.30, size = 41, normalized size = 1.11

$$-\frac{4\,bn}{\sqrt{dx}\,d}-\frac{2\,b\log\left(cx^n\right)}{\sqrt{dx}\,d}-\frac{2\,a}{\sqrt{dx}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d*x)^(3/2),x, algorithm="maxima")
```

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

Fricas [A]
time = 0.47, size = 28, normalized size = 0.76

$$-\frac{2\left(bn\log\left(x\right)+2\,bn+b\log\left(c\right)+a\right)\sqrt{dx}}{d^2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d*x)^(3/2),x, algorithm="fricas")
```

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

Sympy [A]
time = 0.61, size = 44, normalized size = 1.19

$$-\frac{2ax}{(dx)^{\frac{3}{2}}}-\frac{4bnx}{(dx)^{\frac{3}{2}}}-\frac{2bx\log\left(cx^n\right)}{(dx)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d*x)**(3/2),x)
```

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

Giac [A]
time = 3.04, size = 43, normalized size = 1.16

$$-\frac{2\left(\frac{bn\log(dx)}{\sqrt{dx}}-\frac{bn\log(d)-2\,bn-b\log(c)-a}{\sqrt{dx}}\right)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d*x)^(3/2),x, algorithm="giac")
[Out] -2*(b*n*log(d*x)/sqrt(d*x) - (b*n*log(d) - 2*b*n - b*log(c) - a)/sqrt(d*x))
/d
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{{\left(d\,x\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d*x)^(3/2),x)
[Out] int((a + b*log(c*x^n))/(d*x)^(3/2), x)
```

3.94 $\int \frac{a+b\log(cx^n)}{(dx)^{5/2}}\,dx$

Optimal. Leaf size=41

$$-\frac{4bn}{9d(dx)^{3/2}}-\frac{2(a+b\log(cx^n))}{3d(dx)^{3/2}}$$

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

Rubi [A]
time = 0.01, antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {2341}

$$-\frac{2(a+b\log(cx^n))}{3d(dx)^{3/2}}-\frac{4bn}{9d(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])/(d*x)^(5/2),x]
```

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{a+b\log(cx^n)}{(dx)^{5/2}}\,dx=-\frac{4bn}{9d(dx)^{3/2}}-\frac{2(a+b\log(cx^n))}{3d(dx)^{3/2}}$$

Mathematica [A]
time = 0.01, size = 29, normalized size = 0.71

$$-\frac{2x(3a+2bn+3b\log(cx^n))}{9(dx)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])/(d*x)^(5/2),x]
```

```
[Out] (-2*x*(3*a + 2*b*n + 3*b*Log[c*x^n]))/(9*(d*x)^(5/2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 128, normalized size = 3.12

method	result
risch	$-\frac{2b\ln(x^n)}{3d^2x\sqrt{dx}} - \frac{-3ib\pi\,\text{csgn}(ic)\text{csgn}(ix^n)\text{csgn}(icx^n)+3ib\pi\,\text{csgn}(ic)\text{csgn}(icx^n)^2+3ib\pi\,\text{csgn}(ix^n)\text{csgn}(icx^n)^2-3ib\pi\text{csgn}(icx^n)^3+}{9d^2x\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))/(d*x)^(5/2),x,method=_RETURNVERBOSE)
```

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

Maxima [A]
time = 0.31, size = 41, normalized size = 1.00

$$-\frac{4\,bn}{9\,(dx)^{\frac{3}{2}}\,d} - \frac{2\,b\log\left(cx^n\right)}{3\,(dx)^{\frac{3}{2}}\,d} - \frac{2\,a}{3\,(dx)^{\frac{3}{2}}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d*x)^(5/2),x, algorithm="maxima")
```

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

Fricas [A]
time = 0.44, size = 32, normalized size = 0.78

$$-\frac{2\,(3\,bn\log(x) + 2\,bn + 3\,b\log(c) + 3\,a)\sqrt{dx}}{9\,d^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d*x)^(5/2),x, algorithm="fricas")
```

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

Sympy [A]
time = 3.18, size = 49, normalized size = 1.20

$$-\frac{2ax}{3\,(dx)^{\frac{5}{2}}} - \frac{4bnx}{9\,(dx)^{\frac{5}{2}}} - \frac{2bx\log\left(cx^n\right)}{3\,(dx)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))/(d*x)**(5/2),x)
```

```
[Out] -2*a*x/(3*(d*x)**(5/2)) - 4*b*n*x/(9*(d*x)**(5/2)) - 2*b*x*log(c*x**n)/(3*(
d*x)**(5/2))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 67 vs. $2(33) = 66$.
time = 3.08, size = 67, normalized size = 1.63

$$-\frac{2\left(\frac{3\,bdn\log(dx)}{\sqrt{dx}\,x}-\frac{3\,bd^2n\log(d)-2\,bd^2n-3\,bd^2\log(c)-3\,ad^2}{\sqrt{dx}\,dx}\right)}{9\,d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))/(d*x)^(5/2),x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{a+b\,\ln\left(c\,x^n\right)}{{\left(d\,x\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))/(d*x)^(5/2),x)
```

```
[Out] int((a + b*log(c*x^n))/(d*x)^(5/2), x)
```

3.95 $\int (dx)^{5/2} \left(a+b \log \left(c x^n\right)\right)^2 \, dx$

Optimal. Leaf size=73

$$\frac{16b^2n^2(dx)^{7/2}}{343d} - \frac{8bn(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{49d} + \frac{2(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)^2}{7d}$$

```
[Out] 16/343*b^2*n^2*(d*x)^(7/2)/d-8/49*b*n*(d*x)^(7/2)*(a+b*ln(c*x^n))/d+2/7*(d*
x)^(7/2)*(a+b*ln(c*x^n))^2/d
```

Rubi [A]
time = 0.03, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2342, 2341}

$$\frac{2(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)^2}{7d} - \frac{8bn(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{49d} + \frac{16b^2n^2(dx)^{7/2}}{343d}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(5/2)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (16*b^2*n^2*(d*x)^(7/2))/(343*d) - (8*b*n*(d*x)^(7/2)*(a + b*Log[c*x^n]))/(
49*d) + (2*(d*x)^(7/2)*(a + b*Log[c*x^n])^2)/(7*d)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int (dx)^{5/2}\left(a+b\log\left(cx^n\right)\right)^2 \, dx &= \frac{2(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)^2}{7d} - \frac{1}{7}(4bn)\int (dx)^{5/2}\left(a+b\log\left(cx^n\right)\right) \, dx \\
&= \frac{16b^2n^2(dx)^{7/2}}{343d} - \frac{8bn(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{49d} + \frac{2(dx)^{7/2}\left(a+b\log\left(cx^n\right)\right)^2}{7d}
\end{aligned}$$

Mathematica [A]
time = 0.02, size = 61, normalized size = 0.84

$$\frac{2}{343}x(dx)^{5/2}\left(49a^2-28abn+8b^2n^2+14b(7a-2bn)\log\left(cx^n\right)+49b^2\log^2\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(5/2)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*x*(d*x)^(5/2)*(49*a^2 - 28*a*b*n + 8*b^2*n^2 + 14*b*(7*a - 2*b*n)*Log[c*
x^n] + 49*b^2*Log[c*x^n]^2))/343
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 716, normalized size = 9.81

method	result
risch	$\frac{2d^3x^4b^2\ln(x^n)^2}{7\sqrt{dx}}+\frac{2d^3x^4b(-7ib\pi\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)+7ib\pi\operatorname{csgn}(ic)\operatorname{csgn}(icx^n)^2+7ib\pi\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)^2-7ib\pi\operatorname{csgn}(i}{49\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 2/7*d^3*x^4*b^2/(d*x)^(1/2)*ln(x^n)^2+2/49*d^3*x^4*b*(-7*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+7*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+7*I*b*Pi*csgn(I
*x^n)*csgn(I*c*x^n)^2-7*I*b*Pi*csgn(I*c*x^n)^3+14*b*ln(c)-4*b*n+14*a)/(d*x)
^(1/2)*ln(x^n)+1/686*d^3*(196*a^2+196*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+19
6*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2-196*Pi^2*b^2*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)^4-49*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+
98*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+98*Pi^2*b^2*csgn(I*c)*c
sgn(I*x^n)^2*csgn(I*c*x^n)^3-112*b^2*ln(c)*n-112*b*a*n-49*Pi^2*b^2*csgn(I*c
*x^n)^6+392*a*b*ln(c)+196*b^2*ln(c)^2-196*I*Pi*a*b*csgn(I*c*x^n)^3+56*I*Pi*
b^2*n*csgn(I*c*x^n)^3-196*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3+32*b^2*n^2+196*I*P
i*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2-56*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-4
9*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+98*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^
5-49*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+98*Pi^2*b^2*csgn(I*x^n)*csgn(I*
c*x^n)^5-56*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+196*I*Pi*ln(c)*b^2*csgn(
I*c)*csgn(I*c*x^n)^2-196*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+56*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-196*I*Pi*a*b*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n))*x^4/(d*x)^(1/2)
```

Maxima [A]
time = 0.28, size = 102, normalized size = 1.40

$$\frac{2\,(dx)^{\frac{7}{2}}\,b^2\log\left(cx^n\right)^2}{7\,d}-\frac{8\,(dx)^{\frac{7}{2}}\,abn}{49\,d}+\frac{4\,(dx)^{\frac{7}{2}}\,ab\log\left(cx^n\right)}{7\,d}+\frac{2\,(dx)^{\frac{7}{2}}\,a^2}{7\,d}+\frac{8}{343}\left(\frac{2\,(dx)^{\frac{7}{2}}\,n^2}{d}-\frac{7\,(dx)^{\frac{7}{2}}\,n\log\left(cx^n\right)}{d}\right)b^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 2/7*(d*x)^(7/2)*b^2*log(c*x^n)^2/d - 8/49*(d*x)^(7/2)*a*b*n/d + 4/7*(d*x)^(
7/2)*a*b*log(c*x^n)/d + 2/7*(d*x)^(7/2)*a^2/d + 8/343*(2*(d*x)^(7/2)*n^2/d
- 7*(d*x)^(7/2)*n*log(c*x^n)/d)*b^2
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(61) = 122$.
time = 0.39, size = 141, normalized size = 1.93

$$\frac{2}{343}\left(49\, b^{2} d^{2} n^{2} x^{3} \log\left(x\right)^{2} + 49\, b^{2} d^{2} x^{3} \log\left(c\right)^{2} - 14\,{\left(2\, b^{2} d^{2} n - 7\, a b d^{2}\right)} x^{3} \log\left(c\right) + {\left(8\, b^{2} d^{2} n^{2} - 28\, a b d^{2} n + 49\, a^{2} d^{2}\right)} x^{3} + 14\,{\left(7\, b^{2} d^{2} n x^{3} \log\left(c\right) - {\left(2\, b^{2} d^{2} n^{2} - 7\, a b d^{2} n\right)} x^{3}\right)} \log\left(x\right)\right)} \sqrt{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 2/343*(49*b^2*d^2*n^2*x^3*log(x)^2 + 49*b^2*d^2*x^3*log(c)^2 - 14*(2*b^2*d^
2*n - 7*a*b*d^2)*x^3*log(c) + (8*b^2*d^2*n^2 - 28*a*b*d^2*n + 49*a^2*d^2)*x
^3 + 14*(7*b^2*d^2*n*x^3*log(c) - (2*b^2*d^2*n^2 - 7*a*b*d^2*n)*x^3)*log(x)
)*sqrt(d*x)
```

Sympy [A]
time = 29.84, size = 119, normalized size = 1.63

$$\frac{2a^2x(dx)^{\frac{5}{2}}}{7} - \frac{8abnx(dx)^{\frac{5}{2}}}{49} + \frac{4abx(dx)^{\frac{5}{2}}\log\left(cx^n\right)}{7} + \frac{16b^2n^2x(dx)^{\frac{5}{2}}}{343} - \frac{8b^2nx(dx)^{\frac{5}{2}}\log\left(cx^n\right)}{49} + \frac{2b^2x(dx)^{\frac{5}{2}}\log\left(cx^n\right)^2}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(5/2)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] 2*a**2*x*(d*x)**(5/2)/7 - 8*a*b*n*x*(d*x)**(5/2)/49 + 4*a*b*x*(d*x)**(5/2)*
log(c*x**n)/7 + 16*b**2*n**2*x*(d*x)**(5/2)/343 - 8*b**2*n*x*(d*x)**(5/2)*l
og(c*x**n)/49 + 2*b**2*x*(d*x)**(5/2)*log(c*x**n)**2/7
```

Giac [C] Result contains complex when optimal does not.
time = 4.07, size = 425, normalized size = 5.82

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] (1/7*I + 1/7)*sqrt(2)*b^2*d^2*n^2*x^(7/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))*l
og(x)^2 - (1/7*I - 1/7)*sqrt(2)*b^2*d^2*n^2*x^(7/2)*sqrt(abs(d))*log(x)^2*s
in(1/4*pi*sgn(d)) - (4/49*I + 4/49)*sqrt(2)*b^2*d^2*n^2*x^(7/2)*sqrt(abs(d)
)*cos(1/4*pi*sgn(d))*log(x) + (2/7*I + 2/7)*sqrt(2)*b^2*d^2*n*x^(7/2)*sqrt(
```

```
abs(d))*cos(1/4*pi*sgn(d))*log(c)*log(x) + (4/49*I - 4/49)*sqrt(2)*b^2*d^2*
n^2*x^(7/2)*sqrt(abs(d))*log(x)*sin(1/4*pi*sgn(d)) - (2/7*I - 2/7)*sqrt(2)*
b^2*d^2*n*x^(7/2)*sqrt(abs(d))*log(c)*log(x)*sin(1/4*pi*sgn(d)) + (8/343*I
+ 8/343)*sqrt(2)*b^2*d^2*n^2*x^(7/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d)) - (4/4
9*I + 4/49)*sqrt(2)*b^2*d^2*n*x^(7/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))*log(c
) + (2/7*I + 2/7)*sqrt(2)*a*b*d^2*n*x^(7/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))
*log(x) - (8/343*I - 8/343)*sqrt(2)*b^2*d^2*n^2*x^(7/2)*sqrt(abs(d))*sin(1/
4*pi*sgn(d)) + (4/49*I - 4/49)*sqrt(2)*b^2*d^2*n*x^(7/2)*sqrt(abs(d))*log(c
)*sin(1/4*pi*sgn(d)) - (2/7*I - 2/7)*sqrt(2)*a*b*d^2*n*x^(7/2)*sqrt(abs(d))
*log(x)*sin(1/4*pi*sgn(d)) - (4/49*I + 4/49)*sqrt(2)*a*b*d^2*n*x^(7/2)*sqrt
(abs(d))*cos(1/4*pi*sgn(d)) + (4/49*I - 4/49)*sqrt(2)*a*b*d^2*n*x^(7/2)*sqr
t(abs(d))*sin(1/4*pi*sgn(d)) + 2/7*b^2*d^(5/2)*x^(7/2)*log(c)^2 + 4/7*a*b*d
^(5/2)*x^(7/2)*log(c) + 2/7*a^2*d^(5/2)*x^(7/2)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x)^{5/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)*(a + b*log(c*x^n))^2,x)
[Out] int((d*x)^(5/2)*(a + b*log(c*x^n))^2, x)
```

3.96 $\int (dx)^{3/2} (a+b\log(cx^n))^2 \, dx$

Optimal. Leaf size=73

$$\frac{16b^2n^2(dx)^{5/2}}{125d}-\frac{8bn(dx)^{5/2}(a+b\log(cx^n))}{25d}+\frac{2(dx)^{5/2}(a+b\log(cx^n))^2}{5d}$$

```
[Out] 16/125*b^2*n^2*(d*x)^(5/2)/d-8/25*b*n*(d*x)^(5/2)*(a+b*ln(c*x^n))/d+2/5*(d*
x)^(5/2)*(a+b*ln(c*x^n))^2/d
```

Rubi [A]
time = 0.03, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2342, 2341}

$$\frac{2(dx)^{5/2}(a+b\log(cx^n))^2}{5d}-\frac{8bn(dx)^{5/2}(a+b\log(cx^n))}{25d}+\frac{16b^2n^2(dx)^{5/2}}{125d}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(3/2)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (16*b^2*n^2*(d*x)^(5/2))/(125*d) - (8*b*n*(d*x)^(5/2)*(a + b*Log[c*x^n]))/(
25*d) + (2*(d*x)^(5/2)*(a + b*Log[c*x^n])^2)/(5*d)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int (dx)^{3/2}(a+b\log(cx^n))^2\,dx &= \frac{2(dx)^{5/2}(a+b\log(cx^n))^2}{5d}-\frac{1}{5}(4bn)\int (dx)^{3/2}(a+b\log(cx^n))\,dx\\ &= \frac{16b^2n^2(dx)^{5/2}}{125d}-\frac{8bn(dx)^{5/2}(a+b\log(cx^n))}{25d}+\frac{2(dx)^{5/2}(a+b\log(cx^n))^2}{5d}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 61, normalized size = 0.84

$$\frac{2}{125}x(dx)^{3/2}\left(25a^2-20abn+8b^2n^2+10b(5a-2bn)\log\left(cx^n\right)+25b^2\log^2\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(3/2)*(a + b*Log[c*x^n])^2,x]
```

```
[Out] (2*x*(d*x)^(3/2)*(25*a^2 - 20*a*b*n + 8*b^2*n^2 + 10*b*(5*a - 2*b*n)*Log[c*
x^n] + 25*b^2*Log[c*x^n]^2))/125
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 716, normalized size = 9.81

method	result
risch	$\frac{2d^2b^2x^3\ln(x^n)^2}{5\sqrt{dx}}+\frac{2d^2x^3b\left(-5ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+5ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+5ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-5ib\pi\mathrm{csgn}(i\right.}{25\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] 2/5*d^2*b^2*x^3/(d*x)^(1/2)*ln(x^n)^2+2/25*d^2*x^3*b*(-5*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+5*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+5*I*b*Pi*csgn(I
*x^n)*csgn(I*c*x^n)^2-5*I*b*Pi*csgn(I*c*x^n)^3+10*b*ln(c)-4*b*n+10*a)/(d*x)
^(1/2)*ln(x^n)+1/250*d^2*(100*a^2-100*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)-100*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-25*Pi^2*b^
2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+50*Pi^2*b^2*csgn(I*c)^2*csgn(I*
x^n)*csgn(I*c*x^n)^3+50*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-80
*b^2*ln(c)*n-80*b*a*n-25*Pi^2*b^2*csgn(I*c*x^n)^6+200*a*b*ln(c)+100*b^2*ln(
c)^2+32*b^2*n^2+100*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2+100*I*Pi*a*b*c
sgn(I*x^n)*csgn(I*c*x^n)^2-40*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2+100*I*Pi
*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+100*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)
^2-100*I*Pi*a*b*csgn(I*c*x^n)^3+40*I*Pi*b^2*n*csgn(I*c*x^n)^3-100*I*Pi*ln(c
)*b^2*csgn(I*c*x^n)^3-40*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-25*Pi^2*b^2
*csgn(I*c)^2*csgn(I*c*x^n)^4+50*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-25*Pi^2*
b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+50*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5+4
0*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-100*I*Pi*a*b*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n))*x^3/(d*x)^(1/2)
```

Maxima [A]
time = 0.29, size = 102, normalized size = 1.40

$$\frac{2\,(dx)^{\frac{5}{2}}\,b^2\log\left(cx^n\right)^2}{5\,d}-\frac{8\,(dx)^{\frac{5}{2}}\,abn}{25\,d}+\frac{4\,(dx)^{\frac{5}{2}}\,ab\log\left(cx^n\right)}{5\,d}+\frac{2\,(dx)^{\frac{5}{2}}\,a^2}{5\,d}+\frac{8}{125}\left(\frac{2\,(dx)^{\frac{5}{2}}\,n^2}{d}-\frac{5\,(dx)^{\frac{5}{2}}\,n\log\left(cx^n\right)}{d}\right)b^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 2/5*(d*x)^(5/2)*b^2*log(c*x^n)^2/d - 8/25*(d*x)^(5/2)*a*b*n/d + 4/5*(d*x)^(
5/2)*a*b*log(c*x^n)/d + 2/5*(d*x)^(5/2)*a^2/d + 8/125*(2*(d*x)^(5/2)*n^2/d
- 5*(d*x)^(5/2)*n*log(c*x^n)/d)*b^2
```

Fricas [A]
time = 0.43, size = 121, normalized size = 1.66

$$\frac{2}{125}\left(25\,b^2dn^2x^2\log\left(x\right)^2+25\,b^2dx^2\log\left(c\right)^2-10\left(2\,b^2dn-5\,abd\right)x^2\log\left(c\right)+\left(8\,b^2dn^2-20\,abdn+25\,a^2d\right)x^2+10\left(5\,b^2dnx^2\log\left(c\right)-\left(2\,b^2dn^2-5\,abdn\right)x^2\right)\log\left(x\right)\right)\sqrt{dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] 2/125*(25*b^2*d*n^2*x^2*log(x)^2 + 25*b^2*d*x^2*log(c)^2 - 10*(2*b^2*d*n -
5*a*b*d)*x^2*log(c) + (8*b^2*d*n^2 - 20*a*b*d*n + 25*a^2*d)*x^2 + 10*(5*b^2
*d*n*x^2*log(c) - (2*b^2*d*n^2 - 5*a*b*d*n)*x^2)*log(x))*sqrt(d*x)
```

Sympy [A]
time = 4.40, size = 119, normalized size = 1.63

$$\frac{2a^2x(dx)^{\frac{3}{2}}}{5}-\frac{8abnx(dx)^{\frac{3}{2}}}{25}+\frac{4abx(dx)^{\frac{3}{2}}\log\left(cx^n\right)}{5}+\frac{16b^2n^2x(dx)^{\frac{3}{2}}}{125}-\frac{8b^2nx(dx)^{\frac{3}{2}}\log\left(cx^n\right)}{25}+\frac{2b^2x(dx)^{\frac{3}{2}}\log\left(cx^n\right)^2}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] 2*a**2*x*(d*x)**(3/2)/5 - 8*a*b*n*x*(d*x)**(3/2)/25 + 4*a*b*x*(d*x)**(3/2)*
log(c*x**n)/5 + 16*b**2*n**2*x*(d*x)**(3/2)/125 - 8*b**2*n*x*(d*x)**(3/2)*l
og(c*x**n)/25 + 2*b**2*x*(d*x)**(3/2)*log(c*x**n)**2/5
```

Giac [C] Result contains complex when optimal does not.
time = 4.75, size = 386, normalized size = 5.29

$$-\frac{1}{125}\left(-\left(25i+25\right)\sqrt{2}b^2n^2x^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log\left(x\right)^2+\left(25i-25\right)\sqrt{2}b^2n^2x^{\frac{5}{2}}\sqrt{|d|}\log\left(x\right)^2\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(20i+20\right)\sqrt{2}b^2n^2x^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log\left(x\right)-\left(50i+50\right)\sqrt{2}b^2nx^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log\left(c\right)\log\left(x\right)-\left(20i-20\right)\sqrt{2}b^2n^2x^{\frac{5}{2}}\sqrt{|d|}\log\left(x\right)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(50i-50\right)\sqrt{2}b^2nx^{\frac{5}{2}}\sqrt{|d|}\log\left(c\right)\log\left(x\right)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-\left(8i+8\right)\sqrt{2}b^2n^2x^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(20i+20\right)\sqrt{2}b^2nx^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log\left(c\right)-\left(50i+50\right)\sqrt{2}abnx^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)\log\left(x\right)+\left(8i-8\right)\sqrt{2}b^2n^2x^{\frac{5}{2}}\sqrt{|d|}\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-\left(20i-20\right)\sqrt{2}b^2nx^{\frac{5}{2}}\sqrt{|d|}\log\left(c\right)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(50i-50\right)\sqrt{2}abnx^{\frac{5}{2}}\sqrt{|d|}\log\left(x\right)\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)+\left(20i+20\right)\sqrt{2}abnx^{\frac{5}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-\left(20i-20\right)\sqrt{2}abnx^{\frac{5}{2}}\sqrt{|d|}\sin\left(\frac{1}{4}\pi\mathrm{sgn}(d)\right)-50b^2\sqrt{d}x^{\frac{5}{2}}\log\left(c\right)^2-100ab\sqrt{d}x^{\frac{5}{2}}\log\left(c\right)-50a^2\sqrt{d}x^{\frac{5}{2}}\right)d$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] -1/125*(-(25*I + 25)*sqrt(2)*b^2*n^2*x^(5/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d)
)*log(x)^2 + (25*I - 25)*sqrt(2)*b^2*n^2*x^(5/2)*sqrt(abs(d))*log(x)^2*sin(
1/4*pi*sgn(d)) + (20*I + 20)*sqrt(2)*b^2*n^2*x^(5/2)*sqrt(abs(d))*cos(1/4*p
i*sgn(d))*log(x) - (50*I + 50)*sqrt(2)*b^2*n*x^(5/2)*sqrt(abs(d))*cos(1/4*p
i*sgn(d))*log(c)*log(x) - (20*I - 20)*sqrt(2)*b^2*n^2*x^(5/2)*sqrt(abs(d))*
log(x)*sin(1/4*pi*sgn(d)) + (50*I - 50)*sqrt(2)*b^2*n*x^(5/2)*sqrt(abs(d))*
```

```
log(c)*log(x)*sin(1/4*pi*sgn(d)) - (8*I + 8)*sqrt(2)*b^2*n^2*x^(5/2)*sqrt(a
bs(d))*cos(1/4*pi*sgn(d)) + (20*I + 20)*sqrt(2)*b^2*n*x^(5/2)*sqrt(abs(d))*
cos(1/4*pi*sgn(d))*log(c) - (50*I + 50)*sqrt(2)*a*b*n*x^(5/2)*sqrt(abs(d))*
cos(1/4*pi*sgn(d))*log(x) + (8*I - 8)*sqrt(2)*b^2*n^2*x^(5/2)*sqrt(abs(d))*
sin(1/4*pi*sgn(d)) - (20*I - 20)*sqrt(2)*b^2*n*x^(5/2)*sqrt(abs(d))*log(c)*
sin(1/4*pi*sgn(d)) + (50*I - 50)*sqrt(2)*a*b*n*x^(5/2)*sqrt(abs(d))*log(x)*
sin(1/4*pi*sgn(d)) + (20*I + 20)*sqrt(2)*a*b*n*x^(5/2)*sqrt(abs(d))*cos(1/4
*pi*sgn(d)) - (20*I - 20)*sqrt(2)*a*b*n*x^(5/2)*sqrt(abs(d))*sin(1/4*pi*sgn
(d)) - 50*b^2*sqrt(d)*x^(5/2)*log(c)^2 - 100*a*b*sqrt(d)*x^(5/2)*log(c) - 5
0*a^2*sqrt(d)*x^(5/2))*d
```

Mupad [**F**]

time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x)^{3/2}\,(a+b\,\ln(c\,x^n))^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a + b*log(c*x^n))^2,x)
[Out] int((d*x)^(3/2)*(a + b*log(c*x^n))^2, x)
```

3.97 $\int \sqrt{dx}\,(a+b\log(cx^n))^2\,dx$

Optimal. Leaf size=73

$$\frac{16b^2n^2(dx)^{3/2}}{27d}-\frac{8bn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{9d}+\frac{2(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)^2}{3d}$$

```
[Out] 16/27*b^2*n^2*(d*x)^(3/2)/d-8/9*b*n*(d*x)^(3/2)*(a+b*ln(c*x^n))/d+2/3*(d*x)
^(3/2)*(a+b*ln(c*x^n))^2/d
```

Rubi [A]
time = 0.03, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2342, 2341}

$$-\frac{8bn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{9d}+\frac{2(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)^2}{3d}+\frac{16b^2n^2(dx)^{3/2}}{27d}$$

Antiderivative was successfully verified.

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

```
[Out] (16*b^2*n^2*(d*x)^(3/2))/(27*d) - (8*b*n*(d*x)^(3/2)*(a + b*Log[c*x^n]))/(9
*d) + (2*(d*x)^(3/2)*(a + b*Log[c*x^n])^2)/(3*d)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \sqrt{dx}\left(a+b\log\left(cx^n\right)\right)^2\,dx&=\frac{2(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)^2}{3d}-\frac{1}{3}(4bn)\int \sqrt{dx}\left(a+b\log\left(cx^n\right)\right)\,dx\\&=\frac{16b^2n^2(dx)^{3/2}}{27d}-\frac{8bn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{9d}+\frac{2(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)^2}{3d}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 61, normalized size = 0.84

$$\frac{2}{27}x\sqrt{dx}\left(9a^2-12abn+8b^2n^2+6b(3a-2bn)\log\left(cx^n\right)+9b^2\log^2\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

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

```
[Out] (2*x*Sqrt[d*x]*(9*a^2 - 12*a*b*n + 8*b^2*n^2 + 6*b*(3*a - 2*b*n)*Log[c*x^n]
 + 9*b^2*Log[c*x^n]^2))/27
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 710, normalized size = 9.73

method	result
risch	$\frac{2d\,x^2b^2\ln(x^n)^2}{3\sqrt{dx}}+\frac{2db\,x^2\left(-3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+3ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-3ib\pi\mathrm{csgn}(ic\right.}{9\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2/3*d*x^2*b^2/(d*x)^(1/2)*ln(x^n)^2+2/9*d*b*x^2*(-3*I*b*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3*I*b*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2-3*I*b*Pi*csgn(I*c*x^n)^3+6*b*ln(c)-4*b*n+6*a)/(d*x)^(1/2)*
ln(x^n)+1/54*d*(36*a^2-24*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2-36*I*Pi*a*b*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+24*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)-36*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-36*Pi^2*b^
2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-9*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^
2*csgn(I*c*x^n)^2+18*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+18*Pi
^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-48*b^2*ln(c)*n-48*b*a*n-9*Pi
^2*b^2*csgn(I*c*x^n)^6+72*a*b*ln(c)+36*b^2*ln(c)^2-36*I*Pi*ln(c)*b^2*csgn(I
*c*x^n)^3-36*I*Pi*a*b*csgn(I*c*x^n)^3+32*b^2*n^2+36*I*Pi*a*b*csgn(I*x^n)*cs
gn(I*c*x^n)^2-24*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*b^2*n*csgn(
I*c*x^n)^3+36*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2+36*I*Pi*ln(c)*b^2*cs
gn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2-9*Pi^2*b^2*
csgn(I*c)^2*csgn(I*c*x^n)^4+18*Pi^2*b^2*csgn(I*c)*csgn(I*c*x^n)^5-9*Pi^2*b^
2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+18*Pi^2*b^2*csgn(I*x^n)*csgn(I*c*x^n)^5)*x^
2/(d*x)^(1/2)
```

Maxima [A]
time = 0.29, size = 102, normalized size = 1.40

$$\frac{2\,(dx)^{\frac{3}{2}}\,b^2\log\left(cx^n\right)^2}{3\,d}-\frac{8\,(dx)^{\frac{3}{2}}\,abn}{9\,d}+\frac{4\,(dx)^{\frac{3}{2}}\,ab\log\left(cx^n\right)}{3\,d}+\frac{8}{27}\left(\frac{2\,(dx)^{\frac{3}{2}}\,n^2}{d}-\frac{3\,(dx)^{\frac{3}{2}}\,n\log\left(cx^n\right)}{d}\right)b^2+\frac{2\,(dx)^{\frac{3}{2}}\,a^2}{3\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2/3*(d*x)^(3/2)*b^2*log(c*x^n)^2/d - 8/9*(d*x)^(3/2)*a*b*n/d + 4/3*(d*x)^(3
/2)*a*b*log(c*x^n)/d + 8/27*(2*(d*x)^(3/2)*n^2/d - 3*(d*x)^(3/2)*n*log(c*x^
n)/d)*b^2 + 2/3*(d*x)^(3/2)*a^2/d
```

Fricas [A]
time = 0.38, size = 99, normalized size = 1.36

$$\frac{2}{27}\left(9\,b^{2}n^{2}x\log\left(x\right)^{2}+9\,b^{2}x\log\left(c\right)^{2}-6\left(2\,b^{2}n-3\,ab\right)x\log\left(c\right)+\left(8\,b^{2}n^{2}-12\,abn+9\,a^{2}\right)x+6\left(3\,b^{2}nx\log\left(c\right)-\left(2\,b^{2}n^{2}-3\,abn\right)x\right)\log\left(x\right)\right)\sqrt{dx}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2/27*(9*b^2*n^2*x*log(x)^2 + 9*b^2*x*log(c)^2 - 6*(2*b^2*n - 3*a*b)*x*log(c
) + (8*b^2*n^2 - 12*a*b*n + 9*a^2)*x + 6*(3*b^2*n*x*log(c) - (2*b^2*n^2 - 3
*a*b*n)*x)*log(x))*sqrt(d*x)
```

Sympy [A]
time = 0.44, size = 119, normalized size = 1.63

$$\frac{2a^{2}x\sqrt{dx}}{3}-\frac{8abnx\sqrt{dx}}{9}+\frac{4abx\sqrt{dx}\,\log\left(cx^{n}\right)}{3}+\frac{16b^{2}n^{2}x\sqrt{dx}}{27}-\frac{8b^{2}nx\sqrt{dx}\,\log\left(cx^{n}\right)}{9}+\frac{2b^{2}x\sqrt{dx}\,\log\left(cx^{n}\right)^{2}}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)*(a+b*ln(c*x**n))**2,x)
```

```
[Out] 2*a**2*x*sqrt(d*x)/3 - 8*a*b*n*x*sqrt(d*x)/9 + 4*a*b*x*sqrt(d*x)*log(c*x**n
)/3 + 16*b**2*n**2*x*sqrt(d*x)/27 - 8*b**2*n*x*sqrt(d*x)*log(c*x**n)/9 + 2*
b**2*x*sqrt(d*x)*log(c*x**n)**2/3
```

Giac [C] Result contains complex when optimal does not.
time = 3.90, size = 383, normalized size = 5.25

$$\left(\frac{1}{3}i+\frac{1}{3}\right)\sqrt{2}\,b^{2}n^{2}x^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)\log\left(x\right)^{2}-\left(\frac{1}{3}i-\frac{1}{3}\right)\sqrt{2}\,b^{2}n^{2}x^{\frac{3}{2}}\sqrt{|d|}\log\left(x\right)^{2}\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)-\left(\frac{4}{9}i+\frac{4}{9}\right)\sqrt{2}\,b^{2}n^{2}x^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)\log\left(x\right)+\left(\frac{2}{3}i+\frac{2}{3}\right)\sqrt{2}\,b^{2}nx^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)\log\left(c\right)\log\left(x\right)+\left(\frac{4}{9}i-\frac{4}{9}\right)\sqrt{2}\,b^{2}n^{2}x^{\frac{3}{2}}\sqrt{|d|}\log\left(x\right)\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)-\left(\frac{2}{3}i-\frac{2}{3}\right)\sqrt{2}\,b^{2}nx^{\frac{3}{2}}\sqrt{|d|}\log\left(c\right)\log\left(x\right)\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)+\left(\frac{8}{27}i+\frac{8}{27}\right)\sqrt{2}\,b^{2}n^{2}x^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)-\left(\frac{4}{9}i+\frac{4}{9}\right)\sqrt{2}\,b^{2}nx^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)\log\left(c\right)+\left(\frac{2}{3}i+\frac{2}{3}\right)\sqrt{2}\,abnx^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)\log\left(x\right)-\left(\frac{8}{27}i-\frac{8}{27}\right)\sqrt{2}\,b^{2}n^{2}x^{\frac{3}{2}}\sqrt{|d|}\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)+\left(\frac{4}{9}i-\frac{4}{9}\right)\sqrt{2}\,b^{2}nx^{\frac{3}{2}}\sqrt{|d|}\log\left(c\right)\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)-\left(\frac{2}{3}i-\frac{2}{3}\right)\sqrt{2}\,abnx^{\frac{3}{2}}\sqrt{|d|}\log\left(x\right)\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)-\left(\frac{4}{9}i+\frac{4}{9}\right)\sqrt{2}\,abnx^{\frac{3}{2}}\sqrt{|d|}\cos\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)+\left(\frac{4}{9}i-\frac{4}{9}\right)\sqrt{2}\,abnx^{\frac{3}{2}}\sqrt{|d|}\sin\left(\frac{1}{4}\pi\operatorname{sgn}(d)\right)+\frac{2}{3}\,b^{2}\sqrt{d}\,x^{\frac{3}{2}}\log\left(c\right)^{2}+\frac{4}{3}\,ab\sqrt{d}\,x^{\frac{3}{2}}\log\left(c\right)+\frac{2}{3}\,a^{2}\sqrt{d}\,x^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (1/3*I + 1/3)*sqrt(2)*b^2*n^2*x^(3/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d))*log(x
)^2 - (1/3*I - 1/3)*sqrt(2)*b^2*n^2*x^(3/2)*sqrt(abs(d))*log(x)^2*sin(1/4*p
i*sgn(d)) - (4/9*I + 4/9)*sqrt(2)*b^2*n^2*x^(3/2)*sqrt(abs(d))*cos(1/4*pi*s
gn(d))*log(x) + (2/3*I + 2/3)*sqrt(2)*b^2*n*x^(3/2)*sqrt(abs(d))*cos(1/4*pi
*sgn(d))*log(c)*log(x) + (4/9*I - 4/9)*sqrt(2)*b^2*n^2*x^(3/2)*sqrt(abs(d))
*log(x)*sin(1/4*pi*sgn(d)) - (2/3*I - 2/3)*sqrt(2)*b^2*n*x^(3/2)*sqrt(abs(d
```

```
))*log(c)*log(x)*sin(1/4*pi*sgn(d)) + (8/27*I + 8/27)*sqrt(2)*b^2*n^2*x^(3/
2)*sqrt(abs(d))*cos(1/4*pi*sgn(d)) - (4/9*I + 4/9)*sqrt(2)*b^2*n*x^(3/2)*sq
rt(abs(d))*cos(1/4*pi*sgn(d))*log(c) + (2/3*I + 2/3)*sqrt(2)*a*b*n*x^(3/2)*
sqrt(abs(d))*cos(1/4*pi*sgn(d))*log(x) - (8/27*I - 8/27)*sqrt(2)*b^2*n^2*x^
(3/2)*sqrt(abs(d))*sin(1/4*pi*sgn(d)) + (4/9*I - 4/9)*sqrt(2)*b^2*n*x^(3/2)
*sqrt(abs(d))*log(c)*sin(1/4*pi*sgn(d)) - (2/3*I - 2/3)*sqrt(2)*a*b*n*x^(3/
2)*sqrt(abs(d))*log(x)*sin(1/4*pi*sgn(d)) - (4/9*I + 4/9)*sqrt(2)*a*b*n*x^(
3/2)*sqrt(abs(d))*cos(1/4*pi*sgn(d)) + (4/9*I - 4/9)*sqrt(2)*a*b*n*x^(3/2)*
sqrt(abs(d))*sin(1/4*pi*sgn(d)) + 2/3*b^2*sqrt(d)*x^(3/2)*log(c)^2 + 4/3*a*
b*sqrt(d)*x^(3/2)*log(c) + 2/3*a^2*sqrt(d)*x^(3/2)
```

Mupad [**F**]

time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{d\,x}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)*(a + b*log(c*x^n))^2,x)
```

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

3.98 $\int \frac{(a+b\log(cx^n))^2}{\sqrt{dx}}\,dx$

Optimal. Leaf size=67

$$\frac{16b^2n^2\sqrt{dx}}{d}-\frac{8bn\sqrt{dx}\,(a+b\log(cx^n))}{d}+\frac{2\sqrt{dx}\,(a+b\log(cx^n))^2}{d}$$

```
[Out] 16*b^2*n^2*(d*x)^(1/2)/d-8*b*n*(a+b*ln(c*x^n))*(d*x)^(1/2)/d+2*(a+b*ln(c*x^
n))^2*(d*x)^(1/2)/d
```

Rubi [A]
time = 0.03, antiderivative size = 67, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}=0.100$, Rules used = {2342, 2341}

$$-\frac{8bn\sqrt{dx}\,(a+b\log(cx^n))}{d}+\frac{2\sqrt{dx}\,(a+b\log(cx^n))^2}{d}+\frac{16b^2n^2\sqrt{dx}}{d}$$

Antiderivative was successfully verified.

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

```
[Out] (16*b^2*n^2*Sqrt[d*x])/d - (8*b*n*Sqrt[d*x]*(a + b*Log[c*x^n]))/d + (2*Sqrt
[d*x]*(a + b*Log[c*x^n])^2)/d
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{\sqrt{dx}}\,dx &= \frac{2\sqrt{dx}\,(a+b\log(cx^n))^2}{d}-(4bn)\int \frac{a+b\log(cx^n)}{\sqrt{dx}}\,dx\\ &= \frac{16b^2n^2\sqrt{dx}}{d}-\frac{8bn\sqrt{dx}\,(a+b\log(cx^n))}{d}+\frac{2\sqrt{dx}\,(a+b\log(cx^n))^2}{d}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 54, normalized size = 0.81

$$\frac{2x\left(a^2-4abn+8b^2n^2+2b(a-2bn)\log\left(cx^n\right)+b^2\log^2\left(cx^n\right)\right)}{\sqrt{dx}}$$

Antiderivative was successfully verified.

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

```
[Out] (2*x*(a^2 - 4*a*b*n + 8*b^2*n^2 + 2*b*(a - 2*b*n)*Log[c*x^n] + b^2*Log[c*x^
n]^2))/Sqrt[d*x]
```

Maple [A]
time = 0.09, size = 92, normalized size = 1.37

method	result
derivativedivides	$\frac{2\sqrt{dx}\,a^2+2b^2\sqrt{dx}\,\ln\left(c\,e^{n\ln(x)}\right)^2+16b^2n^2\sqrt{dx}-8b^2n\sqrt{dx}\,\ln\left(c\,e^{n\ln(x)}\right)+4\sqrt{dx}\,ab\ln(c\,x^n)-8abn\sqrt{dx}}{d}$
default	$\frac{2\sqrt{dx}\,a^2+2b^2\sqrt{dx}\,\ln\left(c\,e^{n\ln(x)}\right)^2+16b^2n^2\sqrt{dx}-8b^2n\sqrt{dx}\,\ln\left(c\,e^{n\ln(x)}\right)+4\sqrt{dx}\,ab\ln(c\,x^n)-8abn\sqrt{dx}}{d}$
risch	$\frac{2b^2x\ln(x^n)^2}{\sqrt{dx}}+\frac{2b\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-ib\pi\mathrm{csgn}(i\ldots\right.}{\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2/d*((d*x)^(1/2)*a^2+b^2*(d*x)^(1/2)*ln(c*exp(n*ln(x)))^2+8*b^2*n^2*(d*x)^(
1/2)-4*b^2*n*(d*x)^(1/2)*ln(c*exp(n*ln(x)))+2*(d*x)^(1/2)*a*b*ln(c*x^n)-4*a
*b*n*(d*x)^(1/2))
```

Maxima [A]
time = 0.29, size = 102, normalized size = 1.52

$$\frac{2\sqrt{dx}\,b^2\log\left(cx^n\right)^2}{d}+8\left(\frac{2\sqrt{dx}\,n^2}{d}-\frac{\sqrt{dx}\,n\log\left(cx^n\right)}{d}\right)b^2-\frac{8\sqrt{dx}\,abn}{d}+\frac{4\sqrt{dx}\,ab\log\left(cx^n\right)}{d}+\frac{2\sqrt{dx}\,a^2}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*sqrt(d*x)*b^2*log(c*x^n)^2/d + 8*(2*sqrt(d*x)*n^2/d - sqrt(d*x)*n*log(c*x
^n)/d)*b^2 - 8*sqrt(d*x)*a*b*n/d + 4*sqrt(d*x)*a*b*log(c*x^n)/d + 2*sqrt(d*
x)*a^2/d
```

Fricas [A]
time = 0.36, size = 87, normalized size = 1.30

$$\frac{2\left(b^2n^2\log\left(x\right)^2+8\,b^2n^2+b^2\log\left(c\right)^2-4\,abn+a^2-2\left(2\,b^2n-ab\right)\log\left(c\right)-2\left(2\,b^2n^2-b^2n\log\left(c\right)-abn\right)\log\left(x\right)\right)\sqrt{dx}}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*(b^2*n^2*log(x)^2 + 8*b^2*n^2 + b^2*log(c)^2 - 4*a*b*n + a^2 - 2*(2*b^2*n
 - a*b)*log(c) - 2*(2*b^2*n^2 - b^2*n*log(c) - a*b*n)*log(x))*sqrt(d*x)/d
```

Sympy [A]
time = 0.36, size = 109, normalized size = 1.63

$$\frac{2a^2x}{\sqrt{dx}} - \frac{8abnx}{\sqrt{dx}} + \frac{4abx\log(cx^n)}{\sqrt{dx}} + \frac{16b^2n^2x}{\sqrt{dx}} - \frac{8b^2nx\log(cx^n)}{\sqrt{dx}} + \frac{2b^2x\log(cx^n)^2}{\sqrt{dx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(d*x)**(1/2),x)
```

```
[Out] 2*a**2*x/sqrt(d*x) - 8*a*b*n*x/sqrt(d*x) + 4*a*b*x*log(c*x**n)/sqrt(d*x) +
16*b**2*n**2*x/sqrt(d*x) - 8*b**2*n*x*log(c*x**n)/sqrt(d*x) + 2*b**2*x*log(
c*x**n)**2/sqrt(d*x)
```

Giac [A]
time = 2.83, size = 118, normalized size = 1.76

$$\frac{2\left(\left(\sqrt{dx}\log(x)^2 - 4\sqrt{dx}\log(x) + 8\sqrt{dx}\right)b^2n^2 + 2\left(\sqrt{dx}\log(x) - 2\sqrt{dx}\right)b^2n\log(c) + \sqrt{dx}\,b^2\log(c)^2 + 2\left(\sqrt{dx}\log(x) - 2\sqrt{dx}\right)abn + 2\sqrt{dx}\,ab\log(c) + \sqrt{dx}\,a^2\right)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*((sqrt(d*x)*log(x)^2 - 4*sqrt(d*x)*log(x) + 8*sqrt(d*x))*b^2*n^2 + 2*(sqr
t(d*x)*log(x) - 2*sqrt(d*x))*b^2*n*log(c) + sqrt(d*x)*b^2*log(c)^2 + 2*(sqr
t(d*x)*log(x) - 2*sqrt(d*x))*a*b*n + 2*sqrt(d*x)*a*b*log(c) + sqrt(d*x)*a^2
)/d
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d*x)^(1/2),x)
```

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

3.99 $\int \frac{(a+b\log(cx^n))^2}{(dx)^{3/2}}\,dx$

Optimal. Leaf size=67

$$-\frac{16b^2n^2}{d\sqrt{dx}}-\frac{8bn(a+b\log(cx^n))}{d\sqrt{dx}}-\frac{2(a+b\log(cx^n))^2}{d\sqrt{dx}}$$

```
[Out] -16*b^2*n^2/d/(d*x)^(1/2)-8*b*n*(a+b*ln(c*x^n))/d/(d*x)^(1/2)-2*(a+b*ln(c*x
^n))^2/d/(d*x)^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 67, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2342, 2341}

$$-\frac{8bn(a+b\log(cx^n))}{d\sqrt{dx}}-\frac{2(a+b\log(cx^n))^2}{d\sqrt{dx}}-\frac{16b^2n^2}{d\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d*x)^(3/2),x]
```

```
[Out] (-16*b^2*n^2)/(d*Sqrt[d*x]) - (8*b*n*(a + b*Log[c*x^n]))/(d*Sqrt[d*x]) - (2
*(a + b*Log[c*x^n])^2)/(d*Sqrt[d*x])
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{(dx)^{3/2}}\,dx &= -\frac{2(a+b\log(cx^n))^2}{d\sqrt{dx}}+(4bn)\int \frac{a+b\log(cx^n)}{(dx)^{3/2}}\,dx\\ &= -\frac{16b^2n^2}{d\sqrt{dx}}-\frac{8bn(a+b\log(cx^n))}{d\sqrt{dx}}-\frac{2(a+b\log(cx^n))^2}{d\sqrt{dx}}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 54, normalized size = 0.81

$$-\frac{2x\left(a^2+4abn+8b^2n^2+2b(a+2bn)\log\left(cx^n\right)+b^2\log^2\left(cx^n\right)\right)}{(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d*x)^(3/2),x]
```

```
[Out] (-2*x*(a^2 + 4*a*b*n + 8*b^2*n^2 + 2*b*(a + 2*b*n)*Log[c*x^n] + b^2*Log[c*x
^n]^2))/(d*x)^(3/2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.09, size = 707, normalized size = 10.55

method	result
risch	$-\frac{2b^2\ln(x^n)^2}{d\sqrt{dx}}-\frac{2b\left(-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(icx^n)^2+ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(icx^n)^2-ib\pi\mathrm{csgn}(icx^n)^3+2b\right.}{d\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(d*x)^(3/2),x,method=_RETURNVERBOSE)
```

```
[Out] -2/d*b^2/(d*x)^(1/2)*ln(x^n)^2-2/d*b*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-
I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+4*b*n+2*a)/(d*x)^(1/2)*ln(x^n)-1/2/d*(4*a^
2+4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2-4*Pi^2*b^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)^4-Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+2*Pi^
2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*Pi^2*b^2*csgn(I*c)*csgn(I*x
^n)^2*csgn(I*c*x^n)^3+16*b^2*ln(c)*n+16*b*a*n-Pi^2*b^2*csgn(I*c*x^n)^6+8*a*
b*ln(c)+4*b^2*ln(c)^2-4*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-
4*I*Pi*a*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-8*I*Pi*b^2*n*csgn(I*c)*csgn(
I*x^n)*csgn(I*c*x^n)+32*b^2*n^2-4*I*Pi*a*b*csgn(I*c*x^n)^3-8*I*Pi*b^2*n*csg
n(I*c*x^n)^3-4*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3+4*I*Pi*ln(c)*b^2*csgn(I*x^n)*
csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*x^n)
*csgn(I*c*x^n)^2-Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*c)*
csgn(I*c*x^n)^5-Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*x^
n)*csgn(I*c*x^n)^5+8*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*b^2*n*cs
gn(I*c)*csgn(I*c*x^n)^2)/(d*x)^(1/2)
```

Maxima [A]
time = 0.30, size = 101, normalized size = 1.51

$$-8\,b^2\left(\frac{2\,n^2}{\sqrt{dx}\,d}+\frac{n\log\left(cx^n\right)}{\sqrt{dx}\,d}\right)-\frac{2\,b^2\log\left(cx^n\right)^2}{\sqrt{dx}\,d}-\frac{8\,abn}{\sqrt{dx}\,d}-\frac{4\,ab\log\left(cx^n\right)}{\sqrt{dx}\,d}-\frac{2\,a^2}{\sqrt{dx}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(d*x)^(3/2),x, algorithm="maxima")
```

```
[Out] -8*b^2*(2*n^2/(sqrt(d*x)*d) + n*log(c*x^n)/(sqrt(d*x)*d)) - 2*b^2*log(c*x^n
)^2/(sqrt(d*x)*d) - 8*a*b*n/(sqrt(d*x)*d) - 4*a*b*log(c*x^n)/(sqrt(d*x)*d)
- 2*a^2/(sqrt(d*x)*d)
```

Fricas [A]
time = 0.36, size = 87, normalized size = 1.30

$$-\frac{2\left(b^{2}n^{2}\log\left(x\right)^{2}+8\,b^{2}n^{2}+b^{2}\log\left(c\right)^{2}+4\,abn+a^{2}+2\left(2\,b^{2}n+ab\right)\log\left(c\right)+2\left(2\,b^{2}n^{2}+b^{2}n\log\left(c\right)+abn\right)\log\left(x\right)\right)\sqrt{dx}}{d^{2}x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(d*x)^(3/2),x, algorithm="fricas")
```

```
[Out] -2*(b^2*n^2*log(x)^2 + 8*b^2*n^2 + b^2*log(c)^2 + 4*a*b*n + a^2 + 2*(2*b^2*
n + a*b)*log(c) + 2*(2*b^2*n^2 + b^2*n*log(c) + a*b*n)*log(x))*sqrt(d*x)/(d
^2*x)
```

Sympy [A]
time = 0.62, size = 110, normalized size = 1.64

$$-\frac{2a^{2}x}{(dx)^{\frac{3}{2}}}-\frac{8abnx}{(dx)^{\frac{3}{2}}}-\frac{4abx\log\left(cx^{n}\right)}{(dx)^{\frac{3}{2}}}-\frac{16b^{2}n^{2}x}{(dx)^{\frac{3}{2}}}-\frac{8b^{2}nx\log\left(cx^{n}\right)}{(dx)^{\frac{3}{2}}}-\frac{2b^{2}x\log\left(cx^{n}\right)^{2}}{(dx)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(d*x)**(3/2),x)
```

```
[Out] -2*a**2*x/(d*x)**(3/2) - 8*a*b*n*x/(d*x)**(3/2) - 4*a*b*x*log(c*x**n)/(d*x)
**(3/2) - 16*b**2*n**2*x/(d*x)**(3/2) - 8*b**2*n*x*log(c*x**n)/(d*x)**(3/2)
 - 2*b**2*x*log(c*x**n)**2/(d*x)**(3/2)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 149 vs. 2(61) = 122.
time = 3.55, size = 149, normalized size = 2.22

$$-\frac{2\left(\frac{b^{2}n^{2}\log(dx)^{2}}{\sqrt{dx}}-\frac{2\left(b^{2}n^{2}\log(d)-2\,b^{2}n^{2}-b^{2}n\log(c)-abn\right)\log(dx)}{\sqrt{dx}}+\frac{b^{2}n^{2}\log(d)^{2}-4\,b^{2}n^{2}\log(d)-2\,b^{2}n\log(c)\log(d)+8\,b^{2}n^{2}+4\,b^{2}n\log(c)+b^{2}\log(c)^{2}-2\,abn\log(d)+4\,abn+2\,ab\log(c)+a^{2}}{\sqrt{dx}}\right)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(d*x)^(3/2),x, algorithm="giac")
```

```
[Out] -2*(b^2*n^2*log(d*x)^2/sqrt(d*x) - 2*(b^2*n^2*log(d) - 2*b^2*n^2 - b^2*n*lo
g(c) - a*b*n)*log(d*x)/sqrt(d*x) + (b^2*n^2*log(d)^2 - 4*b^2*n^2*log(d) - 2
*b^2*n*log(c)*log(d) + 8*b^2*n^2 + 4*b^2*n*log(c) + b^2*log(c)^2 - 2*a*b*n*
log(d) + 4*a*b*n + 2*a*b*log(c) + a^2)/sqrt(d*x))/d
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{{\left(d\,x\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d*x)^(3/2),x)
[Out] int((a + b*log(c*x^n))^2/(d*x)^(3/2), x)
```

3.100 $\int \frac{(a+b\log(cx^n))^2}{(dx)^{5/2}}\,dx$

Optimal. Leaf size=73

$$-\frac{16b^2n^2}{27d(dx)^{3/2}}-\frac{8bn(a+b\log(cx^n))}{9d(dx)^{3/2}}-\frac{2(a+b\log(cx^n))^2}{3d(dx)^{3/2}}$$

```
[Out] -16/27*b^2*n^2/d/(d*x)^(3/2)-8/9*b*n*(a+b*ln(c*x^n))/d/(d*x)^(3/2)-2/3*(a+b
*ln(c*x^n))^2/d/(d*x)^(3/2)
```

Rubi [A]
time = 0.03, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2342, 2341}

$$-\frac{8bn(a+b\log(cx^n))}{9d(dx)^{3/2}}-\frac{2(a+b\log(cx^n))^2}{3d(dx)^{3/2}}-\frac{16b^2n^2}{27d(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^2/(d*x)^(5/2),x]
```

```
[Out] (-16*b^2*n^2)/(27*d*(d*x)^(3/2)) - (8*b*n*(a + b*Log[c*x^n]))/(9*d*(d*x)^(3
/2)) - (2*(a + b*Log[c*x^n])^2)/(3*d*(d*x)^(3/2))
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{(dx)^{5/2}}\,dx &= -\frac{2(a+b\log(cx^n))^2}{3d(dx)^{3/2}}+\frac{1}{3}(4bn)\int \frac{a+b\log(cx^n)}{(dx)^{5/2}}\,dx\\ &= -\frac{16b^2n^2}{27d(dx)^{3/2}}-\frac{8bn(a+b\log(cx^n))}{9d(dx)^{3/2}}-\frac{2(a+b\log(cx^n))^2}{3d(dx)^{3/2}}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 61, normalized size = 0.84

$$-\frac{2x\left(9a^2+12abn+8b^2n^2+6b(3a+2bn)\log\left(cx^n\right)+9b^2\log^2\left(cx^n\right)\right)}{27(dx)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^2/(d*x)^(5/2),x]
```

```
[Out] (-2*x*(9*a^2 + 12*a*b*n + 8*b^2*n^2 + 6*b*(3*a + 2*b*n)*Log[c*x^n] + 9*b^2*
Log[c*x^n]^2))/(27*(d*x)^(5/2))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.10, size = 716, normalized size = 9.81

method	result
risch	$-\frac{2b^2\ln(x^n)^2}{3d^2x\sqrt{dx}}-\frac{2b\left(-3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)+3ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}(ic\,x^n)^2+3ib\pi\,\mathrm{csgn}(ix^n)\mathrm{csgn}(ic\,x^n)^2-3ib\pi\mathrm{csgn}(ic\,x^n\right.}{9d^2x\sqrt{dx}}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^2/(d*x)^(5/2),x,method=_RETURNVERBOSE)
```

```
[Out] -2/3/d^2*b^2/x/(d*x)^(1/2)*ln(x^n)^2-2/9/d^2*b*(-3*I*b*Pi*csgn(I*c)*csgn(I*
x^n)*csgn(I*c*x^n)+3*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+3*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-3*I*b*Pi*csgn(I*c*x^n)^3+6*b*ln(c)+4*b*n+6*a)/x/(d*x)^(1/2)
*ln(x^n)-1/54/d^2*(36*a^2-24*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
-36*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-9*Pi^2*b^2*csgn(I*c)^2*c
sgn(I*x^n)^2*csgn(I*c*x^n)^2+18*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^3+18*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-36*I*Pi*a*b*csgn(
I*c)*csgn(I*x^n)*csgn(I*c*x^n)+36*I*Pi*ln(c)*b^2*csgn(I*c)*csgn(I*c*x^n)^2+
36*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*Pi*a*b*csgn(I*c)*csgn(I*
c*x^n)^2+48*b^2*ln(c)*n+48*b*a*n-9*Pi^2*b^2*csgn(I*c*x^n)^6+72*a*b*ln(c)+36
*b^2*ln(c)^2+32*b^2*n^2-24*I*Pi*b^2*n*csgn(I*c*x^n)^3-36*I*Pi*ln(c)*b^2*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-36*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3-36*I*Pi*
a*b*csgn(I*c*x^n)^3-9*Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+18*Pi^2*b^2*csgn
(I*c)*csgn(I*c*x^n)^5-9*Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+18*Pi^2*b^2*
csgn(I*x^n)*csgn(I*c*x^n)^5+24*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2+36*I*
Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*b^2*n*csgn(I*c)*csgn(I*c*x^n)^2)
/x/(d*x)^(1/2)
```

Maxima [A]
time = 0.29, size = 102, normalized size = 1.40

$$-\frac{8}{27}\,b^2\left(\frac{2\,n^2}{(dx)^{\frac{3}{2}}\,d}+\frac{3\,n\log\left(cx^n\right)}{(dx)^{\frac{3}{2}}\,d}\right)-\frac{2\,b^2\log\left(cx^n\right)^2}{3\,(dx)^{\frac{3}{2}}\,d}-\frac{8\,abn}{9\,(dx)^{\frac{3}{2}}\,d}-\frac{4\,ab\log\left(cx^n\right)}{3\,(dx)^{\frac{3}{2}}\,d}-\frac{2\,a^2}{3\,(dx)^{\frac{3}{2}}\,d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(d*x)^(5/2),x, algorithm="maxima")
```

```
[Out] -8/27*b^2*(2*n^2/((d*x)^(3/2)*d) + 3*n*log(c*x^n)/((d*x)^(3/2)*d)) - 2/3*b^
2*log(c*x^n)^2/((d*x)^(3/2)*d) - 8/9*a*b*n/((d*x)^(3/2)*d) - 4/3*a*b*log(c*
x^n)/((d*x)^(3/2)*d) - 2/3*a^2/((d*x)^(3/2)*d)
```

Fricas [A]
time = 0.38, size = 94, normalized size = 1.29

$$-\frac{2\,\left(9\,b^2n^2\log\left(x\right)^2+8\,b^2n^2+9\,b^2\log\left(c\right)^2+12\,abn+9\,a^2+6\,\left(2\,b^2n+3\,ab\right)\log\left(c\right)+6\,\left(2\,b^2n^2+3\,b^2n\log\left(c\right)+3\,abn\right)\log\left(x\right)\right)\sqrt{dx}}{27\,d^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(d*x)^(5/2),x, algorithm="fricas")
```

```
[Out] -2/27*(9*b^2*n^2*log(x)^2 + 8*b^2*n^2 + 9*b^2*log(c)^2 + 12*a*b*n + 9*a^2 +
 6*(2*b^2*n + 3*a*b)*log(c) + 6*(2*b^2*n^2 + 3*b^2*n*log(c) + 3*a*b*n)*log(
x))*sqrt(d*x)/(d^3*x^2)
```

Sympy [A]
time = 3.18, size = 121, normalized size = 1.66

$$-\frac{2a^2x}{3\left(dx\right)^{\frac{5}{2}}}-\frac{8abnx}{9\left(dx\right)^{\frac{5}{2}}}-\frac{4abx\log\left(cx^n\right)}{3\left(dx\right)^{\frac{5}{2}}}-\frac{16b^2n^2x}{27\left(dx\right)^{\frac{5}{2}}}-\frac{8b^2nx\log\left(cx^n\right)}{9\left(dx\right)^{\frac{5}{2}}}-\frac{2b^2x\log\left(cx^n\right)^2}{3\left(dx\right)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**2/(d*x)**(5/2),x)
```

```
[Out] -2*a**2*x/(3*(d*x)**(5/2)) - 8*a*b*n*x/(9*(d*x)**(5/2)) - 4*a*b*x*log(c*x**
n)/(3*(d*x)**(5/2)) - 16*b**2*n**2*x/(27*(d*x)**(5/2)) - 8*b**2*n*x*log(c*x
**n)/(9*(d*x)**(5/2)) - 2*b**2*x*log(c*x**n)**2/(3*(d*x)**(5/2))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 213 vs. 2(61) = 122.
time = 3.11, size = 213, normalized size = 2.92

$$-\frac{2\left(\frac{9\,b^2dn^2\log(dx)^2}{\sqrt{dx}\,x}-\frac{6\,(3\,b^2d^2n^2\log(d)-2\,b^2d^2n^2-3\,b^2d^2n\log(c)-3\,abd^2n)\log(dx)}{\sqrt{dx}\,dx}+\frac{9\,b^2d^2n^2\log(d)^2-12\,b^2d^2n^2\log(d)-18\,b^2d^2n\log(c)\log(d)+8\,b^2d^2n^2+12\,b^2d^2n\log(c)+9\,b^2d^2\log(c)^2-18\,abd^2n\log(d)+12\,abd^2n+18\,abd^2\log(c)+9\,a^2d^2}{\sqrt{dx}\,dx}\right)}{27\,d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^2/(d*x)^(5/2),x, algorithm="giac")
```

```
[Out] -2/27*(9*b^2*d*n^2*log(d*x)^2/(sqrt(d*x)*x) - 6*(3*b^2*d^2*n^2*log(d) - 2*b
^2*d^2*n^2 - 3*b^2*d^2*n*log(c) - 3*a*b*d^2*n)*log(d*x)/(sqrt(d*x)*d*x) + (
9*b^2*d^2*n^2*log(d)^2 - 12*b^2*d^2*n^2*log(d) - 18*b^2*d^2*n*log(c)*log(d)
```

```
 + 8*b^2*d^2*n^2 + 12*b^2*d^2*n*log(c) + 9*b^2*d^2*log(c)^2 - 18*a*b*d^2*n*
log(d) + 12*a*b*d^2*n + 18*a*b*d^2*log(c) + 9*a^2*d^2)/(sqrt(d*x)*d*x))/d^3
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a+b\ln(c\,x^n))^2}{(d\,x)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^2/(d*x)^(5/2),x)
[Out] int((a + b*log(c*x^n))^2/(d*x)^(5/2), x)
```

3.101 $\int \frac{(dx)^{5/2}}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=64

$$\frac{e^{-\frac{7a}{2bn}}(dx)^{7/2}\,(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{bdn}$$

```
[Out] (d*x)^(7/2)*Ei(7/2*(a+b*ln(c*x^n))/b/n)/b/d/exp(7/2*a/b/n)/n/((c*x^n)^(7/2/
n))
```

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2347, 2209}

$$\frac{(dx)^{7/2}e^{-\frac{7a}{2bn}}\,(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{bdn}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(5/2)/(a + b*Log[c*x^n]),x]
```

```
[Out] ((d*x)^(7/2)*ExpIntegralEi[(7*(a + b*Log[c*x^n]))/(2*b*n)])/(b*d*E^((7*a)/(
2*b*n))*n*(c*x^n)^(7/(2*n)))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(dx)^{5/2}}{a+b\log(cx^n)}\,dx &= \frac{\left((dx)^{7/2}\,(cx^n)^{-\frac{7}{2}/n}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{7x}{2n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{dn}\\ &= \frac{e^{-\frac{7a}{2bn}}(dx)^{7/2}\,(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{bdn}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 62, normalized size = 0.97

$$\frac{e^{-\frac{7a}{2bn}}x(dx)^{5/2}\left(cx^n\right)^{-\frac{7}{2}/n}\operatorname{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(5/2)/(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(d*x)^(5/2)*ExpIntegralEi[(7*(a + b*Log[c*x^n]))/(2*b*n)])/(b*E^((7*a)/(
2*b*n))*n*(c*x^n)^(7/(2*n)))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{\frac{5}{2}}}{a+b\ln\left(c\,x^{n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)/(a+b*ln(c*x^n)),x)
```

```
[Out] int((d*x)^(5/2)/(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] 2*b*d^(5/2)*n*integrate(1/7*x^(5/2)/(b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*
log(c) + a^2 + 2*(b^2*log(c) + a*b)*log(x^n)), x) + 2/7*d^(5/2)*x^(7/2)/(b*
log(c) + b*log(x^n) + a)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*d^2*x^2/(b*log(c*x^n) + a), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{\frac{5}{2}}}{a + b\log\left(cx^n\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(5/2)/(a+b*ln(c*x**n)),x)
[Out] Integral((d*x)**(5/2)/(a + b*log(c*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate((d*x)^(5/2)/(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(d\,x)^{5/2}}{a + b\,\ln\left(c\,x^n\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)/(a + b*log(c*x^n)),x)
[Out] int((d*x)^(5/2)/(a + b*log(c*x^n)), x)
```

3.102 $\int \frac{(dx)^{3/2}}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=64

$$\frac{e^{-\frac{5a}{2bn}}(dx)^{5/2}\left(cx^n\right)^{-\frac{5}{2}/n}\operatorname{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{bdn}$$

```
[Out] (d*x)^(5/2)*Ei(5/2*(a+b*ln(c*x^n))/b/n)/b/d/exp(5/2*a/b/n)/n/((c*x^n)^(5/2/
n))
```

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2347, 2209}

$$\frac{(dx)^{5/2}e^{-\frac{5a}{2bn}}\left(cx^n\right)^{-\frac{5}{2}/n}\operatorname{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{bdn}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(3/2)/(a + b*Log[c*x^n]),x]
```

```
[Out] ((d*x)^(5/2)*ExpIntegralEi[(5*(a + b*Log[c*x^n]))/(2*b*n)])/(b*d*E^((5*a)/(
2*b*n))*n*(c*x^n)^(5/(2*n)))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(dx)^{3/2}}{a+b\log\left(cx^n\right)}\,dx &= \frac{\left((dx)^{5/2}\left(cx^n\right)^{-\frac{5}{2}/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{5x}{2n}}}{a+bx}\,dx,x,\log\left(cx^n\right)\right)}{dn}\\ &= \frac{e^{-\frac{5a}{2bn}}(dx)^{5/2}\left(cx^n\right)^{-\frac{5}{2}/n}\operatorname{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{bdn}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 62, normalized size = 0.97

$$\frac{e^{-\frac{5a}{2bn}}x(dx)^{3/2}\left(cx^n\right)^{-\frac{5}{2}/n}\operatorname{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(3/2)/(a + b*Log[c*x^n]),x]
```

```
[Out] (x*(d*x)^(3/2)*ExpIntegralEi[(5*(a + b*Log[c*x^n]))/(2*b*n)])/(b*E^((5*a)/(
2*b*n))*n*(c*x^n)^(5/(2*n)))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{\frac{3}{2}}}{a+b\ln\left(c\,x^{n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)/(a+b*ln(c*x^n)),x)
```

```
[Out] int((d*x)^(3/2)/(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] 2*b*d^(3/2)*n*integrate(1/5*x^(3/2)/(b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*
log(c) + a^2 + 2*(b^2*log(c) + a*b)*log(x^n)), x) + 2/5*d^(3/2)*x^(5/2)/(b*
log(c) + b*log(x^n) + a)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*d*x/(b*log(c*x^n) + a), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{\frac{3}{2}}}{a + b\log(cx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)/(a+b*ln(c*x**n)),x)
[Out] Integral((d*x)**(3/2)/(a + b*log(c*x**n)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate((d*x)^(3/2)/(b*log(c*x^n) + a), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(d\,x)^{3/2}}{a + b\,\ln(c\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)/(a + b*log(c*x^n)),x)
[Out] int((d*x)^(3/2)/(a + b*log(c*x^n)), x)
```

3.103 $\int \frac{\sqrt{dx}}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=64

$$\frac{e^{-\frac{3a}{2bn}}(dx)^{3/2}\left(cx^n\right)^{-\frac{3}{2}/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{bdn}$$

```
[Out] (d*x)^(3/2)*Ei(3/2*(a+b*ln(c*x^n))/b/n)/b/d/exp(3/2*a/b/n)/n/((c*x^n)^(3/2/
n))
```

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2347, 2209}

$$\frac{(dx)^{3/2}e^{-\frac{3a}{2bn}}\left(cx^n\right)^{-\frac{3}{2}/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{bdn}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^(3/2)*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(2*b*n)])/(b*d*E^((3*a)/(
2*b*n))*n*(c*x^n)^(3/(2*n)))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sqrt{dx}}{a+b\log\left(cx^n\right)}\,dx &= \frac{\left((dx)^{3/2}\left(cx^n\right)^{-\frac{3}{2}/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{3x}{2n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{dn}\\ &= \frac{e^{-\frac{3a}{2bn}}(dx)^{3/2}\left(cx^n\right)^{-\frac{3}{2}/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{bdn}\end{aligned}$$

Mathematica [A]
time = 0.05, size = 62, normalized size = 0.97

$$\frac{e^{-\frac{3a}{2bn}}x\sqrt{dx}\,(cx^n)^{-\frac{3}{2}/n}\,\mathrm{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{bn}$$

Antiderivative was successfully verified.

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

```
[Out] (x*Sqrt[d*x]*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(2*b*n)])/(b*E^((3*a)/(2*
b*n))*n*(c*x^n)^(3/(2*n)))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{dx}}{a+b\ln\left(c\,x^{n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)/(a+b*ln(c*x^n)),x)
```

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

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*b*sqrt(d)*n*integrate(1/3*sqrt(x)/(b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*
log(c) + a^2 + 2*(b^2*log(c) + a*b)*log(x^n)), x) + 2/3*sqrt(d)*x^(3/2)/(b*
log(c) + b*log(x^n) + a)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sqrt(d*x)/(b*log(c*x^n) + a), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{dx}}{a + b\log(cx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)/(a+b*ln(c*x**n)),x)
[Out] Integral(sqrt(d*x)/(a + b*log(c*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\sqrt{d\,x}}{a + b\,\ln(c\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)/(a + b*log(c*x^n)),x)
[Out] int((d*x)^(1/2)/(a + b*log(c*x^n)), x)
```

3.104 $\int \frac{1}{\sqrt{dx}\,(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=64

$$\frac{e^{-\frac{a}{2bn}}\sqrt{dx}\,(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{bdn}$$

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

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2347, 2209}

$$\frac{\sqrt{dx}\,e^{-\frac{a}{2bn}}\,(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{bdn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(Sqrt[d*x]*(a + b*Log[c*x^n])),x]
```

```
[Out] (Sqrt[d*x]*ExpIntegralEi[(a + b*Log[c*x^n])/(2*b*n)])/(b*d*E^(a/(2*b*n))*n*
(c*x^n)^(1/(2*n)))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{\sqrt{dx}\,(a+b\log(cx^n))}\,dx &= \frac{\left(\sqrt{dx}\,(cx^n)^{-\frac{1}{2}/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{2n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{dn}\\ &= \frac{e^{-\frac{a}{2bn}}\sqrt{dx}\,(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{bdn}\end{aligned}$$

Mathematica [A]
time = 0.05, size = 62, normalized size = 0.97

$$\frac{e^{-\frac{a}{2bn}}x(cx^n)^{-\frac{1}{2}/n}\operatorname{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{bn\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(Sqrt[d*x]*(a + b*Log[c*x^n])),x]
```

```
[Out] (x*ExpIntegralEi[(a + b*Log[c*x^n])/(2*b*n)])/(b*E^(a/(2*b*n))*n*Sqrt[d*x]*
(c*x^n)^(1/(2*n)))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{dx}\,\left(a+b\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(1/2)/(a+b*ln(c*x^n)),x)
```

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

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*b*n*integrate(1/((b^2*sqrt(d)*log(c)^2 + b^2*sqrt(d)*log(x^n)^2 + 2*a*b*s
qrt(d)*log(c) + a^2*sqrt(d) + 2*(b^2*sqrt(d)*log(c) + a*b*sqrt(d))*log(x^n)
)*sqrt(x)), x) + 2*sqrt(x)/(b*sqrt(d)*log(c) + b*sqrt(d)*log(x^n) + a*sqrt(
d))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sqrt(d*x)/(b*d*x*log(c*x^n) + a*d*x), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{dx}\,\left(a + b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(1/2)/(a+b*ln(c*x**n)),x)
[Out] Integral(1/(sqrt(d*x)*(a + b*log(c*x**n))), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{\sqrt{d\,x}\,\left(a + b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d*x)^(1/2)*(a + b*log(c*x^n))),x)
[Out] int(1/((d*x)^(1/2)*(a + b*log(c*x^n))), x)
```

3.105 $\int \frac{1}{(dx)^{3/2}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=67

$$\frac{e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\mathrm{Ei}\left(\frac{-a-b\log(cx^n)}{2bn}\right)}{bdn\sqrt{dx}}$$

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

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 0.96, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2347, 2209}

$$\frac{e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\mathrm{Ei}\left(-\frac{a+b\log(cx^n)}{2bn}\right)}{bdn\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Int[1/((d*x)^(3/2)*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^(a/(2*b*n))*(c*x^n)^(1/(2*n))*ExpIntegralEi[-1/2*(a + b*Log[c*x^n])/(b*n
)])/(b*d*n*Sqrt[d*x])
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{(dx)^{3/2}\,(a+b\log(cx^n))}\,dx &= \frac{(cx^n)^{\frac{1}{2}/n}\,\mathrm{Subst}\left(\int \frac{e^{-\frac{x}{2n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{dn\sqrt{dx}}\\ &= \frac{e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\mathrm{Ei}\left(-\frac{a+b\log(cx^n)}{2bn}\right)}{bdn\sqrt{dx}}\end{aligned}$$

Mathematica [A]
time = 0.05, size = 62, normalized size = 0.93

$$\frac{e^{\frac{a}{2bn}}x(cx^n)^{\frac{1}{2}/n}\,\mathrm{Ei}\left(-\frac{a+b\log(cx^n)}{2bn}\right)}{bn(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/((d*x)^(3/2)*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^(a/(2*b*n))*x*(c*x^n)^(1/(2*n))*ExpIntegralEi[-1/2*(a + b*Log[c*x^n])/(b
*n)])/(b*n*(d*x)^(3/2))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{(dx)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(3/2)/(a+b*ln(c*x^n)),x)
```

```
[Out] int(1/(d*x)^(3/2)/(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(3/2)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -2*b*n*integrate(1/((b^2*d^(3/2)*log(c)^2 + b^2*d^(3/2)*log(x^n)^2 + 2*a*b*
d^(3/2)*log(c) + a^2*d^(3/2) + 2*(b^2*d^(3/2)*log(c) + a*b*d^(3/2))*log(x^n
))*x^(3/2)), x) - 2/((b*d^(3/2)*log(c) + b*d^(3/2)*log(x^n) + a*d^(3/2))*sq
rt(x))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(3/2)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b*d^2*x^2*log(c*x^n) + a*d^2*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{(dx)^{\frac{3}{2}}\,(a+b\log{(cx^n)})}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(3/2)/(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(1/((d*x)**(3/2)*(a + b*log(c*x**n))), x)
```

Giac [A]
time = 2.89, size = 49, normalized size = 0.73

$$\frac{c^{\frac{1}{2n}}\operatorname{Ei}\left(-\frac{\log(c)}{2n}-\frac{a}{2bn}-\frac{1}{2}\log{(x)}\right)e^{\left(\frac{a}{2bn}\right)}}{bd^{\frac{3}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(3/2)/(a+b*log(c*x^n)),x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{(d\,x)}^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d*x)^(3/2)*(a + b*log(c*x^n))),x)
```

```
[Out] int(1/((d*x)^(3/2)*(a + b*log(c*x^n))), x)
```

3.106 $\int \frac{1}{(dx)^{5/2}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=64

$$\frac{e^{\frac{3a}{2bn}}(cx^n)^{\frac{3}{2}/n}\,\mathrm{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{bdn(dx)^{3/2}}$$

```
[Out] exp(3/2*a/b/n)*(c*x^n)^(3/2/n)*Ei(-3/2*(a+b*ln(c*x^n))/b/n)/b/d/n/(d*x)^(3/
2)
```

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2347, 2209}

$$\frac{e^{\frac{3a}{2bn}}(cx^n)^{\frac{3}{2}/n}\,\mathrm{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{bdn(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[1/((d*x)^(5/2)*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^((3*a)/(2*b*n))*(c*x^n)^(3/(2*n))*ExpIntegralEi[(-3*(a + b*Log[c*x^n]))/
(2*b*n)])/(b*d*n*(d*x)^(3/2))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{(dx)^{5/2}\,(a+b\log(cx^n))}\,dx &= \frac{(cx^n)^{\frac{3}{2}/n}\,\mathrm{Subst}\left(\int \frac{e^{-\frac{3x}{2n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{dn(dx)^{3/2}}\\ &= \frac{e^{\frac{3a}{2bn}}(cx^n)^{\frac{3}{2}/n}\,\mathrm{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{bdn(dx)^{3/2}}\end{aligned}$$

Mathematica [A]
time = 0.06, size = 62, normalized size = 0.97

$$\frac{e^{\frac{3a}{2bn}}x(cx^n)^{\frac{3}{2}/n}\operatorname{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{bn(dx)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/((d*x)^(5/2)*(a + b*Log[c*x^n])),x]
```

```
[Out] (E^((3*a)/(2*b*n))*x*(c*x^n)^(3/(2*n))*ExpIntegralEi[(-3*(a + b*Log[c*x^n])
)/(2*b*n)])/(b*n*(d*x)^(5/2))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{1}{(dx)^{\frac{5}{2}}\left(a+b\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(5/2)/(a+b*ln(c*x^n)),x)
```

```
[Out] int(1/(d*x)^(5/2)/(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(5/2)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] -2*b*n*integrate(1/3/((b^2*d^(5/2)*log(c)^2 + b^2*d^(5/2)*log(x^n)^2 + 2*a*
b*d^(5/2)*log(c) + a^2*d^(5/2) + 2*(b^2*d^(5/2)*log(c) + a*b*d^(5/2))*log(x
^n))*x^(5/2)), x) - 2/3/((b*d^(5/2)*log(c) + b*d^(5/2)*log(x^n) + a*d^(5/2)
)*x^(3/2))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(5/2)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b*d^3*x^3*log(c*x^n) + a*d^3*x^3), x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\left(dx\right)^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(5/2)/(a+b*ln(c*x**n)),x)
[Out] Integral(1/((d*x)**(5/2)*(a + b*log(c*x**n))), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(5/2)/(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(1/((d*x)^(5/2)*(b*log(c*x^n) + a)), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{{\left(d\,x\right)}^{5/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d*x)^(5/2)*(a + b*log(c*x^n))),x)
[Out] int(1/((d*x)^(5/2)*(a + b*log(c*x^n))), x)
```

3.107 $\int \frac{(dx)^{5/2}}{(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=98

$$\frac{7e^{-\frac{7a}{2bn}}(dx)^{7/2}\,(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{7/2}}{bdn\,(a+b\log\,(cx^n))}$$

```
[Out] 7/2*(d*x)^(7/2)*Ei(7/2*(a+b*ln(c*x^n))/b/n)/b^2/d/exp(7/2*a/b/n)/n^2/((c*x^
n)^(7/2/n))-(d*x)^(7/2)/b/d/n/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2343, 2347, 2209}

$$\frac{7(dx)^{7/2}e^{-\frac{7a}{2bn}}\,(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{7/2}}{bdn\,(a+b\log\,(cx^n))}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(5/2)/(a + b*Log[c*x^n])^2,x]
```

```
[Out] (7*(d*x)^(7/2)*ExpIntegralEi[(7*(a + b*Log[c*x^n]))/(2*b*n)])/(2*b^2*d*E^((
7*a)/(2*b*n))*n^2*(c*x^n)^(7/(2*n))) - (d*x)^(7/2)/(b*d*n*(a + b*Log[c*x^n]
))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(dx)^{5/2}}{(a+b\log(cx^n))^2}\,dx &= -\frac{(dx)^{7/2}}{bdn(a+b\log(cx^n))}+\frac{7\int \frac{(dx)^{5/2}}{a+b\log(cx^n)}\,dx}{2bn}\\ &= -\frac{(dx)^{7/2}}{bdn(a+b\log(cx^n))}+\frac{\left(7(dx)^{7/2}(cx^n)^{-\frac{7}{2}/n}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{7x}{2n}}}{a+bx}\,dx,x,\log(cx^n)\right)}{2bdn^2}\\ &= \frac{7e^{-\frac{7a}{2bn}}(dx)^{7/2}(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{7/2}}{bdn(a+b\log(cx^n))}\end{aligned}$$

Mathematica [A]
time = 0.11, size = 84, normalized size = 0.86

$$\frac{x(dx)^{5/2}\left(7e^{-\frac{7a}{2bn}}(cx^n)^{-\frac{7}{2}/n}\,\mathrm{Ei}\left(\frac{7(a+b\log(cx^n))}{2bn}\right)-\frac{2bn}{a+b\log(cx^n)}\right)}{2b^2n^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(5/2)/(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x*(d*x)^(5/2)*((7*ExpIntegralEi[(7*(a + b*Log[c*x^n]))/(2*b*n)])/(E^((7*a)
/(2*b*n))*(c*x^n)^(7/(2*n))) - (2*b*n)/(a + b*Log[c*x^n])))/(2*b^2*n^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.64, size = 432, normalized size = 4.41

method	result
risch	$-\frac{2x^4d^3}{bn\sqrt{dx}\left(2a+2b\ln(c)+2b\ln\left(\mathrm{e}^{n\ln(x)}\right)-ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(i\mathrm{e}^{n\ln(x)}\right)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)+ib\pi\,\mathrm{csgn}(ic)\mathrm{csgn}\left(ic\,\mathrm{e}^{n\ln(x)}\right)^2+ib\pi\,\mathrm{csgn}\left(i\mathrm{e}^{n\ln(x)}\right.\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/b/n*x^4/(d*x)^(1/2)/(2*a+2*b*ln(c)+2*b*ln(exp(n*ln(x)))-I*b*Pi*csgn(I*c)
*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))+I*b*Pi*csgn(I*c)*csgn(I*c*exp(
n*ln(x)))^2+I*b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2-I*b*Pi*csg
n(I*c*exp(n*ln(x)))^3)*d^3-7/2/d/b^2/n^2*exp(7/4*I*(b*Pi*csgn(I*c)*csgn(I*e
xp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2
-b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(
x)))^3+2*I*b*n*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))
```

```
+2*I*a)/b/n)*Ei(1,-7/2*ln(d*x)+7/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln(x)))*c
sgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*csgn(I*e
xp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+2*I*b*n
*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 4*b*d^(5/2)*n*integrate(1/7*x^(5/2)/(b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^
2*log(c)^2 + 3*a^2*b*log(c) + a^3 + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(
b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n)), x) + 2/7*d^(5/2)*x^(7/2)/
(b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + a^2 + 2*(b^2*log(c) + a*b)*
log(x^n))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*d^2*x^2/(b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{\frac{5}{2}}}{(a + b\log(cx^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(5/2)/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral((d*x)**(5/2)/(a + b*log(c*x**n))**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)/(a+b*log(c*x^n))^2,x, algorithm="giac")
[Out] integrate((d*x)^(5/2)/(b*log(c*x^n) + a)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d\,x)^{5/2}}{(a+b\,\ln(c\,x^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)/(a + b*log(c*x^n))^2,x)
[Out] int((d*x)^(5/2)/(a + b*log(c*x^n))^2, x)
```

3.108 $\int \frac{(dx)^{3/2}}{(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=98

$$\frac{5e^{-\frac{5a}{2bn}}(dx)^{5/2}(cx^n)^{-\frac{5}{2}/n}\operatorname{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{5/2}}{bdn\,(a+b\log\left(cx^n\right))}$$

```
[Out] 5/2*(d*x)^(5/2)*Ei(5/2*(a+b*ln(c*x^n))/b/n)/b^2/d/exp(5/2*a/b/n)/n^2/((c*x^
n)^(5/2/n))-(d*x)^(5/2)/b/d/n/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2343, 2347, 2209}

$$\frac{5(dx)^{5/2}e^{-\frac{5a}{2bn}}(cx^n)^{-\frac{5}{2}/n}\operatorname{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{5/2}}{bdn\,(a+b\log\left(cx^n\right))}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(3/2)/(a + b*Log[c*x^n])^2,x]
```

```
[Out] (5*(d*x)^(5/2)*ExpIntegralEi[(5*(a + b*Log[c*x^n]))/(2*b*n)])/(2*b^2*d*E^((
5*a)/(2*b*n))*n^2*(c*x^n)^(5/(2*n))) - (d*x)^(5/2)/(b*d*n*(a + b*Log[c*x^n]
))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(dx)^{3/2}}{(a+b\log(cx^n))^2}\,dx &= -\frac{(dx)^{5/2}}{bdn\,(a+b\log(cx^n))}+\frac{5\int \frac{(dx)^{3/2}}{a+b\log(cx^n)}\,dx}{2bn}\\
&= -\frac{(dx)^{5/2}}{bdn\,(a+b\log(cx^n))}+\frac{\left(5(dx)^{5/2}\,(cx^n)^{-\frac{5}{2}/n}\right)\text{Subst}\left(\int \frac{e^{\frac{5x}{2n}}}{a+bx}\,dx,x,\log(cx^n)\right)}{2bdn^2}\\
&= \frac{5e^{-\frac{5a}{2bn}}(dx)^{5/2}\,(cx^n)^{-\frac{5}{2}/n}\,\text{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{5/2}}{bdn\,(a+b\log(cx^n))}
\end{aligned}
$$

Mathematica [**A**]
time = 0.11, size = 84, normalized size = 0.86

$$
\frac{x(dx)^{3/2}\left(5e^{-\frac{5a}{2bn}}\,(cx^n)^{-\frac{5}{2}/n}\,\text{Ei}\left(\frac{5(a+b\log(cx^n))}{2bn}\right)-\frac{2bn}{a+b\log(cx^n)}\right)}{2b^2n^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(3/2)/(a + b*Log[c*x^n])^2,x]
```

```
[Out] (x*(d*x)^(3/2)*((5*ExpIntegralEi[(5*(a + b*Log[c*x^n]))/(2*b*n)])/(E^((5*a)
/(2*b*n))*(c*x^n)^(5/(2*n))) - (2*b*n)/(a + b*Log[c*x^n])))/(2*b^2*n^2)
```

Maple [**C**] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.55, size = 432, normalized size = 4.41

method	result
risch	$-\frac{2x^3d^2}{bn\sqrt{dx}\,\left(2a+2b\ln(c)+2b\ln\left(e^{n\ln(x)}\right)-ib\pi\,\text{csgn}(ic)\text{csgn}\left(ie^{n\ln(x)}\right)\text{csgn}\left(ic\,e^{n\ln(x)}\right)+ib\pi\,\text{csgn}(ic)\text{csgn}\left(ic\,e^{n\ln(x)}\right)^2+ib\pi\,\text{csgn}\left(ie^{n\ln}\right.\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/b/n*x^3/(d*x)^(1/2)/(2*a+2*b*ln(c)+2*b*ln(exp(n*ln(x)))-I*b*Pi*csgn(I*c)
*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))+I*b*Pi*csgn(I*c)*csgn(I*c*exp(
n*ln(x)))^2+I*b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2-I*b*Pi*csg
n(I*c*exp(n*ln(x)))^3)*d^2-5/2/d/b^2/n^2*exp(5/4*I*(b*Pi*csgn(I*c)*csgn(I*e
xp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2
-b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(
x)))^3+2*I*b*n*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))
```

```
+2*I*a)/b/n)*Ei(1,-5/2*ln(d*x)+5/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln(x)))*c
sgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*csgn(I*e
xp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+2*I*b*n
*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] 4*b*d^(3/2)*n*integrate(1/5*x^(3/2)/(b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^
2*log(c)^2 + 3*a^2*b*log(c) + a^3 + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(
b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n)), x) + 2/5*d^(3/2)*x^(5/2)/
(b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + a^2 + 2*(b^2*log(c) + a*b)*
log(x^n))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*d*x/(b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{\frac{3}{2}}}{(a + b\log(cx^n))^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral((d*x)**(3/2)/(a + b*log(c*x**n))**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(3/2)/(b*log(c*x^n) + a)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d\,x)^{3/2}}{(a+b\,\ln(c\,x^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)/(a + b*log(c*x^n))^2,x)
```

```
[Out] int((d*x)^(3/2)/(a + b*log(c*x^n))^2, x)
```

3.109 $\int \frac{\sqrt{dx}}{(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=98

$$\frac{3e^{-\frac{3a}{2bn}}(dx)^{3/2}\left(cx^n\right)^{-\frac{3}{2}/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{3/2}}{bdn\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 3/2*(d*x)^(3/2)*Ei(3/2*(a+b*ln(c*x^n))/b/n)/b^2/d/exp(3/2*a/b/n)/n^2/((c*x^
n)^(3/2/n))-(d*x)^(3/2)/b/d/n/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2343, 2347, 2209}

$$\frac{3(dx)^{3/2}e^{-\frac{3a}{2bn}}\left(cx^n\right)^{-\frac{3}{2}/n}\operatorname{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{3/2}}{bdn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

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

```
[Out] (3*(d*x)^(3/2)*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(2*b*n)])/(2*b^2*d*E^((
3*a)/(2*b*n))*n^2*(c*x^n)^(3/(2*n))) - (d*x)^(3/2)/(b*d*n*(a + b*Log[c*x^n]
))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\sqrt{dx}}{(a+b\log(cx^n))^2}\,dx &= -\frac{(dx)^{3/2}}{bdn(a+b\log(cx^n))}+\frac{3\int \frac{\sqrt{dx}}{a+b\log(cx^n)}\,dx}{2bn}\\
&= -\frac{(dx)^{3/2}}{bdn(a+b\log(cx^n))}+\frac{\left(3(dx)^{3/2}(cx^n)^{-\frac{3}{2}/n}\right)\text{Subst}\left(\int \frac{e^{\frac{3x}{2n}}}{a+bx}\,dx,x,\log(cx^n)\right)}{2bdn^2}\\
&= \frac{3e^{-\frac{3a}{2bn}}(dx)^{3/2}(cx^n)^{-\frac{3}{2}/n}\,\text{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2}-\frac{(dx)^{3/2}}{bdn(a+b\log(cx^n))}
\end{aligned}
$$

Mathematica [A]
time = 0.10, size = 84, normalized size = 0.86

$$
\frac{x\sqrt{dx}\left(3e^{-\frac{3a}{2bn}}(cx^n)^{-\frac{3}{2}/n}\,\text{Ei}\left(\frac{3(a+b\log(cx^n))}{2bn}\right)-\frac{2bn}{a+b\log(cx^n)}\right)}{2b^2n^2}
$$

Antiderivative was successfully verified.

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

```
[Out] (x*Sqrt[d*x]*((3*ExpIntegralEi[(3*(a + b*Log[c*x^n]))/(2*b*n)])/(E^((3*a)/(
2*b*n))*(c*x^n)^(3/(2*n))) - (2*b*n)/(a + b*Log[c*x^n])))/(2*b^2*n^2)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.56, size = 430, normalized size = 4.39

method	result
risch	$-\frac{2x^2d}{bn\sqrt{dx}\,\left(2a+2b\ln(c)+2b\ln\left(e^{n\ln(x)}\right)-ib\pi\,\text{csgn}(ic)\text{csgn}\left(ie^{n\ln(x)}\right)\text{csgn}\left(ic\,e^{n\ln(x)}\right)+ib\pi\,\text{csgn}(ic)\text{csgn}\left(ic\,e^{n\ln(x)}\right)^2+ib\pi\,\text{csgn}\left(ie^{n\ln}\right.\right.}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2/b/n*x^2/(d*x)^(1/2)/(2*a+2*b*ln(c)+2*b*ln(exp(n*ln(x)))-I*b*Pi*csgn(I*c)
*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))+I*b*Pi*csgn(I*c)*csgn(I*c*exp(
n*ln(x)))^2+I*b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2-I*b*Pi*csg
n(I*c*exp(n*ln(x)))^3)*d-3/2/d/b^2/n^2*exp(3/4*I*(b*Pi*csgn(I*c)*csgn(I*exp
(n*ln(x)))*csgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b
*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)
))^3+2*I*b*n*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2
```

```
*I*a)/b/n)*Ei(1,-3/2*ln(d*x)+3/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln(x)))*csg
n(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*csgn(I*exp
(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+2*I*b*n*(
ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 4*b*sqrt(d)*n*integrate(1/3*sqrt(x)/(b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^
2*log(c)^2 + 3*a^2*b*log(c) + a^3 + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(
b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n)), x) + 2/3*sqrt(d)*x^(3/2)/
(b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + a^2 + 2*(b^2*log(c) + a*b)*
log(x^n))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sqrt(d*x)/(b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{dx}}{\left(a + b\log\left(cx^{n}\right)\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(sqrt(d*x)/(a + b*log(c*x**n))**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(d*x)/(b*log(c*x^n) + a)^2, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)/(a + b*log(c*x^n))^2,x)
```

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

3.110 $\int \frac{1}{\sqrt{dx}\,(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=98

$$\frac{e^{-\frac{a}{2bn}}\sqrt{dx}\,(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{2b^2dn^2}-\frac{\sqrt{dx}}{bdn\,(a+b\log{(cx^n)})}$$

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

Rubi [A]
time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2343, 2347, 2209}

$$\frac{\sqrt{dx}\,e^{-\frac{a}{2bn}}(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{2b^2dn^2}-\frac{\sqrt{dx}}{bdn\,(a+b\log{(cx^n)})}$$

Antiderivative was successfully verified.

```
[In] Int[1/(Sqrt[d*x]*(a + b*Log[c*x^n])^2),x]
```

```
[Out] (Sqrt[d*x]*ExpIntegralEi[(a + b*Log[c*x^n])/(2*b*n)])/(2*b^2*d*E^(a/(2*b*n)
)*n^2*(c*x^n)^(1/(2*n))) - Sqrt[d*x]/(b*d*n*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{\sqrt{dx}\,(a+b\log(cx^n))^2}\,dx = -\frac{\sqrt{dx}}{bdn(a+b\log(cx^n))} + \frac{\int \frac{1}{\sqrt{dx}\,(a+b\log(cx^n))}\,dx}{2bn}$$
$$= -\frac{\sqrt{dx}}{bdn(a+b\log(cx^n))} + \frac{\left(\sqrt{dx}\,(cx^n)^{-\frac{1}{2}/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{2n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{2bdn^2}$$
$$= \frac{e^{-\frac{a}{2bn}}\sqrt{dx}\,(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right)}{2b^2dn^2} - \frac{\sqrt{dx}}{bdn(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.09, size = 83, normalized size = 0.85

$$\frac{x\left(e^{-\frac{a}{2bn}}(cx^n)^{-\frac{1}{2}/n}\,\text{Ei}\left(\frac{a+b\log(cx^n)}{2bn}\right) - \frac{2bn}{a+b\log(cx^n)}\right)}{2b^2n^2\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(Sqrt[d*x]*(a + b*Log[c*x^n])^2),x]
```

```
[Out] (x*(ExpIntegralEi[(a + b*Log[c*x^n])/(2*b*n)]/(E^(a/(2*b*n))*(c*x^n)^(1/(2*
n))) - (2*b*n)/(a + b*Log[c*x^n])))/(2*b^2*n^2*Sqrt[d*x])
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.58, size = 427, normalized size = 4.36

method	result
risch	$-\frac{2x}{bn\sqrt{dx}\,\left(2a+2b\ln(c)+2b\ln\left(e^{n\ln(x)}\right)-ib\pi\,\text{csgn}(ic)\text{csgn}\left(ie^{n\ln(x)}\right)\text{csgn}\left(ic\,e^{n\ln(x)}\right)+ib\pi\,\text{csgn}(ic)\text{csgn}\left(ic\,e^{n\ln(x)}\right)^2+ib\pi\,\text{csgn}\left(ie^{n\ln(x)}\right.\right.}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2/b/n*x/(d*x)^(1/2)/(2*a+2*b*ln(c)+2*b*ln(exp(n*ln(x)))-I*b*Pi*csgn(I*c)*c
sgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))+I*b*Pi*csgn(I*c)*csgn(I*c*exp(n*
ln(x)))^2+I*b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2-I*b*Pi*csgn(
I*c*exp(n*ln(x)))^3)-1/2/d/b^2/n^2*exp(1/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*l
n(x)))*csgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*
csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3
+2*I*b*n*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a
)/b/n)*Ei(1,-1/2*ln(d*x)+1/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln(x)))*csgn(I*
```

```
c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*csgn(I*exp(n*l
n(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+2*I*b*n*(ln(x
)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)/b/n)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 4*b*n*integrate(1/((b^3*sqrt(d)*log(c)^3 + b^3*sqrt(d)*log(x^n)^3 + 3*a*b^2
*sqrt(d)*log(c)^2 + 3*a^2*b*sqrt(d)*log(c) + a^3*sqrt(d) + 3*(b^3*sqrt(d)*l
og(c) + a*b^2*sqrt(d))*log(x^n)^2 + 3*(b^3*sqrt(d)*log(c)^2 + 2*a*b^2*sqrt(
d)*log(c) + a^2*b*sqrt(d))*log(x^n))*sqrt(x)), x) + 2*sqrt(x)/(b^2*sqrt(d)*
log(c)^2 + b^2*sqrt(d)*log(x^n)^2 + 2*a*b*sqrt(d)*log(c) + a^2*sqrt(d) + 2*
(b^2*sqrt(d)*log(c) + a*b*sqrt(d))*log(x^n))
```

Fricas [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sqrt(d*x)/(b^2*d*x*log(c*x^n)^2 + 2*a*b*d*x*log(c*x^n) + a^2*d*x),
 x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{dx}\,\left(a + b\log\left(cx^{n}\right)\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(1/2)/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(1/(sqrt(d*x)*(a + b*log(c*x**n))**2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sqrt{d\,x}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d*x)^(1/2)*(a + b*log(c*x^n))^2),x)
[Out] int(1/((d*x)^(1/2)*(a + b*log(c*x^n))^2), x)
```

3.111 $\int \frac{1}{(dx)^{3/2}(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=101

$$-\frac{e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\text{Ei}\left(\frac{-a-b\log(cx^n)}{2bn}\right)}{2b^2dn^2\sqrt{dx}}-\frac{1}{bdn\sqrt{dx}\,\left(a+b\log\left(cx^n\right)\right)}$$

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

Rubi [A]
time = 0.06, antiderivative size = 98, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2343, 2347, 2209}

$$-\frac{e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\text{Ei}\left(-\frac{a+b\log(cx^n)}{2bn}\right)}{2b^2dn^2\sqrt{dx}}-\frac{1}{bdn\sqrt{dx}\,\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/((d*x)^(3/2)*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -1/2*(E^(a/(2*b*n))*(c*x^n)^(1/(2*n))*ExpIntegralEi[-1/2*(a + b*Log[c*x^n])
/(b*n)])/(b^2*d*n^2*Sqrt[d*x]) - 1/(b*d*n*Sqrt[d*x]*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{(dx)^{3/2}\,(a+b\log(cx^n))^2}\,dx = -\frac{1}{bdn\sqrt{dx}\,(a+b\log(cx^n))} - \frac{\int \frac{1}{(dx)^{3/2}(a+b\log(cx^n))}\,dx}{2bn}$$
$$= -\frac{1}{bdn\sqrt{dx}\,(a+b\log(cx^n))} - \frac{(cx^n)^{\frac{1}{2}/n}\,\text{Subst}\left(\int \frac{e^{-\frac{x}{2n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{2bdn^2\sqrt{dx}}$$
$$= -\frac{e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\text{Ei}\left(-\frac{a+b\log(cx^n)}{2bn}\right)}{2b^2dn^2\sqrt{dx}} - \frac{1}{bdn\sqrt{dx}\,(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.09, size = 93, normalized size = 0.92

$$-\frac{x\left(2bn+e^{\frac{a}{2bn}}(cx^n)^{\frac{1}{2}/n}\,\text{Ei}\left(-\frac{a+b\log(cx^n)}{2bn}\right)(a+b\log(cx^n))\right)}{2b^2n^2(dx)^{3/2}\,(a+b\log(cx^n))}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/((d*x)^(3/2)*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -1/2*(x*(2*b*n + E^(a/(2*b*n))*(c*x^n)^(1/(2*n))*ExpIntegralEi[-1/2*(a + b*
Log[c*x^n])/(b*n)]*(a + b*Log[c*x^n])))/(b^2*n^2*(d*x)^(3/2)*(a + b*Log[c*x
^n]))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.58, size = 429, normalized size = 4.25

method	result
risch	$-\frac{2}{bn\sqrt{dx}\,\left(2a+2b\ln(c)+2b\ln(e^{n\ln(x)})-ib\pi\,\text{csgn}(ic)\text{csgn}(ie^{n\ln(x)})\text{csgn}(ic\,e^{n\ln(x)})+ib\pi\,\text{csgn}(ic)\text{csgn}(ic\,e^{n\ln(x)})^2+ib\pi\,\text{csgn}(ie^{n\ln}\right.}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2/b/n/(d*x)^(1/2)/(2*a+2*b*ln(c)+2*b*ln(exp(n*ln(x)))-I*b*Pi*csgn(I*c)*csg
n(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))+I*b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln
(x)))^2+I*b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2-I*b*Pi*csgn(I*
c*exp(n*ln(x)))^3)/d+1/2/b^2/n^2*exp(-1/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln
(x)))*csgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*c
sgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+
2*I*b*n*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)
```

```
/b/n)*Ei(1,1/2*ln(d*x)-1/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln(x)))*csgn(I*c*
exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*csgn(I*exp(n*ln(
x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+2*I*b*n*(ln(x)-
ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)/b/n)/d
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(3/2)/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

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

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(3/2)/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b^2*d^2*x^2*log(c*x^n)^2 + 2*a*b*d^2*x^2*log(c*x^n) + a
^2*d^2*x^2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{(dx)^{\frac{3}{2}} \left(a + b\log\left(cx^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(3/2)/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(1/((d*x)**(3/2)*(a + b*log(c*x**n))**2), x)
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 293 vs. 2(85) = 170.
time = 2.68, size = 293, normalized size = 2.90

$$-\frac{\frac{bc^{\frac{1}{2n}} n \operatorname{Ei}\left(-\frac{\log(c)}{2n} - \frac{a}{2bn} - \frac{1}{2}\log(x)\right) e^{\left(\frac{a}{2bn}\right)} \log(x)}{b^3\sqrt{d}\,n^3\log(x) + b^3\sqrt{d}\,n^2\log(c) + ab^2\sqrt{d}\,n^2} + \frac{bc^{\frac{1}{2n}} \operatorname{Ei}\left(-\frac{\log(c)}{2n} - \frac{a}{2bn} - \frac{1}{2}\log(x)\right) e^{\left(\frac{a}{2bn}\right)} \log(c)}{b^3\sqrt{d}\,n^3\log(x) + b^3\sqrt{d}\,n^2\log(c) + ab^2\sqrt{d}\,n^2} + \frac{ac^{\frac{1}{2n}} \operatorname{Ei}\left(-\frac{\log(c)}{2n} - \frac{a}{2bn} - \frac{1}{2}\log(x)\right) e^{\left(\frac{a}{2bn}\right)}}{b^3\sqrt{d}\,n^3\log(x) + b^3\sqrt{d}\,n^2\log(c) + ab^2\sqrt{d}\,n^2} + \frac{2bn}{\left(b^3\sqrt{d}\,n^3\log(x) + b^3\sqrt{d}\,n^2\log(c) + ab^2\sqrt{d}\,n^2\right)\sqrt{x}}}{2d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(3/2)/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] -1/2*(b*c^(1/2/n)*n*Ei(-1/2*log(c)/n - 1/2*a/(b*n) - 1/2*log(x))*e^(1/2*a/(
b*n))*log(x)/(b^3*sqrt(d)*n^3*log(x) + b^3*sqrt(d)*n^2*log(c) + a*b^2*sqrt(
d)*n^2) + b*c^(1/2/n)*Ei(-1/2*log(c)/n - 1/2*a/(b*n) - 1/2*log(x))*e^(1/2*a
/(b*n))*log(c)/(b^3*sqrt(d)*n^3*log(x) + b^3*sqrt(d)*n^2*log(c) + a*b^2*sqr
t(d)*n^2) + a*c^(1/2/n)*Ei(-1/2*log(c)/n - 1/2*a/(b*n) - 1/2*log(x))*e^(1/2
*a/(b*n))/(b^3*sqrt(d)*n^3*log(x) + b^3*sqrt(d)*n^2*log(c) + a*b^2*sqrt(d)*
n^2) + 2*b*n/((b^3*sqrt(d)*n^3*log(x) + b^3*sqrt(d)*n^2*log(c) + a*b^2*sqrt
(d)*n^2)*sqrt(x)))/d
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{(d\,x)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d*x)^(3/2)*(a + b*log(c*x^n))^2),x)
```

```
[Out] int(1/((d*x)^(3/2)*(a + b*log(c*x^n))^2), x)
```

3.112 $\int \frac{1}{(dx)^{5/2}(a+b\log(cx^n))^2}\,dx$

Optimal. Leaf size=98

$$-\frac{3e^{\frac{3a}{2bn}}\left(cx^n\right)^{\frac{3}{2}/n}\,\mathrm{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2(dx)^{3/2}}-\frac{1}{bdn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] -3/2*exp(3/2*a/b/n)*(c*x^n)^(3/2/n)*Ei(-3/2*(a+b*ln(c*x^n))/b/n)/b^2/d/n^2/
(d*x)^(3/2)-1/b/d/n/(d*x)^(3/2)/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {2343, 2347, 2209}

$$-\frac{3e^{\frac{3a}{2bn}}\left(cx^n\right)^{\frac{3}{2}/n}\,\mathrm{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2(dx)^{3/2}}-\frac{1}{bdn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/((d*x)^(5/2)*(a + b*Log[c*x^n])^2),x]
```

```
[Out] (-3*E^((3*a)/(2*b*n))*(c*x^n)^(3/(2*n))*ExpIntegralEi[(-3*(a + b*Log[c*x^n]
))/(2*b*n)])/(2*b^2*d*n^2*(d*x)^(3/2)) - 1/(b*d*n*(d*x)^(3/2)*(a + b*Log[c*
x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{(dx)^{5/2}\left(a+b\log\left(cx^n\right)\right)^2}\,dx = -\frac{1}{bdn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)} - \frac{3\int \frac{1}{(dx)^{5/2}(a+b\log(cx^n))}\,dx}{2bn}$$

$$= -\frac{1}{bdn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)} - \frac{\left(3(cx^n)^{\frac{3}{2}/n}\right)\text{Subst}\left(\int \frac{e^{-\frac{3x}{2n}}}{a+bx}\,dx, x, \log\left(cx\right.\right.}{2bdn^2(dx)^{3/2}}$$

$$= -\frac{3e^{\frac{3a}{2bn}}\left(cx^n\right)^{\frac{3}{2}/n}\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)}{2b^2dn^2(dx)^{3/2}} - \frac{1}{bdn(dx)^{3/2}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A]
time = 0.09, size = 94, normalized size = 0.96

$$-\frac{x\left(2bn+3e^{\frac{3a}{2bn}}\left(cx^n\right)^{\frac{3}{2}/n}\text{Ei}\left(-\frac{3(a+b\log(cx^n))}{2bn}\right)\left(a+b\log\left(cx^n\right)\right)\right)}{2b^2n^2(dx)^{5/2}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/((d*x)^(5/2)*(a + b*Log[c*x^n])^2),x]
```

```
[Out] -1/2*(x*(2*b*n + 3*E^((3*a)/(2*b*n))*(c*x^n)^(3/(2*n))*ExpIntegralEi[(-3*(a
 + b*Log[c*x^n]))/(2*b*n)]*(a + b*Log[c*x^n])))/(b^2*n^2*(d*x)^(5/2)*(a + b
*Log[c*x^n]))
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 4.
time = 0.62, size = 432, normalized size = 4.41

method	result
risch	$-\frac{2}{bnx\sqrt{dx}\,\left(2a+2b\ln(c)+2b\ln\left(e^{n\ln(x)}\right)-ib\pi\,\text{csgn}(ic)\text{csgn}\left(ie^{n\ln(x)}\right)\text{csgn}\left(ic\,e^{n\ln(x)}\right)+ib\pi\,\text{csgn}(ic)\text{csgn}\left(ic\,e^{n\ln(x)}\right)^2+ib\pi\,\text{csgn}\left(ie\right.\right.}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(5/2)/(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

```
[Out] -2/b/n/x/(d*x)^(1/2)/(2*a+2*b*ln(c)+2*b*ln(exp(n*ln(x)))-I*b*Pi*csgn(I*c)*c
sgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))+I*b*Pi*csgn(I*c)*csgn(I*c*exp(n*
ln(x)))^2+I*b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2-I*b*Pi*csgn(
I*c*exp(n*ln(x)))^3)/d^2+3/2/d/b^2/n^2*exp(-3/4*I*(b*Pi*csgn(I*c)*csgn(I*ex
p(n*ln(x)))*csgn(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-
b*Pi*csgn(I*exp(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x
)))^3+2*I*b*n*(ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+
```

```
2*I*a)/b/n)*Ei(1,3/2*ln(d*x)-3/4*I*(b*Pi*csgn(I*c)*csgn(I*exp(n*ln(x)))*csg
n(I*c*exp(n*ln(x)))-b*Pi*csgn(I*c)*csgn(I*c*exp(n*ln(x)))^2-b*Pi*csgn(I*exp
(n*ln(x)))*csgn(I*c*exp(n*ln(x)))^2+b*Pi*csgn(I*c*exp(n*ln(x)))^3+2*I*b*n*(
ln(x)-ln(d*x))+2*I*b*ln(c)+2*I*b*(ln(exp(n*ln(x)))-n*ln(x))+2*I*a)/b/n)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(5/2)/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] -4*b*n*integrate(1/3/((b^3*d^(5/2)*log(c)^3 + b^3*d^(5/2)*log(x^n)^3 + 3*a*
b^2*d^(5/2)*log(c)^2 + 3*a^2*b*d^(5/2)*log(c) + a^3*d^(5/2) + 3*(b^3*d^(5/2
)*log(c) + a*b^2*d^(5/2))*log(x^n)^2 + 3*(b^3*d^(5/2)*log(c)^2 + 2*a*b^2*d^
(5/2)*log(c) + a^2*b*d^(5/2))*log(x^n))*x^(5/2)), x) - 2/3/((b^2*d^(5/2)*lo
g(c)^2 + b^2*d^(5/2)*log(x^n)^2 + 2*a*b*d^(5/2)*log(c) + a^2*d^(5/2) + 2*(b
^2*d^(5/2)*log(c) + a*b*d^(5/2))*log(x^n))*x^(3/2))
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(5/2)/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b^2*d^3*x^3*log(c*x^n)^2 + 2*a*b*d^3*x^3*log(c*x^n) + a
^2*d^3*x^3), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{(dx)^{\frac{5}{2}} \left(a + b \log \left(cx^{n}\right)\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(5/2)/(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(1/((d*x)**(5/2)*(a + b*log(c*x**n))**2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(5/2)/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((d*x)^(5/2)*(b*log(c*x^n) + a)^2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\left(d\,x\right)}^{5/2}\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/((d*x)^(5/2)*(a + b*log(c*x^n))^2),x)
```

```
[Out] int(1/((d*x)^(5/2)*(a + b*log(c*x^n))^2), x)
```

3.113 $\int \sqrt{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=85

$$-\frac{1}{2}\sqrt{b}\,e^{-\frac{a}{bn}}\sqrt{n}\,\sqrt{\pi}\,x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)+x\sqrt{a+b\log(cx^n)}$$

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

Rubi [A]
time = 0.06, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2333, 2337, 2211, 2235}

$$x\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\pi}\,\sqrt{b}\,\sqrt{n}\,xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\,\sqrt{n}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[a + b*Log[c*x^n]],x]
```

```
[Out] -1/2*(Sqrt[b]*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sqrt[
n]])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) + x*Sqrt[a + b*Log[c*x^n]]
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
```

```
{a, b, c, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int \sqrt{a+b\log(cx^n)}\,dx &= x\sqrt{a+b\log(cx^n)} - \frac{1}{2}(bn)\int \frac{1}{\sqrt{a+b\log(cx^n)}}\,dx \\
&= x\sqrt{a+b\log(cx^n)} - \frac{1}{2}\left(bx(cx^n)^{-1/n}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{x}{n}}}{\sqrt{a+bx}}\,dx, x, \log(cx^n)\right) \\
&= x\sqrt{a+b\log(cx^n)} - \left(x(cx^n)^{-1/n}\right)\mathrm{Subst}\left(\int e^{-\frac{a}{bn}+\frac{x^2}{bn}}\,dx, x, \sqrt{a+b\log(cx^n)}\right) \\
&= -\frac{1}{2}\sqrt{b}\,e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}\,x(cx^n)^{-1/n}\,\mathrm{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) + x\sqrt{a+b\log(cx^n)}
\end{aligned}
$$

Mathematica [A]
time = 0.03, size = 85, normalized size = 1.00

$$-\frac{1}{2}\sqrt{b}\,e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}\,x(cx^n)^{-1/n}\,\mathrm{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) + x\sqrt{a+b\log(cx^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[a + b*Log[c*x^n]],x]
[Out] -1/2*(Sqrt[b]*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sqrt[
n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) + x*Sqrt[a + b*Log[c*x^n]]
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{a+b\ln(c\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^(1/2),x)
[Out] int((a+b*ln(c*x^n))^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(b*log(c*x^n) + a), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{a + b \log{\left(c x^{n} \right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(sqrt(a + b*log(c*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*log(c*x^n) + a), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{a+b\,\ln\left(c\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^(1/2),x)
```

```
[Out] int((a + b*log(c*x^n))^(1/2), x)
```

3.114 $\int x^3 \sqrt{\log(ax^n)}\, dx$

Optimal. Leaf size=64

$$-\frac{1}{16}\sqrt{n}\,\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\mathrm{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{4}x^4\sqrt{\log(ax^n)}$$

```
[Out] -1/16*x^4*erfi(2*ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*Pi^(1/2)/((a*x^n)^(4/n))+
1/4*x^4*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{1}{4}x^4\sqrt{\log(ax^n)}-\frac{1}{16}\sqrt{\pi}\,\sqrt{n}\,x^4(ax^n)^{-4/n}\,\mathrm{Erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Sqrt[Log[a*x^n]],x]
```

```
[Out] -1/16*(Sqrt[n]*Sqrt[Pi]*x^4*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^n)^(4/
n) + (x^4*Sqrt[Log[a*x^n]])/4
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int x^3\sqrt{\log\left(ax^n\right)}\,dx &= \frac{1}{4}x^4\sqrt{\log\left(ax^n\right)}-\frac{1}{8}n\int\frac{x^3}{\sqrt{\log\left(ax^n\right)}}\,dx\\
&= \frac{1}{4}x^4\sqrt{\log\left(ax^n\right)}-\frac{1}{8}\left(x^4\left(ax^n\right)^{-4/n}\right)\text{Subst}\left(\int\frac{e^{\frac{4x}{n}}}{\sqrt{x}}\,dx,x,\log\left(ax^n\right)\right)\\
&= \frac{1}{4}x^4\sqrt{\log\left(ax^n\right)}-\frac{1}{4}\left(x^4\left(ax^n\right)^{-4/n}\right)\text{Subst}\left(\int e^{\frac{4x^2}{n}}\,dx,x,\sqrt{\log\left(ax^n\right)}\right)\\
&= -\frac{1}{16}\sqrt{n}\sqrt{\pi}\,x^4\left(ax^n\right)^{-4/n}\text{erfi}\left(\frac{2\sqrt{\log\left(ax^n\right)}}{\sqrt{n}}\right)+\frac{1}{4}x^4\sqrt{\log\left(ax^n\right)}
\end{aligned}
$$

Mathematica [A]
time = 0.02, size = 61, normalized size = 0.95

$$
\frac{1}{16}x^4\left(-\sqrt{n}\sqrt{\pi}\left(ax^n\right)^{-4/n}\text{erfi}\left(\frac{2\sqrt{\log\left(ax^n\right)}}{\sqrt{n}}\right)+4\sqrt{\log\left(ax^n\right)}\right)
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Sqrt[Log[a*x^n]],x]
[Out] (x^4*(-((Sqrt[n]*Sqrt[Pi]*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^n)^(4/n)
) + 4*Sqrt[Log[a*x^n]]))/16
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$
\int x^3\sqrt{\ln\left(a\,x^n\right)}\,dx
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*ln(a*x^n)^(1/2),x)
[Out] int(x^3*ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^3*sqrt(log(a*x^n)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \sqrt{\log(ax^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(x**3*sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^3*sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^3\,\sqrt{\ln\left(a\,x^n\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*log(a*x^n)^(1/2),x)
```

```
[Out] int(x^3*log(a*x^n)^(1/2), x)
```

3.115 $\int x^2 \sqrt{\log(ax^n)}\, dx$

Optimal. Leaf size=72

$$-\frac{1}{6}\sqrt{n}\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\,\mathrm{erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{3}x^3\sqrt{\log(ax^n)}$$

```
[Out] -1/18*x^3*erfi(3^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*3^(1/2)*Pi^(1/2)/((
a*x^n)^(3/n))+1/3*x^3*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{1}{3}x^3\sqrt{\log(ax^n)}-\frac{1}{6}\sqrt{\frac{\pi}{3}}\sqrt{n}\,x^3(ax^n)^{-3/n}\,\mathrm{Erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sqrt[Log[a*x^n]],x]
```

```
[Out] -1/6*(Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x
^n)^(3/n) + (x^3*Sqrt[Log[a*x^n]])/3
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int x^2\sqrt{\log(ax^n)}\,dx &= \frac{1}{3}x^3\sqrt{\log(ax^n)}-\frac{1}{6}n\int\frac{x^2}{\sqrt{\log(ax^n)}}\,dx\\ &= \frac{1}{3}x^3\sqrt{\log(ax^n)}-\frac{1}{6}\left(x^3(ax^n)^{-3/n}\right)\text{Subst}\left(\int\frac{e^{\frac{3x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)\\ &= \frac{1}{3}x^3\sqrt{\log(ax^n)}-\frac{1}{3}\left(x^3(ax^n)^{-3/n}\right)\text{Subst}\left(\int e^{\frac{3x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)\\ &= -\frac{1}{6}\sqrt{n}\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\,\text{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{3}x^3\sqrt{\log(ax^n)}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 67, normalized size = 0.93

$$\frac{1}{18}x^3\left(-\sqrt{n}\sqrt{3\pi}\,(ax^n)^{-3/n}\,\text{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+6\sqrt{\log(ax^n)}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sqrt[Log[a*x^n]],x]
[Out] (x^3*(-((Sqrt[n]*Sqrt[3*Pi]*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^
n)^(3/n)) + 6*Sqrt[Log[a*x^n]]))/18
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2\sqrt{\ln(a\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*ln(a*x^n)^(1/2),x)
[Out] int(x^2*ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2*sqrt(log(a*x^n)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \sqrt{\log{(ax^n)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^2*sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\,\sqrt{\ln\left(a\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*log(a*x^n)^(1/2),x)
```

```
[Out] int(x^2*log(a*x^n)^(1/2), x)
```

3.116 $\int x\sqrt{\log(ax^n)}\,dx$

Optimal. Leaf size=72

$$-\frac{1}{4}\sqrt{n}\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\,\mathrm{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{2}x^2\sqrt{\log(ax^n)}$$

```
[Out] -1/8*x^2*erfi(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*2^(1/2)*Pi^(1/2)/((a
*x^n)^(2/n))+1/2*x^2*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.04, antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{1}{2}x^2\sqrt{\log(ax^n)}-\frac{1}{4}\sqrt{\frac{\pi}{2}}\sqrt{n}\,x^2(ax^n)^{-2/n}\,\mathrm{Erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[Log[a*x^n]],x]
```

```
[Out] -1/4*(Sqrt[n]*Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x
^n)^(2/n) + (x^2*Sqrt[Log[a*x^n]])/2
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int x\sqrt{\log(ax^n)}\,dx &= \frac{1}{2}x^2\sqrt{\log(ax^n)}-\frac{1}{4}n\int\frac{x}{\sqrt{\log(ax^n)}}\,dx\\ &= \frac{1}{2}x^2\sqrt{\log(ax^n)}-\frac{1}{4}\left(x^2(ax^n)^{-2/n}\right)\text{Subst}\left(\int\frac{e^{\frac{2x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)\\ &= \frac{1}{2}x^2\sqrt{\log(ax^n)}-\frac{1}{2}\left(x^2(ax^n)^{-2/n}\right)\text{Subst}\left(\int e^{\frac{2x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)\\ &= -\frac{1}{4}\sqrt{n}\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\,\text{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{2}x^2\sqrt{\log(ax^n)}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 67, normalized size = 0.93

$$\frac{1}{8}x^2\left(-\sqrt{n}\sqrt{2\pi}\,(ax^n)^{-2/n}\,\text{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+4\sqrt{\log(ax^n)}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sqrt[Log[a*x^n]],x]
[Out] (x^2*(-((Sqrt[n]*Sqrt[2*Pi]*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^
n)^(2/n)) + 4*Sqrt[Log[a*x^n]]))/8
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x\sqrt{\ln(a\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(a*x^n)^(1/2),x)
[Out] int(x*ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x*sqrt(log(a*x^n)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x\sqrt{\log\left(ax^{n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(x*sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x*sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\sqrt{\ln\left(a\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(a*x^n)^(1/2),x)
```

```
[Out] int(x*log(a*x^n)^(1/2), x)
```

3.117 $\int \sqrt{\log(ax^n)}\,dx$

Optimal. Leaf size=56

$$-\frac{1}{2}\sqrt{n}\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+x\sqrt{\log(ax^n)}$$

```
[Out] -1/2*x*erfi(ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*Pi^(1/2)/((a*x^n)^(1/n))+x*ln(
a*x^n)^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2333, 2337, 2211, 2235}

$$x\sqrt{\log(ax^n)}-\frac{1}{2}\sqrt{\pi}\sqrt{n}\,x(ax^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Log[a*x^n]],x]
```

```
[Out] -1/2*(Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(a*x^n)^n^(-1) + x
*Sqrt[Log[a*x^n]]
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
```

```
{a, b, c, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \sqrt{\log(ax^n)}\,dx &= x\sqrt{\log(ax^n)} - \frac{1}{2}n\int \frac{1}{\sqrt{\log(ax^n)}}\,dx \\
&= x\sqrt{\log(ax^n)} - \frac{1}{2}\left(x(ax^n)^{-1/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right) \\
&= x\sqrt{\log(ax^n)} - \left(x(ax^n)^{-1/n}\right)\text{Subst}\left(\int e^{\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right) \\
&= -\frac{1}{2}\sqrt{n}\,\sqrt{\pi}\,x(ax^n)^{-1/n}\,\text{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right) + x\sqrt{\log(ax^n)}
\end{aligned}$$

Mathematica [A]
time = 0.01, size = 56, normalized size = 1.00

$$-\frac{1}{2}\sqrt{n}\,\sqrt{\pi}\,x(ax^n)^{-1/n}\,\text{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right) + x\sqrt{\log(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Log[a*x^n]],x]
[Out] -1/2*(Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(a*x^n)^n^(-1) + x
*Sqrt[Log[a*x^n]]
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\ln(a\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(1/2),x)
[Out] int(ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(log(a*x^n)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\log\left(ax^{n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \sqrt{\ln\left(a\,x^{n}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(1/2),x)
```

```
[Out] int(log(a*x^n)^(1/2), x)
```

3.118 $\int \frac{\sqrt{\log(ax^n)}}{x}\,dx$

Optimal. Leaf size=17

$$\frac{2\log^{\frac{3}{2}}(ax^n)}{3n}$$

```
[Out] 2/3*ln(a*x^n)^(3/2)/n
```

Rubi [A]
time = 0.01, antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2339, 30}

$$\frac{2\log^{\frac{3}{2}}(ax^n)}{3n}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Log[a*x^n]]/x,x]
```

```
[Out] (2*Log[a*x^n]^(3/2))/(3*n)
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sqrt{\log(ax^n)}}{x}\,dx &= \frac{\operatorname{Subst}\left(\int \sqrt{x}\,dx, x, \log(ax^n)\right)}{n}\\ &= \frac{2\log^{\frac{3}{2}}(ax^n)}{3n}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 17, normalized size = 1.00

$$\frac{2\log^{\frac{3}{2}}(ax^n)}{3n}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Log[a*x^n]]/x,x]
```

```
[Out] (2*Log[a*x^n]^(3/2))/(3*n)
```

Maple [A]
time = 0.12, size = 14, normalized size = 0.82

method	result	size
derivativedivides	$\frac{2\ln(a\,x^{n})^{\frac{3}{2}}}{3n}$	14
default	$\frac{2\ln(a\,x^{n})^{\frac{3}{2}}}{3n}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(1/2)/x,x,method=_RETURNVERBOSE)
```

```
[Out] 2/3*ln(a*x^n)^(3/2)/n
```

Maxima [A]
time = 0.29, size = 13, normalized size = 0.76

$$\frac{2\,\log\left(ax^{n}\right)^{\frac{3}{2}}}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x,x, algorithm="maxima")
```

```
[Out] 2/3*log(a*x^n)^(3/2)/n
```

Fricas [A]
time = 0.35, size = 14, normalized size = 0.82

$$\frac{2\left(n\log\left(x\right)+\log\left(a\right)\right)^{\frac{3}{2}}}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x,x, algorithm="fricas")
```

```
[Out] 2/3*(n*log(x) + log(a))^(3/2)/n
```

Sympy [A]
time = 0.53, size = 29, normalized size = 1.71

$$-\begin{cases} -\sqrt{\log\left(a\right)}\,\log\left(x\right) & \text{for}\ n=0\\ -\frac{2\log\left(ax^{n}\right)^{\frac{3}{2}}}{3n} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(1/2)/x,x)
```

```
[Out] -Piecewise((-sqrt(log(a))*log(x), Eq(n, 0)), (-2*log(a*x**n)**(3/2)/(3*n), True))
```

Giac [A]
time = 2.79, size = 14, normalized size = 0.82

$$\frac{2\left(n\log\left(x\right)+\log\left(a\right)\right)^{\frac{3}{2}}}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x,x, algorithm="giac")
```

```
[Out] 2/3*(n*log(x) + log(a))^(3/2)/n
```

Mupad [B]
time = 3.54, size = 13, normalized size = 0.76

$$\frac{2\ln\left(a\,x^n\right)^{3/2}}{3\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(1/2)/x,x)
```

```
[Out] (2*log(a*x^n)^(3/2))/(3*n)
```

3.119 $\int \frac{\sqrt{\log(ax^n)}}{x^2} \, dx$

Optimal. Leaf size=59

$$\frac{\sqrt{n}\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\operatorname{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2x} - \frac{\sqrt{\log(ax^n)}}{x}$$

```
[Out] 1/2*(a*x^n)^(1/n)*erf(ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*Pi^(1/2)/x-ln(a*x^n)
^(1/2)/x
```

Rubi [A]
time = 0.03, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2236}

$$\frac{\sqrt{\pi}\sqrt{n}\,(ax^n)^{\frac{1}{n}}\operatorname{Erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2x} - \frac{\sqrt{\log(ax^n)}}{x}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Log[a*x^n]]/x^2,x]
```

```
[Out] (Sqrt[n]*Sqrt[Pi]*(a*x^n)^n^(-1)*Erf[Sqrt[Log[a*x^n]]/Sqrt[n]])/(2*x) - Sqr
t[Log[a*x^n]]/x
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sqrt{\log(ax^n)}}{x^2}\,dx &= -\frac{\sqrt{\log(ax^n)}}{x}+\frac{1}{2}n\int \frac{1}{x^2\sqrt{\log(ax^n)}}\,dx\\ &= -\frac{\sqrt{\log(ax^n)}}{x}+\frac{(ax^n)^{\frac{1}{n}}\operatorname{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{2x}\\ &= -\frac{\sqrt{\log(ax^n)}}{x}+\frac{(ax^n)^{\frac{1}{n}}\operatorname{Subst}\left(\int e^{-\frac{x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{x}\\ &= \frac{\sqrt{n}\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\operatorname{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2x}-\frac{\sqrt{\log(ax^n)}}{x}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 65, normalized size = 1.10

$$-\frac{2\log(ax^n)+n(ax^n)^{\frac{1}{n}}\Gamma\left(\frac{1}{2},\frac{\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}}{2x\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Log[a*x^n]]/x^2,x]
```

```
[Out] -1/2*(2*Log[a*x^n] + n*(a*x^n)^n^(-1)*Gamma[1/2, Log[a*x^n]/n]*Sqrt[Log[a*x
^n]/n])/(x*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\ln(a\,x^n)}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(1/2)/x^2,x)
```

```
[Out] int(ln(a*x^n)^(1/2)/x^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x^2,x, algorithm="maxima")
[Out] integrate(sqrt(log(a*x^n))/x^2, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x^2,x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\log{\left(ax^{n} \right)}}}{x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(1/2)/x**2,x)
[Out] Integral(sqrt(log(a*x**n))/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x^2,x, algorithm="giac")
[Out] integrate(sqrt(log(a*x^n))/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\sqrt{\ln\left(a\,x^n\right)}}{x^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(1/2)/x^2,x)
[Out] int(log(a*x^n)^(1/2)/x^2, x)
```

3.120 $\int \frac{\sqrt{\log(ax^n)}}{x^3}\,dx$

Optimal. Leaf size=72

$$\frac{\sqrt{n}\sqrt{\frac{\pi}{2}}(ax^n)^{2/n}\,\mathrm{erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4x^2}-\frac{\sqrt{\log(ax^n)}}{2x^2}$$

```
[Out] 1/8*(a*x^n)^(2/n)*erf(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*2^(1/2)*Pi^(
1/2)/x^2-1/2*ln(a*x^n)^(1/2)/x^2
```

Rubi [A]
time = 0.04, antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2236}

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{n}(ax^n)^{2/n}\,\mathrm{Erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4x^2}-\frac{\sqrt{\log(ax^n)}}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Log[a*x^n]]/x^3,x]
```

```
[Out] (Sqrt[n]*Sqrt[Pi/2]*(a*x^n)^(2/n)*Erf[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/
(4*x^2) - Sqrt[Log[a*x^n]]/(2*x^2)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\sqrt{\log(ax^n)}}{x^3}\,dx &= -\frac{\sqrt{\log(ax^n)}}{2x^2} + \frac{1}{4}n\int \frac{1}{x^3\sqrt{\log(ax^n)}}\,dx \\
&= -\frac{\sqrt{\log(ax^n)}}{2x^2} + \frac{(ax^n)^{2/n}\,\mathrm{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{4x^2} \\
&= -\frac{\sqrt{\log(ax^n)}}{2x^2} + \frac{(ax^n)^{2/n}\,\mathrm{Subst}\left(\int e^{-\frac{2x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{2x^2} \\
&= \frac{\sqrt{n}\sqrt{\frac{\pi}{2}}(ax^n)^{2/n}\,\mathrm{erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4x^2} - \frac{\sqrt{\log(ax^n)}}{2x^2}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 73, normalized size = 1.01

$$-\frac{4\log(ax^n) + \sqrt{2}\,n(ax^n)^{2/n}\,\Gamma\left(\frac{1}{2}, \frac{2\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}}{8x^2\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Log[a*x^n]]/x^3,x]
[Out] -1/8*(4*Log[a*x^n] + Sqrt[2]*n*(a*x^n)^(2/n)*Gamma[1/2, (2*Log[a*x^n])/n]*S
qrt[Log[a*x^n]/n])/(x^2*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\ln(a\,x^n)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(1/2)/x^3,x)
[Out] int(ln(a*x^n)^(1/2)/x^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x^3,x, algorithm="maxima")
[Out] integrate(sqrt(log(a*x^n))/x^3, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x^3,x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\log\left(ax^{n}\right)}}{x^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(1/2)/x**3,x)
[Out] Integral(sqrt(log(a*x**n))/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(1/2)/x^3,x, algorithm="giac")
[Out] integrate(sqrt(log(a*x^n))/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sqrt{\ln\left(a\,x^n\right)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(1/2)/x^3,x)
[Out] int(log(a*x^n)^(1/2)/x^3, x)
```

3.121 $\int x^3 \log^{\frac{3}{2}}(ax^n)\,dx$

Optimal. Leaf size=82

$$\frac{3}{128}n^{3/2}\sqrt{\pi}\,x^4(ax^n)^{-4/n}\operatorname{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)-\frac{3}{32}nx^4\sqrt{\log(ax^n)}+\frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n)$$

```
[Out] 1/4*x^4*ln(a*x^n)^(3/2)+3/128*n^(3/2)*x^4*erfi(2*ln(a*x^n)^(1/2)/n^(1/2))*P
i^(1/2)/((a*x^n)^(4/n))-3/32*n*x^4*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {2342, 2347, 2211, 2235}

$$\frac{3}{128}\sqrt{\pi}\,n^{3/2}x^4(ax^n)^{-4/n}\operatorname{Erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n)-\frac{3}{32}nx^4\sqrt{\log(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Log[a*x^n]^(3/2),x]
```

```
[Out] (3*n^(3/2)*Sqrt[Pi]*x^4*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(128*(a*x^n)^(4
/n)) - (3*n*x^4*Sqrt[Log[a*x^n]])/32 + (x^4*Log[a*x^n]^(3/2))/4
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int x^3 \log^{\frac{3}{2}}(ax^n)\,dx = \frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n) - \frac{1}{8}(3n)\int x^3\sqrt{\log(ax^n)}\,dx$$

$$= -\frac{3}{32}nx^4\sqrt{\log(ax^n)} + \frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n) + \frac{1}{64}(3n^2)\int \frac{x^3}{\sqrt{\log(ax^n)}}\,dx$$

$$= -\frac{3}{32}nx^4\sqrt{\log(ax^n)} + \frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n) + \frac{1}{64}\left(3nx^4(ax^n)^{-4/n}\right)\text{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{\sqrt{x}}\,dx, x, \text{lo}\right.$$

$$= -\frac{3}{32}nx^4\sqrt{\log(ax^n)} + \frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n) + \frac{1}{32}\left(3nx^4(ax^n)^{-4/n}\right)\text{Subst}\left(\int e^{\frac{4x^2}{n}}\,dx, x, \sqrt{}\right.$$

$$= \frac{3}{128}n^{3/2}\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\text{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right) - \frac{3}{32}nx^4\sqrt{\log(ax^n)} + \frac{1}{4}x^4\log^{\frac{3}{2}}(ax^n$$

Mathematica [A]
time = 0.03, size = 73, normalized size = 0.89

$$\frac{1}{128}x^4\left(3n^{3/2}\sqrt{\pi}\,(ax^n)^{-4/n}\,\text{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right) + 4\sqrt{\log(ax^n)}\,(-3n + 8\log(ax^n))\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Log[a*x^n]^(3/2),x]
[Out] (x^4*((3*n^(3/2)*Sqrt[Pi]*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^n)^(4/n)
 + 4*Sqrt[Log[a*x^n]]*(-3*n + 8*Log[a*x^n])))/128
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \ln(a\,x^n)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*ln(a*x^n)^(3/2),x)
[Out] int(x^3*ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] integrate(x^3*log(a*x^n)^(3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \log{(ax^n)}^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*ln(a*x**n)**(3/2),x)
[Out] Integral(x**3*log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*log(a*x^n)^(3/2),x, algorithm="giac")
[Out] integrate(x^3*log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^3 \ln\left(a\, x^n\right)^{3/2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*log(a*x^n)^(3/2),x)
[Out] int(x^3*log(a*x^n)^(3/2), x)
```

3.122 $\int x^2 \log^{\frac{3}{2}}(ax^n)\, dx$

Optimal. Leaf size=90

$$\frac{1}{12}n^{3/2}\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\,\mathrm{erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)-\frac{1}{6}nx^3\sqrt{\log(ax^n)}+\frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n)$$

```
[Out] 1/3*x^3*ln(a*x^n)^(3/2)+1/36*n^(3/2)*x^3*erfi(3^(1/2)*ln(a*x^n)^(1/2)/n^(1/
2))*3^(1/2)*Pi^(1/2)/((a*x^n)^(3/n))-1/6*n*x^3*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{1}{12}\sqrt{\frac{\pi}{3}}\,n^{3/2}x^3(ax^n)^{-3/n}\,\mathrm{Erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n)-\frac{1}{6}nx^3\sqrt{\log(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Log[a*x^n]^(3/2),x]
```

```
[Out] (n^(3/2)*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(12*(a*x^
n)^(3/n)) - (n*x^3*Sqrt[Log[a*x^n]])/6 + (x^3*Log[a*x^n]^(3/2))/3
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int x^2 \log^{\frac{3}{2}}(ax^n)\,dx &= \frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n) - \frac{1}{2}n\int x^2\sqrt{\log(ax^n)}\,dx\\ &= -\frac{1}{6}nx^3\sqrt{\log(ax^n)} + \frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n) + \frac{1}{12}n^2\int\frac{x^2}{\sqrt{\log(ax^n)}}\,dx\\ &= -\frac{1}{6}nx^3\sqrt{\log(ax^n)} + \frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n) + \frac{1}{12}\left(nx^3(ax^n)^{-3/n}\right)\text{Subst}\left(\int\frac{e^{\frac{3x}{n}}}{\sqrt{x}}\,dx, x, \log(a\right.\\ &= -\frac{1}{6}nx^3\sqrt{\log(ax^n)} + \frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n) + \frac{1}{6}\left(nx^3(ax^n)^{-3/n}\right)\text{Subst}\left(\int e^{\frac{3x^2}{n}}\,dx, x, \sqrt{\log(a}\right.\\ &= \frac{1}{12}n^{3/2}\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\,\text{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right) - \frac{1}{6}nx^3\sqrt{\log(ax^n)} + \frac{1}{3}x^3\log^{\frac{3}{2}}(ax^n\end{aligned}$$

Mathematica [A]
time = 0.04, size = 76, normalized size = 0.84

$$\frac{1}{36}x^3\left(n^{3/2}\sqrt{3\pi}\,(ax^n)^{-3/n}\,\text{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right) - 6(n-2\log(ax^n))\sqrt{\log(ax^n)}\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Log[a*x^n]^(3/2),x]
[Out] (x^3*((n^(3/2)*Sqrt[3*Pi]*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^n)
^(3/n) - 6*(n - 2*Log[a*x^n])*Sqrt[Log[a*x^n]]))/36
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2\ln(a\,x^n)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*ln(a*x^n)^(3/2),x)
[Out] int(x^2*ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] integrate(x^2*log(a*x^n)^(3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \log (ax^n)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*ln(a*x**n)**(3/2),x)
[Out] Integral(x**2*log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*log(a*x^n)^(3/2),x, algorithm="giac")
[Out] integrate(x^2*log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^2 \ln (a\, x^n)^{3/2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*log(a*x^n)^(3/2),x)
[Out] int(x^2*log(a*x^n)^(3/2), x)
```

3.123 $\int x \log^{\frac{3}{2}}(ax^n)\, dx$

Optimal. Leaf size=90

$$\frac{3}{16}n^{3/2}\sqrt{\frac{\pi}{2}}\, x^2(ax^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)-\frac{3}{8}nx^2\sqrt{\log(ax^n)}+\frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n)$$

```
[Out] 1/2*x^2*ln(a*x^n)^(3/2)+3/32*n^(3/2)*x^2*erfi(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/
2))*2^(1/2)*Pi^(1/2)/((a*x^n)^(2/n))-3/8*n*x^2*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.04, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{3}{16}\sqrt{\frac{\pi}{2}}\, n^{3/2}x^2(ax^n)^{-2/n}\operatorname{Erfi}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+\frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n)-\frac{3}{8}nx^2\sqrt{\log(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x*Log[a*x^n]^(3/2),x]
```

```
[Out] (3*n^(3/2)*Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(16*(a*
x^n)^(2/n)) - (3*n*x^2*Sqrt[Log[a*x^n]])/8 + (x^2*Log[a*x^n]^(3/2))/2
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int x\log^{\frac{3}{2}}(ax^n)\,dx &= \frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n)-\frac{1}{4}(3n)\int x\sqrt{\log(ax^n)}\,dx\\ &= -\frac{3}{8}nx^2\sqrt{\log(ax^n)}+\frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n)+\frac{1}{16}(3n^2)\int\frac{x}{\sqrt{\log(ax^n)}}\,dx\\ &= -\frac{3}{8}nx^2\sqrt{\log(ax^n)}+\frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n)+\frac{1}{16}\Big(3nx^2(ax^n)^{-2/n}\Big)\operatorname{Subst}\left(\int\frac{e^{\frac{2x}{n}}}{\sqrt{x}}\,dx,x,\log\right.\\ &= -\frac{3}{8}nx^2\sqrt{\log(ax^n)}+\frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n)+\frac{1}{8}\Big(3nx^2(ax^n)^{-2/n}\Big)\operatorname{Subst}\left(\int e^{\frac{2x^2}{n}}\,dx,x,\sqrt{\log}\right.\\ &= \frac{3}{16}n^{3/2}\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)-\frac{3}{8}nx^2\sqrt{\log(ax^n)}+\frac{1}{2}x^2\log^{\frac{3}{2}}(ax^n\end{aligned}$$

Mathematica [A]
time = 0.04, size = 79, normalized size = 0.88

$$\frac{1}{32}x^2\left(3n^{3/2}\sqrt{2\pi}\,(ax^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+4\sqrt{\log(ax^n)}\,(-3n+4\log(ax^n))\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Log[a*x^n]^(3/2),x]
[Out] (x^2*((3*n^(3/2)*Sqrt[2*Pi]*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(a*x^
n)^(2/n) + 4*Sqrt[Log[a*x^n]]*(-3*n + 4*Log[a*x^n])))/32
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x\ln(a\,x^n)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*ln(a*x^n)^(3/2),x)
[Out] int(x*ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] integrate(x*log(a*x^n)^(3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x\log{(ax^n)}^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*ln(a*x**n)**(3/2),x)
[Out] Integral(x*log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*log(a*x^n)^(3/2),x, algorithm="giac")
[Out] integrate(x*log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\ln\left(a\,x^n\right)^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*log(a*x^n)^(3/2),x)
[Out] int(x*log(a*x^n)^(3/2), x)
```

3.124 $\int \log^{\frac{3}{2}}(ax^n)\, dx$

Optimal. Leaf size=72

$$\frac{3}{4}n^{3/2}\sqrt{\pi}\, x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)-\frac{3}{2}nx\sqrt{\log(ax^n)}+x\log^{\frac{3}{2}}(ax^n)$$

```
[Out] x*ln(a*x^n)^(3/2)+3/4*n^(3/2)*x*erfi(ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/((a*
x^n)^(1/n))-3/2*n*x*ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2333, 2337, 2211, 2235}

$$\frac{3}{4}\sqrt{\pi}\, n^{3/2}x(ax^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)+x\log^{\frac{3}{2}}(ax^n)-\frac{3}{2}nx\sqrt{\log(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[Log[a*x^n]^(3/2),x]
```

```
[Out] (3*n^(3/2)*Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(4*(a*x^n)^n^(-1)) -
(3*n*x*Sqrt[Log[a*x^n]])/2 + x*Log[a*x^n]^(3/2)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2333

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Dist[b*n*p, Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
```

```
{a, b, c, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int \log^{\frac{3}{2}}(ax^n)\,dx &= x\log^{\frac{3}{2}}(ax^n) - \frac{1}{2}(3n)\int \sqrt{\log(ax^n)}\,dx \\
&= -\frac{3}{2}nx\sqrt{\log(ax^n)} + x\log^{\frac{3}{2}}(ax^n) + \frac{1}{4}(3n^2)\int \frac{1}{\sqrt{\log(ax^n)}}\,dx \\
&= -\frac{3}{2}nx\sqrt{\log(ax^n)} + x\log^{\frac{3}{2}}(ax^n) + \frac{1}{4}\left(3nx(ax^n)^{-1/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right) \\
&= -\frac{3}{2}nx\sqrt{\log(ax^n)} + x\log^{\frac{3}{2}}(ax^n) + \frac{1}{2}\left(3nx(ax^n)^{-1/n}\right)\operatorname{Subst}\left(\int e^{\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right) \\
&= \frac{3}{4}n^{3/2}\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right) - \frac{3}{2}nx\sqrt{\log(ax^n)} + x\log^{\frac{3}{2}}(ax^n)
\end{aligned}
$$

Mathematica [A]
time = 0.03, size = 72, normalized size = 1.00

$$\frac{3}{4}n^{3/2}\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right) - \frac{3}{2}nx\sqrt{\log(ax^n)} + x\log^{\frac{3}{2}}(ax^n)$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^n]^(3/2),x]
[Out] (3*n^(3/2)*Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(4*(a*x^n)^n^(-1)) -
(3*n*x*Sqrt[Log[a*x^n]])/2 + x*Log[a*x^n]^(3/2)
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \ln(a\,x^n)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(3/2),x)
[Out] int(ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(log(a*x^n)^(3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \log{(ax^{n})}^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(3/2),x)
```

```
[Out] Integral(log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \ln\left(a\,x^n\right)^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(3/2),x)
```

```
[Out] int(log(a*x^n)^(3/2), x)
```

3.125 $\int \frac{\log^{\frac{3}{2}}(ax^n)}{x} dx$

Optimal. Leaf size=17

$$\frac{2\log^{\frac{5}{2}}(ax^n)}{5n}$$

[Out] 2/5*ln(a*x^n)^(5/2)/n

Rubi [A]
time = 0.01, antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2339, 30}

$$\frac{2\log^{\frac{5}{2}}(ax^n)}{5n}$$

Antiderivative was successfully verified.

[In] Int[Log[a*x^n]^(3/2)/x,x]

[Out] (2*Log[a*x^n]^(5/2))/(5*n)

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{\log^{\frac{3}{2}}(ax^n)}{x} dx &= \frac{\text{Subst}\left(\int x^{3/2} dx, x, \log(ax^n)\right)}{n}\\ &= \frac{2\log^{\frac{5}{2}}(ax^n)}{5n}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 17, normalized size = 1.00

$$\frac{2\log^{\frac{5}{2}}(ax^n)}{5n}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^n]^(3/2)/x,x]
```

```
[Out] (2*Log[a*x^n]^(5/2))/(5*n)
```

Maple [A]
time = 0.12, size = 14, normalized size = 0.82

method	result	size
derivativedivides	$\frac{2\ln(a\,x^{n})^{\frac{5}{2}}}{5n}$	14
default	$\frac{2\ln(a\,x^{n})^{\frac{5}{2}}}{5n}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(3/2)/x,x,method=_RETURNVERBOSE)
```

```
[Out] 2/5*ln(a*x^n)^(5/2)/n
```

Maxima [A]
time = 0.29, size = 13, normalized size = 0.76

$$\frac{2\,\log\left(ax^{n}\right)^{\frac{5}{2}}}{5\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x,x, algorithm="maxima")
```

```
[Out] 2/5*log(a*x^n)^(5/2)/n
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 34 vs. $2(13) = 26$.
time = 0.36, size = 34, normalized size = 2.00

$$\frac{2\,\left(n^{2}\log\left(x\right)^{2}+2\,n\log\left(a\right)\log\left(x\right)+\log\left(a\right)^{2}\right)\sqrt{n\log\left(x\right)+\log\left(a\right)}}{5\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x,x, algorithm="fricas")
```

```
[Out] 2/5*(n^2*log(x)^2 + 2*n*log(a)*log(x) + log(a)^2)*sqrt(n*log(x) + log(a))/n
```

Sympy [A]
time = 2.24, size = 24, normalized size = 1.41

$$\begin{cases}\frac{2\log\left(ax^{n}\right)^{\frac{5}{2}}}{5n} & \text{for}\: n\neq 0\\\log\left(a\right)^{\frac{3}{2}}\log\left(x\right) & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(3/2)/x,x)
```

```
[Out] Piecewise((2*log(a*x**n)**(5/2)/(5*n), Ne(n, 0)), (log(a)**(3/2)*log(x), Tr
ue))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 72 vs. 2(13) = 26.
time = 3.08, size = 72, normalized size = 4.24

$$\frac{2\left(3\left(n\log\left(x\right)+\log\left(a\right)\right)^{\frac{5}{2}}-10\left(n\log\left(x\right)+\log\left(a\right)\right)^{\frac{3}{2}}\log\left(a\right)+30\sqrt{n\log\left(x\right)+\log\left(a\right)}\log\left(a\right)^{2}+10\left(\left(n\log\left(x\right)+\log\left(a\right)\right)^{\frac{3}{2}}-3\sqrt{n\log\left(x\right)+\log\left(a\right)}\log\left(a\right)\right)\log\left(a\right)\right)}{15\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x,x, algorithm="giac")
```

```
[Out] 2/15*(3*(n*log(x) + log(a))^(5/2) - 10*(n*log(x) + log(a))^(3/2)*log(a) + 3
0*sqrt(n*log(x) + log(a))*log(a)^2 + 10*((n*log(x) + log(a))^(3/2) - 3*sqrt
(n*log(x) + log(a))*log(a))*log(a))/n
```

Mupad [B]
time = 3.53, size = 13, normalized size = 0.76

$$\frac{2\ln\left(a\,x^n\right)^{5/2}}{5\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(3/2)/x,x)
```

```
[Out] (2*log(a*x^n)^(5/2))/(5*n)
```

3.126 $\int \frac{\log^{\frac{3}{2}}(ax^n)}{x^2} \, dx$

Optimal. Leaf size=77

$$\frac{3n^{3/2}\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\operatorname{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4x}-\frac{3n\sqrt{\log(ax^n)}}{2x}-\frac{\log^{\frac{3}{2}}(ax^n)}{x}$$

```
[Out] -ln(a*x^n)^(3/2)/x+3/4*n^(3/2)*(a*x^n)^(1/n)*erf(ln(a*x^n)^(1/2)/n^(1/2))*P
i^(1/2)/x-3/2*n*ln(a*x^n)^(1/2)/x
```

Rubi [A]
time = 0.04, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2236}

$$\frac{3\sqrt{\pi}\,n^{3/2}(ax^n)^{\frac{1}{n}}\operatorname{Erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4x}-\frac{\log^{\frac{3}{2}}(ax^n)}{x}-\frac{3n\sqrt{\log(ax^n)}}{2x}$$

Antiderivative was successfully verified.

```
[In] Int[Log[a*x^n]^(3/2)/x^2,x]
```

```
[Out] (3*n^(3/2)*Sqrt[Pi]*(a*x^n)^n^(-1)*Erf[Sqrt[Log[a*x^n]]/Sqrt[n]])/(4*x) - (
3*n*Sqrt[Log[a*x^n]])/(2*x) - Log[a*x^n]^(3/2)/x
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\log^{\frac{3}{2}}(ax^n)}{x^2}\,dx &= -\frac{\log^{\frac{3}{2}}(ax^n)}{x} + \frac{1}{2}(3n)\int \frac{\sqrt{\log(ax^n)}}{x^2}\,dx \\
&= -\frac{3n\sqrt{\log(ax^n)}}{2x} - \frac{\log^{\frac{3}{2}}(ax^n)}{x} + \frac{1}{4}(3n^2)\int \frac{1}{x^2\sqrt{\log(ax^n)}}\,dx \\
&= -\frac{3n\sqrt{\log(ax^n)}}{2x} - \frac{\log^{\frac{3}{2}}(ax^n)}{x} + \frac{\left(3n(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{4x} \\
&= -\frac{3n\sqrt{\log(ax^n)}}{2x} - \frac{\log^{\frac{3}{2}}(ax^n)}{x} + \frac{\left(3n(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int e^{-\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{2x} \\
&= \frac{3n^{3/2}\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\text{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4x} - \frac{3n\sqrt{\log(ax^n)}}{2x} - \frac{\log^{\frac{3}{2}}(ax^n)}{x}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 79, normalized size = 1.03

$$-\frac{6n\log(ax^n) + 4\log^2(ax^n) + 3n^2(ax^n)^{\frac{1}{n}}\,\Gamma\left(\frac{1}{2}, \frac{\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}}{4x\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^n]^(3/2)/x^2,x]
[Out] -1/4*(6*n*Log[a*x^n] + 4*Log[a*x^n]^2 + 3*n^2*(a*x^n)^n^(-1)*Gamma[1/2, Log
[a*x^n]/n]*Sqrt[Log[a*x^n]/n])/(x*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\ln(a\,x^n)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(3/2)/x^2,x)
```

```
[Out] int(ln(a*x^n)^(3/2)/x^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x^2,x, algorithm="maxima")
[Out] integrate(log(a*x^n)^(3/2)/x^2, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x^2,x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\log \left(ax^{n}\right)^{\frac{3}{2}}}{x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(3/2)/x**2,x)
[Out] Integral(log(a*x**n)**(3/2)/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x^2,x, algorithm="giac")
[Out] integrate(log(a*x^n)^(3/2)/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\ln\left(a\,x^n\right)}^{3/2}}{x^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(3/2)/x^2,x)
[Out] int(log(a*x^n)^(3/2)/x^2, x)
```

3.127 $\int \frac{\log^{\frac{3}{2}}(ax^n)}{x^3}\,dx$

Optimal. Leaf size=90

$$\frac{3n^{3/2}\sqrt{\frac{\pi}{2}}\,(ax^n)^{2/n}\operatorname{erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{16x^2}-\frac{3n\sqrt{\log(ax^n)}}{8x^2}-\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}$$

```
[Out] -1/2*ln(a*x^n)^(3/2)/x^2+3/32*n^(3/2)*(a*x^n)^(2/n)*erf(2^(1/2)*ln(a*x^n)^(
1/2)/n^(1/2))*2^(1/2)*Pi^(1/2)/x^2-3/8*n*ln(a*x^n)^(1/2)/x^2
```

Rubi [A]
time = 0.05, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2236}

$$\frac{3\sqrt{\frac{\pi}{2}}\,n^{3/2}(ax^n)^{2/n}\operatorname{Erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{16x^2}-\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}-\frac{3n\sqrt{\log(ax^n)}}{8x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Log[a*x^n]^(3/2)/x^3,x]
```

```
[Out] (3*n^(3/2)*Sqrt[Pi/2]*(a*x^n)^(2/n)*Erf[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]]
)/(16*x^2) - (3*n*Sqrt[Log[a*x^n]])/(8*x^2) - Log[a*x^n]^(3/2)/(2*x^2)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\log^{\frac{3}{2}}(ax^n)}{x^3}\,dx &= -\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}+\frac{1}{4}(3n)\int \frac{\sqrt{\log(ax^n)}}{x^3}\,dx \\
&= -\frac{3n\sqrt{\log(ax^n)}}{8x^2}-\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}+\frac{1}{16}\left(3n^2\right)\int \frac{1}{x^3\sqrt{\log(ax^n)}}\,dx \\
&= -\frac{3n\sqrt{\log(ax^n)}}{8x^2}-\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}+\frac{\left(3n(ax^n)^{2/n}\right)\text{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{16x^2} \\
&= -\frac{3n\sqrt{\log(ax^n)}}{8x^2}-\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}+\frac{\left(3n(ax^n)^{2/n}\right)\text{Subst}\left(\int e^{-\frac{2x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{8x^2} \\
&= \frac{3n^{3/2}\sqrt{\frac{\pi}{2}}\,(ax^n)^{2/n}\,\text{erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{16x^2}-\frac{3n\sqrt{\log(ax^n)}}{8x^2}-\frac{\log^{\frac{3}{2}}(ax^n)}{2x^2}
\end{aligned}$$

Mathematica [A]
time = 0.05, size = 88, normalized size = 0.98

$$-\frac{3\sqrt{2}\,n^2(ax^n)^{2/n}\,\Gamma\left(\frac{1}{2},\frac{2\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}+4\log(ax^n)\left(3n+4\log(ax^n)\right)}{32x^2\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^n]^(3/2)/x^3,x]
[Out] -1/32*(3*Sqrt[2]*n^2*(a*x^n)^(2/n)*Gamma[1/2, (2*Log[a*x^n])/n]*Sqrt[Log[a*
x^n]/n] + 4*Log[a*x^n]*(3*n + 4*Log[a*x^n]))/(x^2*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\ln(a\,x^n)^{\frac{3}{2}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(ln(a*x^n)^(3/2)/x^3,x)
```

```
[Out] int(ln(a*x^n)^(3/2)/x^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x^3,x, algorithm="maxima")
[Out] integrate(log(a*x^n)^(3/2)/x^3, x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x^3,x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\log{\left(ax^{n} \right)}^{\frac{3}{2}}}{x^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(ln(a*x**n)**(3/2)/x**3,x)
[Out] Integral(log(a*x**n)**(3/2)/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(log(a*x^n)^(3/2)/x^3,x, algorithm="giac")
[Out] integrate(log(a*x^n)^(3/2)/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\ln\left(a\,x^n\right)}^{3/2}}{x^3} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(a*x^n)^(3/2)/x^3,x)
[Out] int(log(a*x^n)^(3/2)/x^3, x)
```

3.128 $\int \frac{x^3}{\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=46

$$\frac{\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\text{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2\sqrt{n}}$$

```
[Out] 1/2*x^4*erfi(2*ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/((a*x^n)^(4/n))/n^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {2347, 2211, 2235}

$$\frac{\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\text{Erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/Sqrt[Log[a*x^n]],x]
```

```
[Out] (Sqrt[Pi]*x^4*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(2*Sqrt[n]*(a*x^n)^(4/n))
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^3}{\sqrt{\log(ax^n)}}\,dx = \frac{\left(x^4(ax^n)^{-4/n}\right)\text{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n}$$

$$= \frac{\left(2x^4(ax^n)^{-4/n}\right)\text{Subst}\left(\int e^{\frac{4x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n}$$

$$= \frac{\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\text{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2\sqrt{n}}$$

Mathematica [**A**]
time = 0.01, size = 46, normalized size = 1.00

$$\frac{\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\text{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Sqrt[Log[a*x^n]],x]
[Out] (Sqrt[Pi]*x^4*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(2*Sqrt[n]*(a*x^n)^(4/n))
```

Maple [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/ln(a*x^n)^(1/2),x)
[Out] int(x^3/ln(a*x^n)^(1/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(1/2),x, algorithm="maxima")
[Out] integrate(x^3/sqrt(log(a*x^n)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\sqrt{\log(ax^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x^3}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/log(a*x^n)^(1/2),x)
```

```
[Out] int(x^3/log(a*x^n)^(1/2), x)
```

3.129 $\int \frac{x^2}{\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=51

$$\frac{\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

```
[Out] 1/3*x^3*erfi(3^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*3^(1/2)*Pi^(1/2)/((a*x^n)^(3/
n))/n^(1/2)
```

Rubi [A]

time = 0.02, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {2347, 2211, 2235}

$$\frac{\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\operatorname{Erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Sqrt[Log[a*x^n]],x]
```

```
[Out] (Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[n]*(a*x^n)^
(3/n))
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^2}{\sqrt{\log(ax^n)}}\,dx = \frac{\left(x^3(ax^n)^{-3/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{3x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n}$$
$$= \frac{\left(2x^3(ax^n)^{-3/n}\right)\operatorname{Subst}\left(\int e^{\frac{3x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n}$$
$$= \frac{\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Mathematica [A]
time = 0.01, size = 51, normalized size = 1.00

$$\frac{\sqrt{\frac{\pi}{3}}\,x^3(ax^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/Sqrt[Log[a*x^n]],x]
[Out] (Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[n]*(a*x^n)^
(3/n))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/ln(a*x^n)^(1/2),x)
[Out] int(x^2/ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/sqrt(log(a*x^n)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{\sqrt{\log(ax^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x^2}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/log(a*x^n)^(1/2),x)
```

```
[Out] int(x^2/log(a*x^n)^(1/2), x)
```

3.130 $\int \frac{x}{\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=51

$$\frac{\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\,\mathrm{erfi}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

```
[Out] 1/2*x^2*erfi(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*2^(1/2)*Pi^(1/2)/((a*x^n)^(2/
n))/n^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2347, 2211, 2235}

$$\frac{\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\,\mathrm{Erfi}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Int[x/Sqrt[Log[a*x^n]],x]
```

```
[Out] (Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[n]*(a*x^n)^
(2/n))
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x}{\sqrt{\log(ax^n)}}\,dx = \frac{\left(x^2(ax^n)^{-2/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{2x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n}$$
$$= \frac{\left(2x^2(ax^n)^{-2/n}\right)\operatorname{Subst}\left(\int e^{\frac{2x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n}$$
$$= \frac{\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Mathematica [**A**]
time = 0.01, size = 51, normalized size = 1.00

$$\frac{\sqrt{\frac{\pi}{2}}\,x^2(ax^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Sqrt[Log[a*x^n]],x]
[Out] (Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[n]*(a*x^n)^
(2/n))
```

Maple [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/ln(a*x^n)^(1/2),x)
[Out] int(x/ln(a*x^n)^(1/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x/sqrt(log(a*x^n)), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\sqrt{\log(ax^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(x/sqrt(log(a*x**n)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x/sqrt(log(a*x^n)), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/log(a*x^n)^(1/2),x)
```

```
[Out] int(x/log(a*x^n)^(1/2), x)
```

3.131 $\int \frac{1}{\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=40

$$\frac{\sqrt{\pi}\,x(ax^n)^{-1/n}\,\mathrm{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

```
[Out] x*erfi(ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/((a*x^n)^(1/n))/n^(1/2)
```

Rubi [A]
time = 0.01, antiderivative size = 40, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2337, 2211, 2235}

$$\frac{\sqrt{\pi}\,x(ax^n)^{-1/n}\,\mathrm{Erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[Log[a*x^n]],x]
[Out] (Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(Sqrt[n]*(a*x^n)^n^(-1))
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\int \frac{1}{\sqrt{\log(ax^n)}}\,dx = \frac{\left(x(ax^n)^{-1/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n}$$
$$= \frac{\left(2x(ax^n)^{-1/n}\right)\operatorname{Subst}\left(\int e^{\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n}$$
$$= \frac{\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Mathematica [A]
time = 0.00, size = 40, normalized size = 1.00

$$\frac{\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/Sqrt[Log[a*x^n]],x]
[Out] (Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(Sqrt[n]*(a*x^n)^n^(-1))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/ln(a*x^n)^(1/2),x)
[Out] int(1/ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(1/2),x, algorithm="maxima")
[Out] integrate(1/sqrt(log(a*x^n)), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\log{(ax^n)}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(1/sqrt(log(a*x**n)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(log(a*x^n)), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{\sqrt{\ln\left(a\,x^n\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/log(a*x^n)^(1/2),x)
```

```
[Out] int(1/log(a*x^n)^(1/2), x)
```

3.132 $\int \frac{1}{x\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=15

$$\frac{2\sqrt{\log(ax^n)}}{n}$$

```
[Out] 2*ln(a*x^n)^(1/2)/n
```

Rubi [A]
time = 0.01, antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2339, 30}

$$\frac{2\sqrt{\log(ax^n)}}{n}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Log[a*x^n]]),x]
```

```
[Out] (2*Sqrt[Log[a*x^n]])/n
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\sqrt{\log(ax^n)}}\,dx &= \frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n}\\ &= \frac{2\sqrt{\log(ax^n)}}{n}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 15, normalized size = 1.00

$$\frac{2\sqrt{\log(ax^n)}}{n}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Log[a*x^n]]),x]
[Out] (2*Sqrt[Log[a*x^n]])/n
```

Maple [A]
time = 0.13, size = 14, normalized size = 0.93

method	result	size
derivativedivides	$\frac{2\sqrt{\ln\left(a\,x^{n}\right)}}{n}$	14
default	$\frac{2\sqrt{\ln\left(a\,x^{n}\right)}}{n}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/ln(a*x^n)^(1/2),x,method=_RETURNVERBOSE)
[Out] 2*ln(a*x^n)^(1/2)/n
```

Maxima [A]
time = 0.29, size = 13, normalized size = 0.87

$$\frac{2\sqrt{\log\left(ax^{n}\right)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(1/2),x, algorithm="maxima")
[Out] 2*sqrt(log(a*x^n))/n
```

Fricas [A]
time = 0.38, size = 14, normalized size = 0.93

$$\frac{2\sqrt{n\log\left(x\right)+\log\left(a\right)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(1/2),x, algorithm="fricas")
[Out] 2*sqrt(n*log(x) + log(a))/n
```

Sympy [A]
time = 0.47, size = 22, normalized size = 1.47

$$\begin{cases} \frac{2\sqrt{\log\left(ax^{n}\right)}}{n} & \text{for}\ n \neq 0 \\ \frac{\log\left(x\right)}{\sqrt{\log\left(a\right)}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/ln(a*x**n)**(1/2),x)
```

```
[Out] Piecewise((2*sqrt(log(a*x**n))/n, Ne(n, 0)), (log(x)/sqrt(log(a)), True))
```

Giac [A]
time = 3.16, size = 14, normalized size = 0.93

$$\frac{2\,\sqrt{n\log\left(x\right)+\log\left(a\right)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] 2*sqrt(n*log(x) + log(a))/n
```

Mupad [B]
time = 3.58, size = 13, normalized size = 0.87

$$\frac{2\,\sqrt{\ln\left(a\,x^n\right)}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*log(a*x^n)^(1/2)),x)
```

```
[Out] (2*log(a*x^n)^(1/2))/n
```

3.133 $\int \frac{1}{x^2 \sqrt{\log (a x^n)}} \, dx$

Optimal. Leaf size=40

$$\frac{\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\text{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}\,x}$$

```
[Out] (a*x^n)^(1/n)*erf(ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/x/n^(1/2)
```

Rubi [A]

time = 0.02, antiderivative size = 40, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {2347, 2211, 2236}

$$\frac{\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\text{Erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}\,x}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Sqrt[Log[a*x^n]]),x]
```

```
[Out] (Sqrt[Pi]*(a*x^n)^n^(-1)*Erf[Sqrt[Log[a*x^n]]/Sqrt[n]])/(Sqrt[n]*x)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^2\sqrt{\log(ax^n)}}\,dx = \frac{(ax^n)^{\frac{1}{n}}\,\text{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{nx}$$
$$= \frac{\left(2(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int e^{-\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{nx}$$
$$= \frac{\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\text{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}\,x}$$

Mathematica [A]
time = 0.03, size = 52, normalized size = 1.30

$$-\frac{(ax^n)^{\frac{1}{n}}\,\Gamma\left(\frac{1}{2}, \frac{\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}}{x\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Sqrt[Log[a*x^n]]),x]
[Out] -(((a*x^n)^n^(-1)*Gamma[1/2, Log[a*x^n]/n]*Sqrt[Log[a*x^n]/n])/(x*Sqrt[Log[
a*x^n]]))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/ln(a*x^n)^(1/2),x)
[Out] int(1/x^2/ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x^2*sqrt(log(a*x^n))), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^{2}\sqrt{\log (ax^{n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/ln(a*x**n)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(log(a*x**n))), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*sqrt(log(a*x^n))), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x^{2}\,\sqrt{\ln (a\,x^{n})}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*log(a*x^n)^(1/2)),x)
```

```
[Out] int(1/(x^2*log(a*x^n)^(1/2)), x)
```

3.134 $\int \frac{1}{x^3\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=51

$$\frac{\sqrt{\frac{\pi}{2}}\,(ax^n)^{2/n}\operatorname{erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}\,x^2}$$

```
[Out] 1/2*(a*x^n)^(2/n)*erf(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*2^(1/2)*Pi^(1/2)/x^2
/n^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {2347, 2211, 2236}

$$\frac{\sqrt{\frac{\pi}{2}}\,(ax^n)^{2/n}\operatorname{Erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}\,x^2}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*Sqrt[Log[a*x^n]]),x]
```

```
[Out] (Sqrt[Pi/2]*(a*x^n)^(2/n)*Erf[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[n]
*x^2)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{1}{x^3\sqrt{\log(ax^n)}}\,dx = \frac{(ax^n)^{2/n}\,\text{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{nx^2}$$
$$= \frac{\left(2(ax^n)^{2/n}\right)\text{Subst}\left(\int e^{-\frac{2x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{nx^2}$$
$$= \frac{\sqrt{\frac{\pi}{2}}\,(ax^n)^{2/n}\,\text{erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{n}\,x^2}$$

Mathematica [A]
time = 0.03, size = 60, normalized size = 1.18

$$-\frac{(ax^n)^{2/n}\,\Gamma\left(\frac{1}{2},\frac{2\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}}{\sqrt{2}\,x^2\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*Sqrt[Log[a*x^n]]),x]
```

```
[Out] -(((a*x^n)^(2/n)*Gamma[1/2, (2*Log[a*x^n])/n]*Sqrt[Log[a*x^n]/n])/(Sqrt[2]*
x^2*Sqrt[Log[a*x^n]]))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/ln(a*x^n)^(1/2),x)
```

```
[Out] int(1/x^3/ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x^3*sqrt(log(a*x^n))), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(1/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3 \sqrt{\log(ax^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/ln(a*x**n)**(1/2),x)
[Out] Integral(1/(x**3*sqrt(log(a*x**n))), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(1/2),x, algorithm="giac")
[Out] integrate(1/(x^3*sqrt(log(a*x^n))), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x^3\,\sqrt{\ln\left(a\,x^n\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*log(a*x^n)^(1/2)),x)
[Out] int(1/(x^3*log(a*x^n)^(1/2)), x)
```

3.135 $\int \frac{x^3}{\log^{\frac{3}{2}}(ax^n)} \, dx$

Optimal. Leaf size=63

$$\frac{4\sqrt{\pi}\, x^4 (ax^n)^{-4/n} \operatorname{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^4}{n\sqrt{\log(ax^n)}}$$

```
[Out] 4*x^4*erfi(2*ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/n^(3/2)/((a*x^n)^(4/n))-2*x^
4/n/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{4\sqrt{\pi}\, x^4 (ax^n)^{-4/n} \text{Erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^4}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/Log[a*x^n]^(3/2),x]
```

```
[Out] (4*Sqrt[Pi]*x^4*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(n^(3/2)*(a*x^n)^(4/n))
 - (2*x^4)/(n*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{\log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2x^4}{n\sqrt{\log(ax^n)}} + \frac{8\int \frac{x^3}{\sqrt{\log(ax^n)}}\,dx}{n} \\
&= -\frac{2x^4}{n\sqrt{\log(ax^n)}} + \frac{\left(8x^4(ax^n)^{-4/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n^2} \\
&= -\frac{2x^4}{n\sqrt{\log(ax^n)}} + \frac{\left(16x^4(ax^n)^{-4/n}\right)\operatorname{Subst}\left(\int e^{\frac{4x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n^2} \\
&= \frac{4\sqrt{\pi}\,x^4(ax^n)^{-4/n}\operatorname{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^4}{n\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 73, normalized size = 1.16

$$-\frac{2x^4(ax^n)^{-4/n}\left((ax^n)^{4/n} - 2\Gamma\left(\frac{1}{2}, -\frac{4\log(ax^n)}{n}\right)\sqrt{-\frac{\log(ax^n)}{n}}\right)}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Log[a*x^n]^(3/2),x]
```

```
[Out] (-2*x^4*((a*x^n)^(4/n) - 2*Gamma[1/2, (-4*Log[a*x^n])/n]*Sqrt[-(Log[a*x^n]/
n)]))/(n*(a*x^n)^(4/n)*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\ln(a\,x^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/ln(a*x^n)^(3/2),x)
```

```
[Out] int(x^3/ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^3/log(a*x^n)^(3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\log{(ax^n)}^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/ln(a*x**n)**(3/2),x)
```

```
[Out] Integral(x**3/log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x^3}{\ln\left(a\,x^n\right)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/log(a*x^n)^(3/2),x)
[Out] int(x^3/log(a*x^n)^(3/2), x)
```

3.136 $\int \frac{x^2}{\log^{\frac{3}{2}}(ax^n)}\,dx$

Optimal. Leaf size=69

$$\frac{2\sqrt{3\pi}\,x^3(ax^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}}-\frac{2x^3}{n\sqrt{\log(ax^n)}}$$

```
[Out] 2*x^3*erfi(3^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*3^(1/2)*Pi^(1/2)/n^(3/2)/((a*x^
n)^(3/n))-2*x^3/n/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.04, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{2\sqrt{3\pi}\,x^3(ax^n)^{-3/n}\operatorname{Erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}}-\frac{2x^3}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Log[a*x^n]^(3/2),x]
```

```
[Out] (2*Sqrt[3*Pi]*x^3*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(n^(3/2)*(a*x^n
)^(3/n)) - (2*x^3)/(n*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^2}{\log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2x^3}{n\sqrt{\log(ax^n)}} + \frac{6\int \frac{x^2}{\sqrt{\log(ax^n)}}\,dx}{n} \\
&= -\frac{2x^3}{n\sqrt{\log(ax^n)}} + \frac{\left(6x^3(ax^n)^{-3/n}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{3x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n^2} \\
&= -\frac{2x^3}{n\sqrt{\log(ax^n)}} + \frac{\left(12x^3(ax^n)^{-3/n}\right)\mathrm{Subst}\left(\int e^{\frac{3x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n^2} \\
&= \frac{2\sqrt{3\pi}\,x^3(ax^n)^{-3/n}\,\mathrm{erfi}\left(\frac{\sqrt{3}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^3}{n\sqrt{\log(ax^n)}}
\end{aligned}
$$

Mathematica [A]
time = 0.04, size = 78, normalized size = 1.13

$$
-\frac{2x^3(ax^n)^{-3/n}\left((ax^n)^{3/n} - \sqrt{3}\,\Gamma\left(\frac{1}{2}, -\frac{3\log(ax^n)}{n}\right)\sqrt{-\frac{\log(ax^n)}{n}}\right)}{n\sqrt{\log(ax^n)}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/Log[a*x^n]^(3/2),x]
[Out] (-2*x^3*((a*x^n)^(3/n) - Sqrt[3]*Gamma[1/2, (-3*Log[a*x^n])/n]*Sqrt[-(Log[a
*x^n]/n)]))/(n*(a*x^n)^(3/n)*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$
\int \frac{x^2}{\ln(a\,x^n)^{\frac{3}{2}}}\,dx
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/ln(a*x^n)^(3/2),x)
```

```
[Out] int(x^2/ln(a*x^n)^(3/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/log(a*x^n)^(3/2), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{\log{(ax^n)}^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/ln(a*x**n)**(3/2),x)
```

```
[Out] Integral(x**2/log(a*x**n)**(3/2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2}{\ln\left(a\,x^n\right)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/log(a*x^n)^(3/2),x)
[Out] int(x^2/log(a*x^n)^(3/2), x)
```

3.137 $\int \frac{x}{\log^{\frac{3}{2}}(ax^n)} dx$

Optimal. Leaf size=69

$$\frac{2\sqrt{2\pi}\, x^2 (ax^n)^{-2/n} \operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^2}{n\sqrt{\log(ax^n)}}$$

```
[Out] 2*x^2*erfi(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*2^(1/2)*Pi^(1/2)/n^(3/2)/((a*x^
n)^(2/n))-2*x^2/n/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{2\sqrt{2\pi}\, x^2 (ax^n)^{-2/n} \operatorname{Erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^2}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[x/Log[a*x^n]^(3/2),x]
```

```
[Out] (2*Sqrt[2*Pi]*x^2*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(n^(3/2)*(a*x^n
)^(2/n)) - (2*x^2)/(n*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x}{\log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2x^2}{n\sqrt{\log(ax^n)}} + \frac{4\int \frac{x}{\sqrt{\log(ax^n)}}\,dx}{n} \\
&= -\frac{2x^2}{n\sqrt{\log(ax^n)}} + \frac{\left(4x^2(ax^n)^{-2/n}\right)\text{Subst}\left(\int \frac{e^{\frac{2x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n^2} \\
&= -\frac{2x^2}{n\sqrt{\log(ax^n)}} + \frac{\left(8x^2(ax^n)^{-2/n}\right)\text{Subst}\left(\int e^{\frac{2x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n^2} \\
&= \frac{2\sqrt{2\pi}\,x^2(ax^n)^{-2/n}\,\text{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^2}{n\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 78, normalized size = 1.13

$$-\frac{2x^2(ax^n)^{-2/n}\left((ax^n)^{2/n} - \sqrt{2}\,\Gamma\left(\frac{1}{2}, -\frac{2\log(ax^n)}{n}\right)\sqrt{-\frac{\log(ax^n)}{n}}\right)}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Log[a*x^n]^(3/2),x]
```

```
[Out] (-2*x^2*((a*x^n)^(2/n) - Sqrt[2]*Gamma[1/2, (-2*Log[a*x^n])/n]*Sqrt[-(Log[a
*x^n]/n)]))/(n*(a*x^n)^(2/n)*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\ln(a\,x^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/ln(a*x^n)^(3/2),x)
```

```
[Out] int(x/ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x/log(a*x^n)^(3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\log\left(ax^n\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/ln(a*x**n)**(3/2),x)
```

```
[Out] Integral(x/log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x/log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\ln\left(a\,x^n\right)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/log(a*x^n)^(3/2),x)
[Out] int(x/log(a*x^n)^(3/2), x)
```

3.138 $\int \frac{1}{\log^{\frac{3}{2}}(ax^n)} dx$

Optimal. Leaf size=58

$$\frac{2\sqrt{\pi}\, x(ax^n)^{-1/n} \operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x}{n\sqrt{\log(ax^n)}}$$

```
[Out] 2*x*erfi(ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/n^(3/2)/((a*x^n)^(1/n))-2*x/n/ln
(a*x^n)^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 58, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2334, 2337, 2211, 2235}

$$\frac{2\sqrt{\pi}\, x(ax^n)^{-1/n} \operatorname{Erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[Log[a*x^n]^(-3/2),x]
```

```
[Out] (2*Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(n^(3/2)*(a*x^n)^n^(-1)) - (2
*x)/(n*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2334

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Simp[x*((a + b
*Log[c*x^n])^(p + 1)/(b*n*(p + 1))), x] - Dist[1/(b*n*(p + 1)), Int[(a + b*
Log[c*x^n])^(p + 1), x], x] /; FreeQ[{a, b, c, n}, x] && LtQ[p, -1] && Inte
gerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{\log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2x}{n\sqrt{\log(ax^n)}}+\frac{2\int \frac{1}{\sqrt{\log(ax^n)}}\,dx}{n}\\ &= -\frac{2x}{n\sqrt{\log(ax^n)}}+\frac{\left(2x(ax^n)^{-1/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{n^2}\\ &= -\frac{2x}{n\sqrt{\log(ax^n)}}+\frac{\left(4x(ax^n)^{-1/n}\right)\text{Subst}\left(\int e^{\frac{x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{n^2}\\ &= \frac{2\sqrt{\pi}\,x(ax^n)^{-1/n}\,\text{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}}-\frac{2x}{n\sqrt{\log(ax^n)}}\end{aligned}$$

Mathematica [A]
time = 0.03, size = 69, normalized size = 1.19

$$-\frac{2x(ax^n)^{-1/n}\left((ax^n)^{\frac{1}{n}}-\Gamma\left(\frac{1}{2},-\frac{\log(ax^n)}{n}\right)\sqrt{-\frac{\log(ax^n)}{n}}\right)}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^n]^(-3/2),x]
[Out] (-2*x*((a*x^n)^n^(-1) - Gamma[1/2, -(Log[a*x^n]/n)]*Sqrt[-(Log[a*x^n]/n)]))
/(n*(a*x^n)^n^(-1)*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\ln(a\,x^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/ln(a*x^n)^(3/2),x)
```

```
[Out] int(1/ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(log(a*x^n)^(-3/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\log\left(ax^n\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/ln(a*x**n)**(3/2),x)
```

```
[Out] Integral(log(a*x**n)**(-3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(log(a*x^n)^(-3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{\ln \left(a\,x^n\right)^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/log(a*x^n)^(3/2),x)
```

```
[Out] int(1/log(a*x^n)^(3/2), x)
```

3.139 $\int \frac{1}{x \log^{\frac{3}{2}}(ax^n)} dx$

Optimal. Leaf size=15

$$-\frac{2}{n\sqrt{\log(ax^n)}}$$

```
[Out] -2/n/ln(a*x^n)^(1/2)
```

Rubi [A]

time = 0.01, antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2339, 30}

$$-\frac{2}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Log[a*x^n]^(3/2)),x]
```

```
[Out] -2/(n*Sqrt[Log[a*x^n]])
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x \log^{\frac{3}{2}}(ax^n)} dx &= \frac{\text{Subst}\left(\int \frac{1}{x^{3/2}} dx, x, \log(ax^n)\right)}{n} \\ &= -\frac{2}{n\sqrt{\log(ax^n)}}\end{aligned}$$

Mathematica [A]

time = 0.00, size = 15, normalized size = 1.00

$$-\frac{2}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Log[a*x^n]^(3/2)),x]
[Out] -2/(n*Sqrt[Log[a*x^n]])
```

Maple [A]
time = 0.12, size = 14, normalized size = 0.93

method	result	size
derivativedivides	$-\frac{2}{n\sqrt{\ln\left(a\,x^{n}\right)}}$	14
default	$-\frac{2}{n\sqrt{\ln\left(a\,x^{n}\right)}}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/ln(a*x^n)^(3/2),x,method=_RETURNVERBOSE)
[Out] -2/n/ln(a*x^n)^(1/2)
```

Maxima [A]
time = 0.35, size = 13, normalized size = 0.87

$$-\frac{2}{n\sqrt{\log\left(ax^{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] -2/(n*sqrt(log(a*x^n)))
```

Fricas [A]
time = 0.33, size = 24, normalized size = 1.60

$$-\frac{2\sqrt{n\log\left(x\right)+\log\left(a\right)}}{n^{2}\log\left(x\right)+n\log\left(a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] -2*sqrt(n*log(x) + log(a))/(n^2*log(x) + n*log(a))
```

Sympy [A]
time = 1.47, size = 24, normalized size = 1.60

$$\begin{cases} -\frac{2}{n\sqrt{\log\left(ax^{n}\right)}} & \text{for}\: n \neq 0 \\ \frac{\log\left(x\right)}{\log\left(a\right)^{\frac{3}{2}}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/ln(a*x**n)**(3/2),x)
```

```
[Out] Piecewise((-2/(n*sqrt(log(a*x**n))), Ne(n, 0)), (log(x)/log(a)**(3/2), True
))
```

Giac [A]
time = 3.58, size = 14, normalized size = 0.93

$$-\frac{2}{\sqrt{n\log\left(x\right)+\log\left(a\right)}\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] -2/(sqrt(n*log(x) + log(a))*n)
```

Mupad [B]
time = 3.45, size = 13, normalized size = 0.87

$$-\frac{2}{n\,\sqrt{\ln\left(a\,x^n\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*log(a*x^n)^(3/2)),x)
```

```
[Out] -2/(n*log(a*x^n)^(1/2))
```

3.140 $\int \frac{1}{x^2 \log^{\frac{3}{2}}(ax^n)} dx$

Optimal. Leaf size=60

$$-\frac{2\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\mathrm{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}x}-\frac{2}{nx\sqrt{\log(ax^n)}}$$

```
[Out] -2*(a*x^n)^(1/n)*erf(ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/n^(3/2)/x-2/n/x/ln(a
*x^n)^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 60, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2236}

$$-\frac{2\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\mathrm{Erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}x}-\frac{2}{nx\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Log[a*x^n]^(3/2)),x]
```

```
[Out] (-2*Sqrt[Pi]*(a*x^n)^n^(-1)*Erf[Sqrt[Log[a*x^n]]/Sqrt[n]])/(n^(3/2)*x) - 2/
(n*x*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{1}{x^2 \log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2}{nx\sqrt{\log(ax^n)}} - \frac{2\int \frac{1}{x^2\sqrt{\log(ax^n)}}\,dx}{n} \\
&= -\frac{2}{nx\sqrt{\log(ax^n)}} - \frac{\left(2(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n^2x} \\
&= -\frac{2}{nx\sqrt{\log(ax^n)}} - \frac{\left(4(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int e^{-\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n^2x} \\
&= -\frac{2\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\,\text{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}x} - \frac{2}{nx\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [**A**]
time = 0.04, size = 58, normalized size = 0.97

$$\frac{2\left(-1+(ax^n)^{\frac{1}{n}}\,\Gamma\left(\frac{1}{2},\frac{\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}\right)}{nx\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Log[a*x^n]^(3/2)),x]
[Out] (2*(-1 + (a*x^n)^n^(-1)*Gamma[1/2, Log[a*x^n]/n]*Sqrt[Log[a*x^n]/n]))/(n*x*
Sqrt[Log[a*x^n]])
```

Maple [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2 \ln(a\,x^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/ln(a*x^n)^(3/2),x)
[Out] int(1/x^2/ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] integrate(1/(x^2*log(a*x^n)^(3/2)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2 \log{(ax^n)}^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/ln(a*x**n)**(3/2),x)
[Out] Integral(1/(x**2*log(a*x**n)**(3/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(3/2),x, algorithm="giac")
[Out] integrate(1/(x^2*log(a*x^n)^(3/2)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x^2 \ln \left(a\, x^n\right)^{3/2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*log(a*x^n)^(3/2)),x)
[Out] int(1/(x^2*log(a*x^n)^(3/2)), x)
```

3.141 $\int \frac{1}{x^3 \log^{\frac{3}{2}}(ax^n)}\,dx$

Optimal. Leaf size=69

$$-\frac{2\sqrt{2\pi}\,(ax^n)^{2/n}\operatorname{erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}x^2}-\frac{2}{nx^2\sqrt{\log(ax^n)}}$$

```
[Out] -2*(a*x^n)^(2/n)*erf(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*2^(1/2)*Pi^(1/2)/n^(3
/2)/x^2-2/n/x^2/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.04, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2236}

$$-\frac{2\sqrt{2\pi}\,(ax^n)^{2/n}\operatorname{Erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}x^2}-\frac{2}{nx^2\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*Log[a*x^n]^(3/2)),x]
```

```
[Out] (-2*Sqrt[2*Pi]*(a*x^n)^(2/n)*Erf[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(n^(3
/2)*x^2) - 2/(n*x^2*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{1}{x^3\log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2}{nx^2\sqrt{\log(ax^n)}}-\frac{4\int \frac{1}{x^3\sqrt{\log(ax^n)}}\,dx}{n}\\
&= -\frac{2}{nx^2\sqrt{\log(ax^n)}}-\frac{\left(4(ax^n)^{2/n}\right)\operatorname{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{n^2x^2}\\
&= -\frac{2}{nx^2\sqrt{\log(ax^n)}}-\frac{\left(8(ax^n)^{2/n}\right)\operatorname{Subst}\left(\int e^{-\frac{2x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{n^2x^2}\\
&= -\frac{2\sqrt{2\pi}\,(ax^n)^{2/n}\operatorname{erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}x^2}-\frac{2}{nx^2\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 66, normalized size = 0.96

$$\frac{2\left(-1+\sqrt{2}\,(ax^n)^{2/n}\,\Gamma\left(\frac{1}{2},\frac{2\log(ax^n)}{n}\right)\sqrt{\frac{\log(ax^n)}{n}}\right)}{nx^2\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*Log[a*x^n]^(3/2)),x]
```

```
[Out] (2*(-1 + Sqrt[2]*(a*x^n)^(2/n)*Gamma[1/2, (2*Log[a*x^n])/n]*Sqrt[Log[a*x^n]
/n]))/(n*x^2*Sqrt[Log[a*x^n]])
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3\ln(a\,x^n)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/ln(a*x^n)^(3/2),x)
```

```
[Out] int(1/x^3/ln(a*x^n)^(3/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x^3*log(a*x^n)^(3/2)), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3 \log{(ax^n)}^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/ln(a*x**n)**(3/2),x)
```

```
[Out] Integral(1/(x**3*log(a*x**n)**(3/2)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x^3*log(a*x^n)^(3/2)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^3 \ln (a x^n)^{3/2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*log(a*x^n)^(3/2)),x)
[Out] int(1/(x^3*log(a*x^n)^(3/2)), x)
```

3.142 $\int \frac{x^3}{\log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=87

$$\frac{32\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\mathrm{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{16x^4}{3n^2\sqrt{\log(ax^n)}}$$

```
[Out] -2/3*x^4/n/ln(a*x^n)^(3/2)+32/3*x^4*erfi(2*ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2
)/n^(5/2)/((a*x^n)^(4/n))-16/3*x^4/n^2/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{32\sqrt{\pi}\,x^4(ax^n)^{-4/n}\,\mathrm{Erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{16x^4}{3n^2\sqrt{\log(ax^n)}}-\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/Log[a*x^n]^(5/2),x]
```

```
[Out] (32*Sqrt[Pi]*x^4*Erfi[(2*Sqrt[Log[a*x^n]])/Sqrt[n]])/(3*n^(5/2)*(a*x^n)^(4/
n)) - (2*x^4)/(3*n*Log[a*x^n]^(3/2)) - (16*x^4)/(3*n^2*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] && !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x^3}{\log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}+\frac{8\int \frac{x^3}{\log^{\frac{3}{2}}(ax^n)}\,dx}{3n}\\ &= -\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{16x^4}{3n^2\sqrt{\log(ax^n)}}+\frac{64\int \frac{x^3}{\sqrt{\log(ax^n)}}\,dx}{3n^2}\\ &= -\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{16x^4}{3n^2\sqrt{\log(ax^n)}}+\frac{\left(64x^4(ax^n)^{-4/n}\right)\text{Subst}\left(\int \frac{e^{\frac{4x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{3n^3}\\ &= -\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{16x^4}{3n^2\sqrt{\log(ax^n)}}+\frac{\left(128x^4(ax^n)^{-4/n}\right)\text{Subst}\left(\int e^{\frac{4x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{3n^3}\\ &= \frac{32\sqrt{\pi}\,x^4(ax^n)^{-4/n}\operatorname{erfi}\left(\frac{2\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x^4}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{16x^4}{3n^2\sqrt{\log(ax^n)}}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 87, normalized size = 1.00

$$-\frac{2x^4(ax^n)^{-4/n}\left(16n\Gamma\left(\frac{1}{2},-\frac{4\log(ax^n)}{n}\right)\left(-\frac{\log(ax^n)}{n}\right)^{3/2}+(ax^n)^{4/n}\left(n+8\log(ax^n)\right)\right)}{3n^2\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/Log[a*x^n]^(5/2),x]
```

```
[Out] (-2*x^4*(16*n*Gamma[1/2, (-4*Log[a*x^n])/n]*(-(Log[a*x^n]/n))^(3/2) + (a*x^
n)^(4/n)*(n + 8*Log[a*x^n])))/(3*n^2*(a*x^n)^(4/n)*Log[a*x^n]^(3/2))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/ln(a*x^n)^(5/2),x)
```

```
[Out] int(x^3/ln(a*x^n)^(5/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^3/log(a*x^n)^(5/2), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^3}{\log{(ax^n)}^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(x**3/log(a*x**n)**(5/2), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/log(a*x^n)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^3}{\ln(a\,x^n)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/log(a*x^n)^(5/2),x)
```

```
[Out] int(x^3/log(a*x^n)^(5/2), x)
```

3.143 $\int \frac{x^2}{\log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=89

$$\frac{4\sqrt{3\pi}\,x^3(ax^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{5/2}}-\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x^3}{n^2\sqrt{\log(ax^n)}}$$

```
[Out] -2/3*x^3/n/ln(a*x^n)^(3/2)+4*x^3*erfi(3^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*3^(1
/2)*Pi^(1/2)/n^(5/2)/((a*x^n)^(3/n))-4*x^3/n^2/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{4\sqrt{3\pi}\,x^3(ax^n)^{-3/n}\operatorname{Erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{5/2}}-\frac{4x^3}{n^2\sqrt{\log(ax^n)}}-\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Log[a*x^n]^(5/2),x]
```

```
[Out] (4*Sqrt[3*Pi]*x^3*Erfi[(Sqrt[3]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(n^(5/2)*(a*x^n
)^(3/n)) - (2*x^3)/(3*n*Log[a*x^n]^(3/2)) - (4*x^3)/(n^2*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^2}{\log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}+\frac{2\int \frac{x^2}{\log^{\frac{3}{2}}(ax^n)}\,dx}{n}\\
&= -\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x^3}{n^2\sqrt{\log(ax^n)}}+\frac{12\int \frac{x^2}{\sqrt{\log(ax^n)}}\,dx}{n^2}\\
&= -\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x^3}{n^2\sqrt{\log(ax^n)}}+\frac{\left(12x^3(ax^n)^{-3/n}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{3x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{n^3}\\
&= -\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x^3}{n^2\sqrt{\log(ax^n)}}+\frac{\left(24x^3(ax^n)^{-3/n}\right)\operatorname{Subst}\left(\int e^{\frac{3x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{n^3}\\
&= \frac{4\sqrt{3\pi}\,x^3(ax^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{5/2}}-\frac{2x^3}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x^3}{n^2\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [A]
time = 0.05, size = 92, normalized size = 1.03

$$-\frac{2x^3(ax^n)^{-3/n}\left(6\sqrt{3}\,n\Gamma\left(\frac{1}{2},-\frac{3\log(ax^n)}{n}\right)\left(-\frac{\log(ax^n)}{n}\right)^{3/2}+(ax^n)^{3/n}\left(n+6\log(ax^n)\right)\right)}{3n^2\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/Log[a*x^n]^(5/2),x]
```

```
[Out] (-2*x^3*(6*Sqrt[3]*n*Gamma[1/2, (-3*Log[a*x^n])/n]*(-(Log[a*x^n]/n))^(3/2)
+ (a*x^n)^(3/n)*(n + 6*Log[a*x^n])))/(3*n^2*(a*x^n)^(3/n)*Log[a*x^n]^(3/2))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{\ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/ln(a*x^n)^(5/2),x)
```

```
[Out] int(x^2/ln(a*x^n)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/log(a*x^n)^(5/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^2}{\log{(ax^n)}^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(x**2/log(a*x**n)**(5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/log(a*x^n)^(5/2), x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2}{\ln\left(a\,x^n\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/log(a*x^n)^(5/2),x)
[Out] int(x^2/log(a*x^n)^(5/2), x)
```

3.144 $\int \frac{x}{\log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=93

$$\frac{8\sqrt{2\pi}\,x^2(ax^n)^{-2/n}\,\mathrm{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{8x^2}{3n^2\sqrt{\log(ax^n)}}$$

```
[Out] -2/3*x^2/n/ln(a*x^n)^(3/2)+8/3*x^2*erfi(2^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*2^
(1/2)*Pi^(1/2)/n^(5/2)/((a*x^n)^(2/n))-8/3*x^2/n^2/ln(a*x^n)^(1/2)
```

Rubi [A]

time = 0.04, antiderivative size = 93, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{8\sqrt{2\pi}\,x^2(ax^n)^{-2/n}\,\mathrm{Erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{8x^2}{3n^2\sqrt{\log(ax^n)}}-\frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x/Log[a*x^n]^(5/2),x]
```

```
[Out] (8*Sqrt[2*Pi]*x^2*Erfi[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(3*n^(5/2)*(a*x
^n)^(2/n)) - (2*x^2)/(3*n*Log[a*x^n]^(3/2)) - (8*x^2)/(3*n^2*Sqrt[Log[a*x^n
]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x}{\log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)} + \frac{4\int \frac{x}{\log^{\frac{3}{2}}(ax^n)}\,dx}{3n} \\
&= -\frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)} - \frac{8x^2}{3n^2\sqrt{\log(ax^n)}} + \frac{16\int \frac{x}{\sqrt{\log(ax^n)}}\,dx}{3n^2} \\
&= -\frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)} - \frac{8x^2}{3n^2\sqrt{\log(ax^n)}} + \frac{\left(16x^2(ax^n)^{-2/n}\right)\text{Subst}\left(\int \frac{e^{\frac{2x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{3n^3} \\
&= -\frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)} - \frac{8x^2}{3n^2\sqrt{\log(ax^n)}} + \frac{\left(32x^2(ax^n)^{-2/n}\right)\text{Subst}\left(\int e^{\frac{2x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{3n^3} \\
&= \frac{8\sqrt{2\pi}\,x^2(ax^n)^{-2/n}\,\text{erfi}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}} - \frac{2x^2}{3n\log^{\frac{3}{2}}(ax^n)} - \frac{8x^2}{3n^2\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [**A**]
time = 0.05, size = 92, normalized size = 0.99

$$-\frac{2x^2(ax^n)^{-2/n}\left(4\sqrt{2}\,n\Gamma\left(\frac{1}{2},-\frac{2\log(ax^n)}{n}\right)\left(-\frac{\log(ax^n)}{n}\right)^{3/2} + (ax^n)^{2/n}\left(n+4\log(ax^n)\right)\right)}{3n^2\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/Log[a*x^n]^(5/2),x]
```

```
[Out] (-2*x^2*(4*Sqrt[2]*n*Gamma[1/2, (-2*Log[a*x^n])/n]*(-(Log[a*x^n]/n))^(3/2)
+ (a*x^n)^(2/n)*(n + 4*Log[a*x^n])))/(3*n^2*(a*x^n)^(2/n)*Log[a*x^n]^(3/2))
```

Maple [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/ln(a*x^n)^(5/2),x)
```

```
[Out] int(x/ln(a*x^n)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x/log(a*x^n)^(5/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x}{\log{\left(ax^{n} \right)}^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(x/log(a*x**n)**(5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x/log(a*x^n)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\ln{(a\,x^n)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/log(a*x^n)^(5/2),x)
[Out] int(x/log(a*x^n)^(5/2), x)
```

3.145 $\int \frac{1}{\log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=80

$$\frac{4\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x}{3n^2\sqrt{\log(ax^n)}}$$

```
[Out] -2/3*x/n/ln(a*x^n)^(3/2)+4/3*x*erfi(ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/n^(5/
2)/((a*x^n)^(1/n))-4/3*x/n^2/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.02, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.400, Rules used = {2334, 2337, 2211, 2235}

$$\frac{4\sqrt{\pi}\,x(ax^n)^{-1/n}\operatorname{Erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{4x}{3n^2\sqrt{\log(ax^n)}}-\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[Log[a*x^n]^(-5/2),x]
```

```
[Out] (4*Sqrt[Pi]*x*Erfi[Sqrt[Log[a*x^n]]/Sqrt[n]])/(3*n^(5/2)*(a*x^n)^n^(-1)) -
(2*x)/(3*n*Log[a*x^n]^(3/2)) - (4*x)/(3*n^2*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2334

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Simp[x*((a + b
*Log[c*x^n])^(p + 1)/(b*n*(p + 1))), x] - Dist[1/(b*n*(p + 1)), Int[(a + b*
Log[c*x^n])^(p + 1), x], x] /; FreeQ[{a, b, c, n}, x] && LtQ[p, -1] && Inte
gerQ[2*p]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{\log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}+\frac{2\int \frac{1}{\log^{\frac{3}{2}}(ax^n)}\,dx}{3n}\\ &= -\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x}{3n^2\sqrt{\log(ax^n)}}+\frac{4\int \frac{1}{\sqrt{\log(ax^n)}}\,dx}{3n^2}\\ &= -\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x}{3n^2\sqrt{\log(ax^n)}}+\frac{\left(4x(ax^n)^{-1/n}\right)\text{Subst}\left(\int \frac{e^{\frac{x}{n}}}{\sqrt{x}}\,dx,x,\log(ax^n)\right)}{3n^3}\\ &= -\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x}{3n^2\sqrt{\log(ax^n)}}+\frac{\left(8x(ax^n)^{-1/n}\right)\text{Subst}\left(\int e^{\frac{x^2}{n}}\,dx,x,\sqrt{\log(ax^n)}\right)}{3n^3}\\ &= \frac{4\sqrt{\pi}\,x(ax^n)^{-1/n}\,\text{erfi}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4x}{3n^2\sqrt{\log(ax^n)}}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 83, normalized size = 1.04

$$-\frac{2x(ax^n)^{-1/n}\left(2n\Gamma\left(\frac{1}{2},-\frac{\log(ax^n)}{n}\right)\left(-\frac{\log(ax^n)}{n}\right)^{3/2}+(ax^n)^{\frac{1}{n}}\left(n+2\log(ax^n)\right)\right)}{3n^2\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Log[a*x^n]^(-5/2),x]
[Out] (-2*x*(2*n*Gamma[1/2, -(Log[a*x^n]/n)]*(-(Log[a*x^n]/n))^(3/2) + (a*x^n)^n^
(-1)*(n + 2*Log[a*x^n])))/(3*n^2*(a*x^n)^n^(-1)*Log[a*x^n]^(3/2))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/ln(a*x^n)^(5/2),x)
```

```
[Out] int(1/ln(a*x^n)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(log(a*x^n)^(-5/2), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\log{(ax^{n})}^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(log(a*x**n)**(-5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(log(a*x^n)^(-5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\ln\left(a\,x^n\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/log(a*x^n)^(5/2),x)
```

```
[Out] int(1/log(a*x^n)^(5/2), x)
```

3.146 $\int \frac{1}{x\log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=17

$$-\frac{2}{3n\log^{\frac{3}{2}}(ax^n)}$$

```
[Out] -2/3/n/ln(a*x^n)^(3/2)
```

Rubi [A]
time = 0.01, antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2339, 30}

$$-\frac{2}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Log[a*x^n]^(5/2)),x]
```

```
[Out] -2/(3*n*Log[a*x^n]^(3/2))
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\log^{\frac{5}{2}}(ax^n)}\,dx &= \frac{\text{Subst}\left(\int \frac{1}{x^{5/2}}\,dx, x, \log(ax^n)\right)}{n}\\ &= -\frac{2}{3n\log^{\frac{3}{2}}(ax^n)}\end{aligned}$$

Mathematica [A]
time = 0.00, size = 17, normalized size = 1.00

$$-\frac{2}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Log[a*x^n]^(5/2)),x]
[Out] -2/(3*n*Log[a*x^n]^(3/2))
```

Maple [A]
time = 0.12, size = 14, normalized size = 0.82

method	result	size
derivativedivides	$-\frac{2}{3n\ln(a\,x^n)^{\frac{3}{2}}}$	14
default	$-\frac{2}{3n\ln(a\,x^n)^{\frac{3}{2}}}$	14

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/ln(a*x^n)^(5/2),x,method=_RETURNVERBOSE)
[Out] -2/3/n/ln(a*x^n)^(3/2)
```

Maxima [A]
time = 0.30, size = 13, normalized size = 0.76

$$-\frac{2}{3\,n\log\left(ax^n\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(5/2),x, algorithm="maxima")
[Out] -2/3/(n*log(a*x^n)^(3/2))
```

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 37 vs. 2(13) = 26.
time = 0.34, size = 37, normalized size = 2.18

$$-\frac{2\,\sqrt{n\log\left(x\right)+\log\left(a\right)}}{3\,\left(n^3\log\left(x\right)^2+2\,n^2\log\left(a\right)\log\left(x\right)+n\log\left(a\right)^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(5/2),x, algorithm="fricas")
[Out] -2/3*sqrt(n*log(x) + log(a))/(n^3*log(x)^2 + 2*n^2*log(a)*log(x) + n*log(a)
^2)
```

Sympy [A]
time = 8.08, size = 26, normalized size = 1.53

$$\begin{cases} -\frac{2}{3n\log\left(ax^n\right)^{\frac{3}{2}}} & \text{for}\: n \neq 0 \\ \frac{\log\left(x\right)}{\log\left(a\right)^{\frac{5}{2}}} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/ln(a*x**n)**(5/2),x)
```

```
[Out] Piecewise((-2/(3*n*log(a*x**n)**(3/2)), Ne(n, 0)), (log(x)/log(a)**(5/2), T
rue))
```

Giac [A]
time = 2.65, size = 14, normalized size = 0.82

$$-\frac{2}{3\left(n\log\left(x\right)+\log\left(a\right)\right)^{\frac{3}{2}}n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] -2/3/((n*log(x) + log(a))^(3/2)*n)
```

Mupad [B]
time = 3.43, size = 13, normalized size = 0.76

$$-\frac{2}{3\,n\ln\left(a\,x^n\right)^{3/2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*log(a*x^n)^(5/2)),x)
```

```
[Out] -2/(3*n*log(a*x^n)^(3/2))
```

3.147 $\int \frac{1}{x^2 \log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=84

$$\frac{4\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\operatorname{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}x}-\frac{2}{3nx\log^{\frac{3}{2}}(ax^n)}+\frac{4}{3n^2x\sqrt{\log(ax^n)}}$$

```
[Out] -2/3/n/x/ln(a*x^n)^(3/2)+4/3*(a*x^n)^(1/n)*erf(ln(a*x^n)^(1/2)/n^(1/2))*Pi^
(1/2)/n^(5/2)/x+4/3/n^2/x/ln(a*x^n)^(1/2)
```

Rubi [A]

time = 0.04, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2236}

$$\frac{4\sqrt{\pi}\,(ax^n)^{\frac{1}{n}}\operatorname{Erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}x}+\frac{4}{3n^2x\sqrt{\log(ax^n)}}-\frac{2}{3nx\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^2*Log[a*x^n]^(5/2)),x]
```

```
[Out] (4*Sqrt[Pi]*(a*x^n)^n^(-1)*Erf[Sqrt[Log[a*x^n]]/Sqrt[n]])/(3*n^(5/2)*x) - 2
/(3*n*x*Log[a*x^n]^(3/2)) + 4/(3*n^2*x*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{1}{x^2 \log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2}{3nx\log^{\frac{3}{2}}(ax^n)} - \frac{2\int \frac{1}{x^2\log^{\frac{3}{2}}(ax^n)}\,dx}{3n}\\
&= -\frac{2}{3nx\log^{\frac{3}{2}}(ax^n)} + \frac{4}{3n^2x\sqrt{\log(ax^n)}} + \frac{4\int \frac{1}{x^2\sqrt{\log(ax^n)}}\,dx}{3n^2}\\
&= -\frac{2}{3nx\log^{\frac{3}{2}}(ax^n)} + \frac{4}{3n^2x\sqrt{\log(ax^n)}} + \frac{\left(4(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int \frac{e^{-\frac{x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{3n^3x}\\
&= -\frac{2}{3nx\log^{\frac{3}{2}}(ax^n)} + \frac{4}{3n^2x\sqrt{\log(ax^n)}} + \frac{\left(8(ax^n)^{\frac{1}{n}}\right)\text{Subst}\left(\int e^{-\frac{x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{3n^3x}\\
&= \frac{4\sqrt{\pi}(ax^n)^{\frac{1}{n}}\operatorname{erf}\left(\frac{\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}x} - \frac{2}{3nx\log^{\frac{3}{2}}(ax^n)} + \frac{4}{3n^2x\sqrt{\log(ax^n)}}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 70, normalized size = 0.83

$$-\frac{2\left(n-2\log(ax^n)+2n(ax^n)^{\frac{1}{n}}\Gamma\left(\frac{1}{2},\frac{\log(ax^n)}{n}\right)\left(\frac{\log(ax^n)}{n}\right)^{3/2}\right)}{3n^2x\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^2*Log[a*x^n]^(5/2)),x]
```

```
[Out] (-2*(n - 2*Log[a*x^n] + 2*n*(a*x^n)^n^(-1)*Gamma[1/2, Log[a*x^n]/n]*(Log[a*
x^n]/n)^(3/2)))/(3*n^2*x*Log[a*x^n]^(3/2))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{1}{x^2 \ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/ln(a*x^n)^(5/2),x)
```

```
[Out] int(1/x^2/ln(a*x^n)^(5/2),x)
```

Maxima [**F**]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x^2*log(a*x^n)^(5/2)), x)
```

Fricas [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^{2}\log{(ax^{n})}^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(1/(x**2*log(a*x**n)**(5/2)), x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*log(a*x^n)^(5/2)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^2 \ln{(a\,x^n)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*log(a*x^n)^(5/2)),x)
[Out] int(1/(x^2*log(a*x^n)^(5/2)), x)
```

3.148 $\int \frac{1}{x^3 \log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=93

$$\frac{8\sqrt{2\pi}\,(ax^n)^{2/n}\operatorname{erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}x^2}-\frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)}+\frac{8}{3n^2x^2\sqrt{\log(ax^n)}}$$

```
[Out] -2/3/n/x^2/ln(a*x^n)^(3/2)+8/3*(a*x^n)^(2/n)*erf(2^(1/2)*ln(a*x^n)^(1/2)/n^
(1/2))*2^(1/2)*Pi^(1/2)/n^(5/2)/x^2+8/3/n^2/x^2/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 93, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2236}

$$\frac{8\sqrt{2\pi}\,(ax^n)^{2/n}\operatorname{Erf}\left(\frac{\sqrt{2}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}x^2}+\frac{8}{3n^2x^2\sqrt{\log(ax^n)}}-\frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x^3*Log[a*x^n]^(5/2)),x]
```

```
[Out] (8*Sqrt[2*Pi]*(a*x^n)^(2/n)*Erf[(Sqrt[2]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(3*n^(
5/2)*x^2) - 2/(3*n*x^2*Log[a*x^n]^(3/2)) + 8/(3*n^2*x^2*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2236

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erf[(c + d*x)*Rt[(-b)*Log[F], 2]]/(2*d*Rt[(-b)*Log[F], 2])), x] /; Fr
eeQ[{F, a, b, c, d}, x] && NegQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x^3\log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)} - \frac{4\int \frac{1}{x^3\log^{\frac{3}{2}}(ax^n)}\,dx}{3n}\\ &= -\frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)} + \frac{8}{3n^2x^2\sqrt{\log(ax^n)}} + \frac{16\int \frac{1}{x^3\sqrt{\log(ax^n)}}\,dx}{3n^2}\\ &= -\frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)} + \frac{8}{3n^2x^2\sqrt{\log(ax^n)}} + \frac{\left(16(ax^n)^{2/n}\right)\text{Subst}\left(\int \frac{e^{-\frac{2x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n\right.}{3n^3x^2}\\ &= -\frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)} + \frac{8}{3n^2x^2\sqrt{\log(ax^n)}} + \frac{\left(32(ax^n)^{2/n}\right)\text{Subst}\left(\int e^{-\frac{2x^2}{n}}\,dx, x, \sqrt{\log(\right.}}{3n^3x^2}\\ &= \frac{8\sqrt{2\pi}\,(ax^n)^{2/n}\operatorname{erf}\left(\frac{\sqrt{2}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}x^2} - \frac{2}{3nx^2\log^{\frac{3}{2}}(ax^n)} + \frac{8}{3n^2x^2\sqrt{\log(ax^n)}}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 78, normalized size = 0.84

$$-\frac{2\left(n-4\log(ax^n)+4\sqrt{2}\,n(ax^n)^{2/n}\,\Gamma\left(\frac{1}{2},\frac{2\log(ax^n)}{n}\right)\left(\frac{\log(ax^n)}{n}\right)^{3/2}\right)}{3n^2x^2\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x^3*Log[a*x^n]^(5/2)),x]
```

```
[Out] (-2*(n - 4*Log[a*x^n] + 4*Sqrt[2]*n*(a*x^n)^(2/n)*Gamma[1/2, (2*Log[a*x^n])
/n]*(Log[a*x^n]/n)^(3/2)))/(3*n^2*x^2*Log[a*x^n]^(3/2))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3\ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^3/ln(a*x^n)^(5/2),x)
```

```
[Out] int(1/x^3/ln(a*x^n)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x^3*log(a*x^n)^(5/2)), x)
```

Fricas [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x^3 \log{(a x^n)}^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**3/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(1/(x**3*log(a*x**n)**(5/2)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^3/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x^3*log(a*x^n)^(5/2)), x)
```

Mupad [F]

time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^3 \ln\left(a\,x^n\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*log(a*x^n)^(5/2)),x)
[Out] int(1/(x^3*log(a*x^n)^(5/2)), x)
```

3.149 $\int (dx)^m \left(a+\frac{a(1+m)\log(cx^n)}{n}\right) dx$

Optimal. Leaf size=21

$$\frac{a(dx)^{1+m}\log(cx^n)}{dn}$$

```
[Out] a*(d*x)^(1+m)*ln(c*x^n)/d/n
```

Rubi [A]
time = 0.01, antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$, Rules used = {2340}

$$\frac{a(dx)^{m+1}\log(cx^n)}{dn}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^m*(a + (a*(1 + m)*Log[c*x^n])/n),x]
```

```
[Out] (a*(d*x)^(1 + m)*Log[c*x^n])/(d*n)
```

Rule 2340

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[b*(d*x)^(m + 1)*(Log[c*x^n]/(d*(m + 1))), x] /; FreeQ[{a, b, c, d, m,
n}, x] && NeQ[m, -1] && EqQ[a*(m + 1) - b*n, 0]
```

Rubi steps

$$\int (dx)^m \left(a+\frac{a(1+m)\log(cx^n)}{n}\right) dx = \frac{a(dx)^{1+m}\log(cx^n)}{dn}$$

Mathematica [A]
time = 0.01, size = 17, normalized size = 0.81

$$\frac{ax(dx)^m\log(cx^n)}{n}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^m*(a + (a*(1 + m)*Log[c*x^n])/n),x]
```

```
[Out] (a*x*(d*x)^m*Log[c*x^n])/n
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 260, normalized size = 12.38

method	result
risch	$\frac{ax\,\mathrm{e}^{\frac{m\left(2\ln(d)+2\ln(x)-i\pi\,\mathrm{csgn}(id)\mathrm{csgn}(ix)\mathrm{csgn}(idx)+i\pi\,\mathrm{csgn}(id)\mathrm{csgn}(idx)^2+i\pi\,\mathrm{csgn}(ix)\mathrm{csgn}(idx)^2-i\pi\mathrm{csgn}(idx)^3\right)}{2}}\ln(x^n)}{n}+\frac{a\left(-i\pi\,\mathrm{csgn}(ic)\mathrm{c}\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a+a*(1+m)*ln(c*x^n)/n),x,method=_RETURNVERBOSE)
```

```
[Out] a/n*x*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+I*Pi*
csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3))*l
n(x^n)+1/2*a*(-I*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*csgn(I*c)*csgn
(I*c*x^n)^2+I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*csgn(I*c*x^n)^3+2*ln(c))*
x/n*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+I*Pi*cs
gn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3))
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 102 vs. $2(21) = 42$.
time = 0.30, size = 102, normalized size = 4.86

$$-\frac{ad^m mxx^m}{(m+1)^2}-\frac{ad^m xx^m}{(m+1)^2}+\frac{(dx)^{m+1}\,am\log(cx^n)}{d(m+1)n}+\frac{(dx)^{m+1}\,a}{d(m+1)}+\frac{(dx)^{m+1}\,a\log(cx^n)}{d(m+1)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^m*(a+a*(1+m)*log(c*x^n)/n),x, algorithm="maxima")
```

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

Fricas [A]
time = 0.36, size = 26, normalized size = 1.24

$$\frac{(anx\log(x)+ax\log(c))e^{(m\log(d)+m\log(x))}}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^m*(a+a*(1+m)*log(c*x^n)/n),x, algorithm="fricas")
```

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

Sympy [A]
time = 0.22, size = 15, normalized size = 0.71

$$\frac{ax(dx)^m\log(cx^n)}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**m*(a+a*(1+m)*ln(c*x**n)/n),x)
```

```
[Out] a*x*(d*x)**m*log(c*x**n)/n
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 175 vs. 2(21) = 42.
time = 3.79, size = 175, normalized size = 8.33

$$\frac{ad^m m^2 x x^m \log(x)}{m^2+2m+1}+\frac{2\,ad^m m x x^m \log(x)}{m^2+2m+1}-\frac{ad^m m x x^m}{m^2+2m+1}+\frac{ad^{m+1} m x x^m \log(c)}{(dm+d)n}+\frac{ad^m x x^m \log(x)}{m^2+2m+1}+\frac{ad^{m+1} x x^m}{dm+d}-\frac{ad^m x x^m}{m^2+2m+1}+\frac{ad^{m+1} x x^m \log(c)}{(dm+d)n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^m*(a+a*(1+m)*log(c*x^n)/n),x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.05

$$\int (d\,x)^m\,\left(a+\frac{a\,\ln\left(c\,x^n\right)\,\left(m+1\right)}{n}\right) \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a + (a*log(c*x^n)*(m + 1))/n),x)
```

```
[Out] int((d*x)^m*(a + (a*log(c*x^n)*(m + 1))/n), x)
```

3.150 $\int (dx)^m (a+b\log(cx^n))^3\,dx$

Optimal. Leaf size=116

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

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

Rubi [A]
time = 0.06, antiderivative size = 116, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2342, 2341}

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

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\int (dx)^m \left(a+b\log\left(cx^n\right)\right)^3\,dx = \frac{(dx)^{1+m}\left(a+b\log\left(cx^n\right)\right)^3}{d(1+m)} - \frac{(3bn)\int (dx)^m \left(a+b\log\left(cx^n\right)\right)^2\,dx}{1+m}$$
$$= -\frac{3bn(dx)^{1+m}\left(a+b\log\left(cx^n\right)\right)^2}{d(1+m)^2} + \frac{(dx)^{1+m}\left(a+b\log\left(cx^n\right)\right)^3}{d(1+m)} + \frac{\left(6b^2n^2\right)\int (dx$$
$$= -\frac{6b^3n^3(dx)^{1+m}}{d(1+m)^4} + \frac{6b^2n^2(dx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{d(1+m)^3} - \frac{3bn(dx)^{1+m}\left(a+b\log\left(c\right.\right.}{d(1+m)^2}$$

Mathematica [A]
time = 0.03, size = 76, normalized size = 0.66

$$\frac{x(dx)^m\left(\left(a+b\log\left(cx^n\right)\right)^3-\frac{3bn\left((1+m)^2\left(a+b\log\left(cx^n\right)\right)^2+2bn\left(bn-(1+m)\left(a+b\log\left(cx^n\right)\right)\right)\right)}{(1+m)^3}\right)}{1+m}$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.42, size = 9684, normalized size = 83.48

method	result	size
risch	Expression too large to display	9684

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a+b*ln(c*x^n))^3,x,method=_RETURNVERBOSE)
```

```
[Out] result too large to display
```

Maxima [B] Leaf count of result is larger than twice the leaf count of optimal. 247 vs. 2(116) = 232.
time = 0.30, size = 247, normalized size = 2.13

$$-\frac{3\,a^2bd^mnxx^m}{(m+1)^2}+\frac{(dx)^{m+1}\,b^3\log\left(cx^n\right)^3}{d(m+1)}-6\left(\frac{d^mnxx^m\log\left(cx^n\right)}{(m+1)^2}-\frac{d^mn^2xx^m}{(m+1)^3}\right)ab^2-3\left(\frac{d^mnxx^m\log\left(cx^n\right)^2}{(m+1)^2}-\frac{2\left(\frac{d^{m+1}nxx^m\log(cx^n)}{(m+1)^2}-\frac{d^{m+1}n^2xx^m}{(m+1)^3}\right)n}{d(m+1)}\right)b^3+\frac{3\,(dx)^{m+1}\,ab^2\log\left(cx^n\right)^2}{d(m+1)}+\frac{3\,(dx)^{m+1}\,a^2b\log\left(cx^n\right)}{d(m+1)}+\frac{(dx)^{m+1}\,a^3}{d(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

```
*(d^m*n*x*x^m*log(c*x^n)^2/(m + 1)^2 - 2*(d^(m + 1)*n*x*x^m*log(c*x^n)/(m +
 1)^2 - d^(m + 1)*n^2*x*x^m/(m + 1)^3)*n/(d*(m + 1)))*b^3 + 3*(d*x)^(m + 1)
*a*b^2*log(c*x^n)^2/(d*(m + 1)) + 3*(d*x)^(m + 1)*a^2*b*log(c*x^n)/(d*(m +
1)) + (d*x)^(m + 1)*a^3/(d*(m + 1))
```

Fricas [**B**] Leaf count of result is larger than twice the leaf count of optimal. 574 vs. $2(116) = 232$.
time = 0.35, size = 574, normalized size = 4.95

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [**B**] Leaf count of result is larger than twice the leaf count of optimal. 1273 vs. $2(107) = 214$.
time = 15.57, size = 1273, normalized size = 10.97

[illegible]

Verification of antiderivative is not currently implemented for this CAS.

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

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

```
m**4 + 4*m**3 + 6*m**2 + 4*m + 1) + 3*a*b**2*m**3*x*(d*x)**m*log(c*x**n)**2
/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1) - 6*a*b**2*m**2*n*x*(d*x)**m*log(c*x**n
)/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1) + 9*a*b**2*m**2*x*(d*x)**m*log(c*x**n)
**2/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1) + 6*a*b**2*m*n**2*x*(d*x)**m/(m**4 +
 4*m**3 + 6*m**2 + 4*m + 1) - 12*a*b**2*m*n*x*(d*x)**m*log(c*x**n)/(m**4 +
4*m**3 + 6*m**2 + 4*m + 1) + 9*a*b**2*m*x*(d*x)**m*log(c*x**n)**2/(m**4 + 4
*m**3 + 6*m**2 + 4*m + 1) + 6*a*b**2*n**2*x*(d*x)**m/(m**4 + 4*m**3 + 6*m**
2 + 4*m + 1) - 6*a*b**2*n*x*(d*x)**m*log(c*x**n)/(m**4 + 4*m**3 + 6*m**2 +
4*m + 1) + 3*a*b**2*x*(d*x)**m*log(c*x**n)**2/(m**4 + 4*m**3 + 6*m**2 + 4*m
 + 1) + b**3*m**3*x*(d*x)**m*log(c*x**n)**3/(m**4 + 4*m**3 + 6*m**2 + 4*m +
 1) - 3*b**3*m**2*n*x*(d*x)**m*log(c*x**n)**2/(m**4 + 4*m**3 + 6*m**2 + 4*m
 + 1) + 3*b**3*m**2*x*(d*x)**m*log(c*x**n)**3/(m**4 + 4*m**3 + 6*m**2 + 4*m
 + 1) + 6*b**3*m*n**2*x*(d*x)**m*log(c*x**n)/(m**4 + 4*m**3 + 6*m**2 + 4*m
+ 1) - 6*b**3*m*n*x*(d*x)**m*log(c*x**n)**2/(m**4 + 4*m**3 + 6*m**2 + 4*m +
 1) + 3*b**3*m*x*(d*x)**m*log(c*x**n)**3/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1)
 - 6*b**3*n**3*x*(d*x)**m/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1) + 6*b**3*n**2*
x*(d*x)**m*log(c*x**n)/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1) - 3*b**3*n*x*(d*x
)**m*log(c*x**n)**2/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1) + b**3*x*(d*x)**m*lo
g(c*x**n)**3/(m**4 + 4*m**3 + 6*m**2 + 4*m + 1), Ne(m, -1)), (Piecewise(((a
**3*log(c*x**n) + 3*a**2*b*log(c*x**n)**2/2 + a*b**2*log(c*x**n)**3 + b**3*
log(c*x**n)**4/4)/n, Ne(n, 0)), ((a**3 + 3*a**2*b*log(c) + 3*a*b**2*log(c)*
*2 + b**3*log(c)**3)*log(x), True))/d, True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 1133 vs. $2(116) = 232$.
time = 1.92, size = 1133, normalized size = 9.77

Verification of antiderivative is not currently implemented for this CAS.

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

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

```
(m^3 + 3*m^2 + 3*m + 1) + 6*b^3*d^m*n^3*x*x^m*log(x)/(m^4 + 4*m^3 + 6*m^2 +
 4*m + 1) + 6*a*b^2*d^m*m*n*x*x^m*log(c)*log(x)/(m^2 + 2*m + 1) - 6*b^3*d^m
*n^2*x*x^m*log(c)*log(x)/(m^3 + 3*m^2 + 3*m + 1) + 3*b^3*d^m*n*x*x^m*log(c)
^2*log(x)/(m^2 + 2*m + 1) + 3*a*b^2*d^m*n^2*x*x^m*log(x)^2/(m^3 + 3*m^2 + 3
*m + 1) - 6*b^3*d^m*n^3*x*x^m/(m^4 + 4*m^3 + 6*m^2 + 4*m + 1) + 6*b^3*d^m*n
^2*x*x^m*log(c)/(m^3 + 3*m^2 + 3*m + 1) - 3*b^3*d^m*n*x*x^m*log(c)^2/(m^2 +
 2*m + 1) + 3*a^2*b*d^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - 6*a*b^2*d^m*n^2*
x*x^m*log(x)/(m^3 + 3*m^2 + 3*m + 1) + 6*a*b^2*d^m*n*x*x^m*log(c)*log(x)/(m
^2 + 2*m + 1) + 6*a*b^2*d^m*n^2*x*x^m/(m^3 + 3*m^2 + 3*m + 1) - 6*a*b^2*d^m
*n*x*x^m*log(c)/(m^2 + 2*m + 1) + (d*x)^m*b^3*x*log(c)^3/(m + 1) + 3*a^2*b*
d^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - 3*a^2*b*d^m*n*x*x^m/(m^2 + 2*m + 1) +
3*(d*x)^m*a*b^2*x*log(c)^2/(m + 1) + 3*(d*x)^m*a^2*b*x*log(c)/(m + 1) + (d*
x)^m*a^3*x/(m + 1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x)^m\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^3 \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

3.151 $\int (dx)^m (a+b\log(cx^n))^2\,dx$

Optimal. Leaf size=81

$$\frac{2b^2n^2(dx)^{1+m}}{d(1+m)^3}-\frac{2bn(dx)^{1+m}(a+b\log(cx^n))}{d(1+m)^2}+\frac{(dx)^{1+m}(a+b\log(cx^n))^2}{d(1+m)}$$

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

Rubi [A]
time = 0.03, antiderivative size = 81, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}=0.111$, Rules used = {2342, 2341}

$$\frac{(dx)^{m+1}(a+b\log(cx^n))^2}{d(m+1)}-\frac{2bn(dx)^{m+1}(a+b\log(cx^n))}{d(m+1)^2}+\frac{2b^2n^2(dx)^{m+1}}{d(m+1)^3}$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int (dx)^m(a+b\log(cx^n))^2\,dx&=\frac{(dx)^{1+m}(a+b\log(cx^n))^2}{d(1+m)}-\frac{(2bn)\int (dx)^m(a+b\log(cx^n))\,dx}{1+m}\\&=\frac{2b^2n^2(dx)^{1+m}}{d(1+m)^3}-\frac{2bn(dx)^{1+m}(a+b\log(cx^n))}{d(1+m)^2}+\frac{(dx)^{1+m}(a+b\log(cx^n))^2}{d(1+m)}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 76, normalized size = 0.94

$$\frac{x(dx)^m\left(a^2(1+m)^2-2ab(1+m)n+2b^2n^2+2b(1+m)(a+am-bn)\log\left(cx^n\right)+b^2(1+m)^2\log^2\left(cx^n\right)\right)}{(1+m)^3}$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.11, size = 2126, normalized size = 26.25

method	result	size
risch	Expression too large to display	2126

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^2/(1+m)*x*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)
+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)
^3))*ln(x^n)^2-b*(I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m-I*Pi*b*csgn(
I*c)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*c
*x^n)^3*m+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2-I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*c*x^n)^3-2*b*ln
(c)*m-2*b*ln(c)-2*a*m+2*b*n-2*a)/(1+m)^2*x*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*
csgn(I*d)*csgn(I*x)*csgn(I*d*x)+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)
*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3))*ln(x^n)+1/4*(4*a^2+4*a^2*m^2+8*a^2*m+8*
ln(c)*a*b*m^2+16*ln(c)*a*b*m-8*ln(c)*b^2*m*n-8*b^2*ln(c)*n-8*b*a*n+4*I*Pi*b
^2*m*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+8*a*b*ln(c)+4*b^2*ln(c)^2+8*I*Pi
*ln(c)*b^2*m*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b*m^2*csgn(I*c)*csgn(I*c*
x^n)^2+4*I*Pi*a*b*m^2*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*b^2*m*n*csgn(I*c)*
csgn(I*c*x^n)^2+8*b^2*n^2-Pi^2*b^2*m^2*csgn(I*c*x^n)^6-2*Pi^2*b^2*m*csgn(I*
c*x^n)^6-Pi^2*b^2*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*c)*csgn(I*c
*x^n)^5-Pi^2*b^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*csgn(I*x^n)*csgn(
I*c*x^n)^5-8*I*Pi*a*b*m*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*ln(c)*b^
2*m^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-8*I*Pi*ln(c)*b^2*m*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)-4*I*Pi*a*b*m^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-Pi
^2*b^2*m^2*csgn(I*x^n)^2*csgn(I*c*x^n)^4-2*Pi^2*b^2*m*csgn(I*x^n)^2*csgn(I*
c*x^n)^4-8*a*b*m*n+4*I*Pi*ln(c)*b^2*m^2*csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*ln
(c)*b^2*m^2*csgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*ln(c)*b^2*m*csgn(I*c)*csgn(I
*c*x^n)^2+4*Pi^2*b^2*m*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2*m
^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4-8*Pi^2*b^2*m*csgn(I*c)*csgn(I*x^n)
```

```
*csgn(I*c*x^n)^4+4*ln(c)^2*b^2*m^2+8*ln(c)^2*b^2*m+4*I*Pi*ln(c)*b^2*csgn(I*
c)*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*b^2*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*a*b*
csgn(I*c)*csgn(I*c*x^n)^2+4*I*Pi*a*b*csgn(I*x^n)*csgn(I*c*x^n)^2+2*Pi^2*b^2
*m^2*csgn(I*x^n)*csgn(I*c*x^n)^5+4*Pi^2*b^2*m*csgn(I*x^n)*csgn(I*c*x^n)^5+2
*Pi^2*b^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*b^2*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)^4-Pi^2*b^2*csgn(I*c*x^n)^6-4*I*Pi*a*b*m^2*csgn(I*c*x^
n)^3+4*I*Pi*b^2*n*csgn(I*c*x^n)^3-4*I*Pi*ln(c)*b^2*csgn(I*c*x^n)^3-4*I*Pi*a
*b*csgn(I*c*x^n)^3-2*Pi^2*b^2*m*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi^2*b^2*m^2*
csgn(I*c)*csgn(I*c*x^n)^5+4*Pi^2*b^2*m*csgn(I*c)*csgn(I*c*x^n)^5+4*I*Pi*b^2
*m*n*csgn(I*c*x^n)^3-8*I*Pi*a*b*m*csgn(I*c*x^n)^3-Pi^2*b^2*m^2*csgn(I*c)^2*
csgn(I*x^n)^2*csgn(I*c*x^n)^2-2*Pi^2*b^2*m*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I
*c*x^n)^2+2*Pi^2*b^2*m^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+4*Pi^2*b^2
*m*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+2*Pi^2*b^2*m^2*csgn(I*c)*csgn(I*
x^n)^2*csgn(I*c*x^n)^3-Pi^2*b^2*m^2*csgn(I*c)^2*csgn(I*c*x^n)^4-4*I*Pi*b^2*
n*csgn(I*c)*csgn(I*c*x^n)^2-4*I*Pi*b^2*n*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi
*ln(c)*b^2*m^2*csgn(I*c*x^n)^3-8*I*Pi*ln(c)*b^2*m*csgn(I*c*x^n)^3-4*I*Pi*ln
(c)*b^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*a*b*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+4*I*Pi*b^2*n*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-Pi^2*b^2*c
sgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+2*Pi^2*b^2*csgn(I*c)^2*csgn(I*x^n)
*csgn(I*c*x^n)^3-4*I*Pi*b^2*m*n*csgn(I*x^n)*csgn(I*c*x^n)^2+8*I*Pi*a*b*m*cs
gn(I*c)*csgn(I*c*x^n)^2+8*I*Pi*a*b*m*csgn(I*x^n)*csgn(I*c*x^n)^2)/(1+m)^3*x
*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+I*Pi*csgn(
I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3))
```

Maxima [A]
time = 0.30, size = 132, normalized size = 1.63

$$-\frac{2\,abd^m nxx^m}{(m+1)^2}-2\left(\frac{d^m nxx^m\log\left(cx^n\right)}{(m+1)^2}-\frac{d^m n^2xx^m}{(m+1)^3}\right)b^2+\frac{(dx)^{m+1}\,b^2\log\left(cx^n\right)^2}{d(m+1)}+\frac{2\,(dx)^{m+1}\,ab\log\left(cx^n\right)}{d(m+1)}+\frac{(dx)^{m+1}\,a^2}{d(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 208 vs. $2(81) = 162$.
time = 0.33, size = 208, normalized size = 2.57

$$\frac{\left((b^2m^2+2\,b^2m+b^2)n^2x\log\left(x\right)^2+(b^2m^2+2\,b^2m+b^2)x\log\left(c\right)^2+2\,(abm^2+2\,abm+ab-(b^2m+b^2)n)x\log\left(c\right)+(a^2m^2+2\,b^2n^2+2\,a^2m+a^2-2\,(abm+ab)n)x+2\,((b^2m^2+2\,b^2m+b^2)nx\log\left(c\right)-((b^2m+b^2)n^2-(abm^2+2\,abm+ab)n)x)\log\left(x\right)\right)e^{(m\log(d)+m\log(x))}}{m^3+3\,m^2+3\,m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 502 vs. $2(73) = 146$.
time = 11.29, size = 502, normalized size = 6.20

$$\begin{cases} \frac{a^2m^2x(dx)^m}{m^3+3m^2+3m+1} + \frac{2a^2mx(dx)^m}{m^3+3m^2+3m+1} + \frac{a^2x(dx)^m}{m^3+3m^2+3m+1} + \frac{2abm^2x(dx)^m\log(cx^n)}{m^3+3m^2+3m+1} - \frac{2abmnx(dx)^m}{m^3+3m^2+3m+1} + \frac{4abmx(dx)^m\log(cx^n)}{m^3+3m^2+3m+1} - \frac{2abnx(dx)^m}{m^3+3m^2+3m+1} + \frac{2abx(dx)^m\log(cx^n)}{m^3+3m^2+3m+1} + \frac{b^2m^2x(dx)^m\log(cx^n)^2}{m^3+3m^2+3m+1} - \frac{2b^2mnx(dx)^m\log(cx^n)}{m^3+3m^2+3m+1} + \frac{2b^2mx(dx)^m\log(cx^n)^2}{m^3+3m^2+3m+1} + \frac{2b^2n^2x(dx)^m}{m^3+3m^2+3m+1} - \frac{2b^2nx(dx)^m\log(cx^n)}{m^3+3m^2+3m+1} + \frac{b^2x(dx)^m\log(cx^n)^2}{m^3+3m^2+3m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((a**2*m**2*x*(d*x)**m/(m**3 + 3*m**2 + 3*m + 1) + 2*a**2*m*x*(d*x
)**m/(m**3 + 3*m**2 + 3*m + 1) + a**2*x*(d*x)**m/(m**3 + 3*m**2 + 3*m + 1)
+ 2*a*b*m**2*x*(d*x)**m*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) - 2*a*b*m*n*x
*(d*x)**m/(m**3 + 3*m**2 + 3*m + 1) + 4*a*b*m*x*(d*x)**m*log(c*x**n)/(m**3
+ 3*m**2 + 3*m + 1) - 2*a*b*n*x*(d*x)**m/(m**3 + 3*m**2 + 3*m + 1) + 2*a*b*
x*(d*x)**m*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + b**2*m**2*x*(d*x)**m*log
(c*x**n)**2/(m**3 + 3*m**2 + 3*m + 1) - 2*b**2*m*n*x*(d*x)**m*log(c*x**n)/(
m**3 + 3*m**2 + 3*m + 1) + 2*b**2*m*x*(d*x)**m*log(c*x**n)**2/(m**3 + 3*m**
2 + 3*m + 1) + 2*b**2*n**2*x*(d*x)**m/(m**3 + 3*m**2 + 3*m + 1) - 2*b**2*n*
x*(d*x)**m*log(c*x**n)/(m**3 + 3*m**2 + 3*m + 1) + b**2*x*(d*x)**m*log(c*x*
*n)**2/(m**3 + 3*m**2 + 3*m + 1), Ne(m, -1)), (Piecewise(((a**2*log(c*x**n)
 + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b
*log(c) + b**2*log(c)**2)*log(x), True))/d, True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 402 vs. $2(81) = 162$.
time = 4.23, size = 402, normalized size = 4.96

$$\frac{b^2d^mm^2n^2xx^m\log(x)^2}{m^3+3m^2+3m+1} + \frac{2b^2d^mmn^2xx^m\log(x)^2}{m^3+3m^2+3m+1} - \frac{2b^2d^mmn^2xx^m\log(x)}{m^3+3m^2+3m+1} + \frac{2b^2d^mmnxx^m\log(c)\log(x)}{m^2+2m+1} + \frac{b^2d^mn^2xx^m\log(x)^2}{m^3+3m^2+3m+1} + \frac{2abd^mmnxx^m\log(x)}{m^2+2m+1} - \frac{2b^2d^mn^2xx^m\log(x)}{m^3+3m^2+3m+1} + \frac{2b^2d^mnxx^m\log(c)\log(x)}{m^2+2m+1} + \frac{2b^2d^mn^2xx^m}{m^3+3m^2+3m+1} - \frac{2b^2d^mnxx^m\log(c)}{m^2+2m+1} + \frac{2abd^mnxx^m\log(x)}{m^2+2m+1} - \frac{2abd^mnxx^m}{m^2+2m+1} + \frac{(dx)^mb^2x\log(c)^2}{m+1} + \frac{2(dx)^mabx\log(c)}{m+1} + \frac{(dx)^ma^2x}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

```
x^m*log(x)/(m^2 + 2*m + 1) - 2*a*b*d^m*n*x*x^m/(m^2 + 2*m + 1) + (d*x)^m*b^
2*x*log(c)^2/(m + 1) + 2*(d*x)^m*a*b*x*log(c)/(m + 1) + (d*x)^m*a^2*x/(m +
1)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x)^m\,{\left(a+b\,\ln \left(c\,x^n\right)\right)}^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

3.152 $\int (dx)^m (a + b \log(cx^n))\, dx$

Optimal. Leaf size=46

$$-\frac{bn(dx)^{1+m}}{d(1+m)^2} + \frac{(dx)^{1+m}(a + b\log(cx^n))}{d(1+m)}$$

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

Rubi [A]
time = 0.01, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = $\{2341\}$

$$\frac{(dx)^{m+1}(a + b\log(cx^n))}{d(m+1)} - \frac{bn(dx)^{m+1}}{d(m+1)^2}$$

Antiderivative was successfully verified.

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

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (dx)^m (a + b\log(cx^n))\, dx = -\frac{bn(dx)^{1+m}}{d(1+m)^2} + \frac{(dx)^{1+m}(a + b\log(cx^n))}{d(1+m)}$$

Mathematica [A]
time = 0.01, size = 32, normalized size = 0.70

$$\frac{x(dx)^m(a + am - bn + b(1+m)\log(cx^n))}{(1+m)^2}$$

Antiderivative was successfully verified.

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

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.05, size = 371, normalized size = 8.07

method	result
risch	$\frac{b x\, \mathrm{e}^{\frac{m \left(2 \ln(d)+2 \ln(x)-i \pi \,\mathrm{csgn}(i d) \mathrm{csgn}(i x) \mathrm{csgn}(i d x)+i \pi \,\mathrm{csgn}(i d) \mathrm{csgn}(i d x)^{2}+i \pi \,\mathrm{csgn}(i x) \mathrm{csgn}(i d x)^{2}-i \pi \mathrm{csgn}(i d x)^{3}\right)}{2}} \ln(x^{n})}{1+m} - \frac{\left(i \pi b \,\mathrm{csgn}(i c) \mathrm{csgn}(\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b/(1+m)*x*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+I
*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3
))*ln(x^n)-1/2*(I*Pi*b*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)*m-I*Pi*b*csgn(I*
c)*csgn(I*c*x^n)^2*m-I*Pi*b*csgn(I*x^n)*csgn(I*c*x^n)^2*m+I*Pi*b*csgn(I*c*x
^n)^3*m+I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-I*b*Pi*csgn(I*c)*csgn(I*
c*x^n)^2-I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*c*x^n)^3-2*b*ln(c
)*m-2*b*ln(c)-2*a*m+2*b*n-2*a)/(1+m)^2*x*exp(1/2*m*(2*ln(d)+2*ln(x)-I*Pi*cs
gn(I*d)*csgn(I*x)*csgn(I*d*x)+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*c
sgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3))
```

Maxima [A]
time = 0.29, size = 57, normalized size = 1.24

$$-\frac{b d^{m} n x x^{m}}{(m+1)^{2}} + \frac{(dx)^{m+1} b \log(c x^{n})}{d(m+1)} + \frac{(dx)^{m+1} a}{d(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.34, size = 52, normalized size = 1.13

$$\frac{((bm+b)nx\log(x) + (bm+b)x\log(c) + (am-bn+a)x)e^{(m\log(d)+m\log(x))}}{m^{2}+2\,m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 141 vs. $2(37) = 74$.
time = 4.49, size = 141, normalized size = 3.07

$$\begin{cases} \frac{amx(dx)^m}{m^2+2m+1} + \frac{ax(dx)^m}{m^2+2m+1} + \frac{bmx(dx)^m\log(cx^n)}{m^2+2m+1} - \frac{bnx(dx)^m}{m^2+2m+1} + \frac{bx(dx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{d} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((a*m*x*(d*x)**m/(m**2 + 2*m + 1) + a*x*(d*x)**m/(m**2 + 2*m + 1)
+ b*m*x*(d*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(d*x)**m/(m**2 + 2*m
+ 1) + b*x*(d*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise((a
*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**
n))**2/(2*b*n), True))/d, True))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 95 vs. $2(46) = 92$.
time = 3.92, size = 95, normalized size = 2.07

$$\frac{bd^m mnxx^m\log(x)}{m^2+2m+1} + \frac{bd^m nxx^m\log(x)}{m^2+2m+1} - \frac{bd^m nxx^m}{m^2+2m+1} + \frac{(dx)^m bx\log(c)}{m+1} + \frac{(dx)^m ax}{m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int (d\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.153 $\int \frac{(dx)^m}{a+b\log(cx^n)}\,dx$

Optimal. Leaf size=66

$$\frac{e^{-\frac{a(1+m)}{bn}}(dx)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\operatorname{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{bdn}$$

```
[Out] (d*x)^(1+m)*Ei((1+m)*(a+b*ln(c*x^n))/b/n)/b/d/exp(a*(1+m)/b/n)/n/((c*x^n)^(
(1+m)/n))
```

Rubi [A]
time = 0.05, antiderivative size = 66, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2347, 2209}

$$\frac{(dx)^{m+1}e^{-\frac{a(m+1)}{bn}}\left(cx^n\right)^{-\frac{m+1}{n}}\operatorname{Ei}\left(\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{bdn}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^(1 + m)*ExpIntegralEi[((1 + m)*(a + b*Log[c*x^n]))/(b*n)])/(b*d*E^((
a*(1 + m))/(b*n))*n*(c*x^n)^((1 + m)/n))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(dx)^m}{a+b\log\left(cx^n\right)}\,dx &= \frac{\left((dx)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{dn}\\ &= \frac{e^{-\frac{a(1+m)}{bn}}(dx)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\operatorname{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{bdn}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 67, normalized size = 1.02

$$\frac{e^{-\frac{(1+m)(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-m}(dx)^m\text{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{bn}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^m*ExpIntegralEi[((1 + m)*(a + b*Log[c*x^n]))/(b*n)])/(b*E^(((1 + m)*
(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*n*x^m)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(dx)^m}{a+b\ln(c\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((d*x)^m/(a+b*ln(c*x^n)),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x)^m/(b*log(c*x^n) + a), x)
```

Fricas [A]
time = 0.39, size = 68, normalized size = 1.03

$$\frac{\text{Ei}\left(\frac{(bm+b)n\log(x)+am+(bm+b)\log(c)+a}{bn}\right)e^{\left(\frac{bmn\log(d)-am-(bm+b)\log(c)-a}{bn}\right)}}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^m}{a + b \log(cx^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**m/(a+b*ln(c*x**n)),x)
[Out] Integral((d*x)**m/(a + b*log(c*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(d\,x)^m}{a + b\,\ln(c\,x^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

3.154 $\int \frac{(dx)^m}{(a+b\log(cx^n))^2} \, dx$

Optimal. Leaf size=100

$$\frac{e^{-\frac{a(1+m)}{bn}}(1+m)(dx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\operatorname{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{b^2dn^2}-\frac{(dx)^{1+m}}{bdn\left(a+b\log\left(cx^n\right)\right)}$$

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

Rubi [A]
time = 0.06, antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2343, 2347, 2209}

$$\frac{(m+1)(dx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}\operatorname{Ei}\left(\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{b^2dn^2}-\frac{(dx)^{m+1}}{bdn\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

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

```
[Out] ((1 + m)*(d*x)^(1 + m)*ExpIntegralEi[((1 + m)*(a + b*Log[c*x^n]))/(b*n)])/(
b^2*d*E^((a*(1 + m))/(b*n))*n^2*(c*x^n)^((1 + m)/n)) - (d*x)^(1 + m)/(b*d*n
*(a + b*Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{(dx)^m}{(a+b\log(cx^n))^2}\,dx = -\frac{(dx)^{1+m}}{bdn\,(a+b\log(cx^n))} + \frac{(1+m)\int \frac{(dx)^m}{a+b\log(cx^n)}\,dx}{bn}$$

$$= -\frac{(dx)^{1+m}}{bdn\,(a+b\log(cx^n))} + \frac{\left((1+m)(dx)^{1+m}\,(cx^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{a+bx}\,dx, x, \log\right.}{bdn^2}$$

$$= \frac{e^{-\frac{a(1+m)}{bn}}(1+m)(dx)^{1+m}\,(cx^n)^{-\frac{1+m}{n}}\,\text{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{b^2dn^2} - \frac{(dx)^{1+m}}{bdn\,(a+b\log(cx^n))}$$

Mathematica [A]
time = 0.15, size = 89, normalized size = 0.89

$$\frac{(dx)^m\left(e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}(1+m)x^{-m}\text{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right) - \frac{bnx}{a+b\log(cx^n)}\right)}{b^2n^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^m/(a + b*Log[c*x^n])^2,x]
[Out] ((d*x)^m*(((1 + m)*ExpIntegralEi[((1 + m)*(a + b*Log[c*x^n]))/(b*n)])/(E^((
(1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*x^m) - (b*n*x)/(a + b*Log[c
*x^n])))/(b^2*n^2)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(dx)^m}{(a+b\ln(c\,x^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m/(a+b*ln(c*x^n))^2,x)
[Out] int((d*x)^m/(a+b*ln(c*x^n))^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.38, size = 131, normalized size = 1.31

$$-\frac{bnxe^{(m\log(d)+m\log(x))} - ((bm+b)n\log(x) + am + (bm+b)\log(c) + a)\text{Ei}\left(\frac{(bm+b)n\log(x)+am+(bm+b)\log(c)+a}{bn}\right)e^{\left(\frac{bmn\log(d)-am-(bm+b)\log(c)-a}{bn}\right)}}{b^3n^3\log(x) + b^3n^2\log(c) + ab^2n^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^m}{(a + b\log(cx^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((d*x)**m/(a + b*log(c*x**n))**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x)^m/(b*log(c*x^n) + a)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d\,x)^m}{(a + b\,\ln(c\,x^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.155 $\int \frac{(dx)^m}{(a+b\log(cx^n))^3}\,dx$

Optimal. Leaf size=142

$$\frac{e^{-\frac{a(1+m)}{bn}}(1+m)^2(dx)^{1+m}\,(cx^n)^{-\frac{1+m}{n}}\,\mathrm{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{2b^3dn^3}-\frac{(dx)^{1+m}}{2bdn\,(a+b\log(cx^n))^2}-\frac{(1+m)(dx)^{1+m}}{2b^2dn^2\,(a+b\log(cx^n))}$$

```
[Out] 1/2*(1+m)^2*(d*x)^(1+m)*Ei((1+m)*(a+b*ln(c*x^n))/b/n)/b^3/d/exp(a*(1+m)/b/n
)/n^3/((c*x^n)^((1+m)/n))-1/2*(d*x)^(1+m)/b/d/n/(a+b*ln(c*x^n))^2-1/2*(1+m)
*(d*x)^(1+m)/b^2/d/n^2/(a+b*ln(c*x^n))
```

Rubi [A]
time = 0.10, antiderivative size = 142, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$,
Rules used = {2343, 2347, 2209}

$$\frac{(m+1)^2(dx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}\,\mathrm{Ei}\left(\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{2b^3dn^3}-\frac{(m+1)(dx)^{m+1}}{2b^2dn^2\,(a+b\log(cx^n))}-\frac{(dx)^{m+1}}{2bdn\,(a+b\log(cx^n))^2}$$

Antiderivative was successfully verified.

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

```
[Out] ((1 + m)^2*(d*x)^(1 + m)*ExpIntegralEi[((1 + m)*(a + b*Log[c*x^n]))/(b*n)])
/(2*b^3*d*E^((a*(1 + m))/(b*n))*n^3*(c*x^n)^((1 + m)/n)) - (d*x)^(1 + m)/(2
*b*d*n*(a + b*Log[c*x^n])^2) - ((1 + m)*(d*x)^(1 + m))/(2*b^2*d*n^2*(a + b*
Log[c*x^n]))
```

Rule 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{(dx)^m}{(a+b\log(cx^n))^3}\,dx = -\frac{(dx)^{1+m}}{2bdn\,(a+b\log(cx^n))^2} + \frac{(1+m)\int \frac{(dx)^m}{(a+b\log(cx^n))^2}\,dx}{2bn}$$
$$= -\frac{(dx)^{1+m}}{2bdn\,(a+b\log(cx^n))^2} - \frac{(1+m)(dx)^{1+m}}{2b^2dn^2\,(a+b\log(cx^n))} + \frac{(1+m)^2\int \frac{(dx)^m}{a+b\log(cx^n)}\,dx}{2b^2n^2}$$
$$= -\frac{(dx)^{1+m}}{2bdn\,(a+b\log(cx^n))^2} - \frac{(1+m)(dx)^{1+m}}{2b^2dn^2\,(a+b\log(cx^n))} + \frac{\left((1+m)^2(dx)^{1+m}\,(cx^n)^{-\cdots}\right.}{\cdots}$$
$$= \frac{e^{-\frac{a(1+m)}{bn}}(1+m)^2(dx)^{1+m}\,(cx^n)^{-\frac{1+m}{n}}\,\mathrm{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right)}{2b^3dn^3} - \frac{(dx)^{1+m}}{2bdn\,(a+b\log(cx^{\cdots}}$$

Mathematica [A]
time = 0.24, size = 113, normalized size = 0.80

$$\frac{(dx)^m\left(e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}(1+m)^2x^{-m}\mathrm{Ei}\left(\frac{(1+m)(a+b\log(cx^n))}{bn}\right) - \frac{bnx(a+am+bn+b(1+m)\log(cx^n))}{(a+b\log(cx^n))^2}\right)}{2b^3n^3}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^m*(((1 + m)^2*ExpIntegralEi[((1 + m)*(a + b*Log[c*x^n]))/(b*n)])/(E^
(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*x^m) - (b*n*x*(a + a*m +
b*n + b*(1 + m)*Log[c*x^n]))/(a + b*Log[c*x^n])^2))/(2*b^3*n^3)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(dx)^m}{(a+b\ln(c\,x^n))^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m/(a+b*ln(c*x^n))^3,x)
```

```
[Out] int((d*x)^m/(a+b*ln(c*x^n))^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [B] Leaf count of result is larger than twice the leaf count of optimal. 322 vs. $2(136) = 272$.
time = 0.37, size = 322, normalized size = 2.27

$$\frac{\left((b^2m^2 + 2\,b^2m + b^2)n^2\log\left(x\right)^2 + a^2m^2 + 2\,a^2m + (b^2m^2 + 2\,b^2m + b^2)\log\left(c\right)^2 + a^2 + 2\,(abm^2 + 2\,abm + ab)\log\left(c\right) + 2\,((b^2m^2 + 2\,b^2m + b^2)n\log\left(c\right) + (abm^2 + 2\,abm + ab)n)\log\left(x\right)\right)\mathrm{Ei}\left(\frac{(bm+b)n\log(x)+am+(bm+b)\log(c)+a}{bn}\right)e^{\left(\frac{bmn\log(d)-am-(bm+b)\log(c)-a}{bn}\right)} - ((b^2m + b^2)n^2x\log\left(x\right) + (b^2m + b^2)nx\log\left(c\right) + (b^2n^2 + (abm + ab)n)x)e^{(m\log(d)+m\log(x))}}{2\left(b^5n^5\log\left(x\right)^2 + b^5n^3\log\left(c\right)^2 + 2\,ab^4n^3\log\left(c\right) + a^2b^3n^3 + 2\,(b^5n^4\log\left(c\right) + ab^4n^4)\log\left(x\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(((b^2*m^2 + 2*b^2*m + b^2)*n^2*log(x)^2 + a^2*m^2 + 2*a^2*m + (b^2*m^2
 + 2*b^2*m + b^2)*log(c)^2 + a^2 + 2*(a*b*m^2 + 2*a*b*m + a*b)*log(c) + 2*(
(b^2*m^2 + 2*b^2*m + b^2)*n*log(c) + (a*b*m^2 + 2*a*b*m + a*b)*n)*log(x))*E
i(((b*m + b)*n*log(x) + a*m + (b*m + b)*log(c) + a)/(b*n))*e^((b*m*n*log(d)
 - a*m - (b*m + b)*log(c) - a)/(b*n)) - ((b^2*m + b^2)*n^2*x*log(x) + (b^2*
m + b^2)*n*x*log(c) + (b^2*n^2 + (a*b*m + a*b)*n)*x)*e^(m*log(d) + m*log(x)
))/(b^5*n^5*log(x)^2 + b^5*n^3*log(c)^2 + 2*a*b^4*n^3*log(c) + a^2*b^3*n^3
+ 2*(b^5*n^4*log(c) + a*b^4*n^4)*log(x))
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^m}{(a + b\log{(cx^n)})^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((d*x)**m/(a + b*log(c*x**n))**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x)^m/(b*log(c*x^n) + a)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d\,x)^m}{\left(a+b\,\ln\left(c\,x^n\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((d*x)^m/(a + b*log(c*x^n))^3, x)
```

3.156 $\int (dx)^{-1+n} \log^3(cx^n)\, dx$

Optimal. Leaf size=74

$$-\frac{6(dx)^n}{dn}+\frac{6(dx)^n\log(cx^n)}{dn}-\frac{3(dx)^n\log^2(cx^n)}{dn}+\frac{(dx)^n\log^3(cx^n)}{dn}$$

```
[Out] -6*(d*x)^n/d/n+6*(d*x)^n*ln(c*x^n)/d/n-3*(d*x)^n*ln(c*x^n)^2/d/n+(d*x)^n*ln
(c*x^n)^3/d/n
```

Rubi [A]
time = 0.04, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2342, 2341}

$$\frac{(dx)^n\log^3(cx^n)}{dn}-\frac{3(dx)^n\log^2(cx^n)}{dn}+\frac{6(dx)^n\log(cx^n)}{dn}-\frac{6(dx)^n}{dn}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(-1 + n)*Log[c*x^n]^3,x]
```

```
[Out] (-6*(d*x)^n)/(d*n) + (6*(d*x)^n*Log[c*x^n])/(d*n) - (3*(d*x)^n*Log[c*x^n]^2
)/(d*n) + ((d*x)^n*Log[c*x^n]^3)/(d*n)
```

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int (dx)^{-1+n}\log^3(cx^n)\,dx &= \frac{(dx)^n\log^3(cx^n)}{dn}-3\int (dx)^{-1+n}\log^2(cx^n)\,dx\\ &= -\frac{3(dx)^n\log^2(cx^n)}{dn}+\frac{(dx)^n\log^3(cx^n)}{dn}+6\int (dx)^{-1+n}\log(cx^n)\,dx\\ &= -\frac{6(dx)^n}{dn}+\frac{6(dx)^n\log(cx^n)}{dn}-\frac{3(dx)^n\log^2(cx^n)}{dn}+\frac{(dx)^n\log^3(cx^n)}{dn}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 40, normalized size = 0.54

$$\frac{(dx)^n\left(-6+6\log\left(cx^n\right)-3\log^2\left(cx^n\right)+\log^3\left(cx^n\right)\right)}{dn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(-1 + n)*Log[c*x^n]^3,x]
```

```
[Out] ((d*x)^n*(-6 + 6*Log[c*x^n] - 3*Log[c*x^n]^2 + Log[c*x^n]^3))/(d*n)
```

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.12, size = 2008, normalized size = 27.14

method	result	size
risch	Expression too large to display	2008

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(-1+n)*ln(c*x^n)^3,x,method=_RETURNVERBOSE)
```

```
[Out] 1/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+
I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^
3))*ln(x^n)^3+3/2*(-I*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*csgn(I*c*x^n)^3+2*ln
(c)-2)/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*
d*x)+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*
d*x)^3))*ln(x^n)^2+3/4*(-Pi^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+2*P
i^2*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-Pi^2*csgn(I*c)^2*csgn(I*c*x^n)^
4+2*Pi^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)^4+2*Pi^2*csgn(I*c)*csgn(I*c*x^n)^5-Pi^2*csgn(I*x^n)^2*csgn
(I*c*x^n)^4+2*Pi^2*csgn(I*x^n)*csgn(I*c*x^n)^5-Pi^2*csgn(I*c*x^n)^6+4*I*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*
Pi*ln(c)*csgn(I*c*x^n)^3-4*I*Pi*csgn(I*c)*csgn(I*c*x^n)^2+4*ln(c)^2+4*I*Pi*
csgn(I*c*x^n)^3-4*I*Pi*ln(c)*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*ln(
c)*csgn(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*csgn(I*c)*csgn(I*c*x^n)^2-8*ln(
c)+8)/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d
*x)+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d
*x)^3))*ln(x^n)+1/8*(-48+48*ln(c)-24*I*Pi*ln(c)*csgn(I*x^n)*csgn(I*c*x^n)^2
+12*I*Pi*ln(c)^2*csgn(I*x^n)*csgn(I*c*x^n)^2-3*I*Pi^3*csgn(I*c)^3*csgn(I*x^
n)^2*csgn(I*c*x^n)^4+24*I*Pi*ln(c)*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-12*I
*Pi*ln(c)^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)-24*I*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)-24*I*Pi*ln(c)*csgn(I*c)*csgn(I*c*x^n)^2-12*Pi^2*csgn(I*c)^
2*csgn(I*x^n)*csgn(I*c*x^n)^3-12*Pi^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)
^3+24*Pi^2*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)^4+6*Pi^2*csgn(I*c)^2*csgn(I*
x^n)^2*csgn(I*c*x^n)^2-24*ln(c)^2+3*I*Pi^3*csgn(I*c)^3*csgn(I*x^n)*csgn(I*c
```

```
*x^n)^5+8*ln(c)^3+12*I*Pi*ln(c)^2*csgn(I*c)*csgn(I*c*x^n)^2+3*I*Pi^3*csgn(I
*c)^2*csgn(I*c*x^n)^7-3*I*Pi^3*csgn(I*c)*csgn(I*c*x^n)^8-3*I*Pi^3*csgn(I*x^
n)*csgn(I*c*x^n)^8-12*I*Pi*ln(c)^2*csgn(I*c*x^n)^3+24*I*Pi*csgn(I*c)*csgn(I
*c*x^n)^2+24*I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2+24*I*Pi*ln(c)*csgn(I*c*x^n)^3
-I*Pi^3*csgn(I*c)^3*csgn(I*c*x^n)^6-24*Pi^2*ln(c)*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4+I*Pi^3*csgn(I*c)^3*csgn(I*x^n)^3*csgn(I*c*x^n)^3-6*Pi^2*ln(c)*
csgn(I*c)^2*csgn(I*c*x^n)^4+12*Pi^2*ln(c)*csgn(I*c)*csgn(I*c*x^n)^5-6*Pi^2*
ln(c)*csgn(I*x^n)^2*csgn(I*c*x^n)^4+12*Pi^2*ln(c)*csgn(I*x^n)*csgn(I*c*x^n)
^5+3*I*Pi^3*csgn(I*x^n)^2*csgn(I*c*x^n)^7-I*Pi^3*csgn(I*x^n)^3*csgn(I*c*x^n
)^6-6*Pi^2*ln(c)*csgn(I*c*x^n)^6-24*I*Pi*csgn(I*c*x^n)^3+I*Pi^3*csgn(I*c*x^
n)^9+6*Pi^2*csgn(I*c*x^n)^6-12*Pi^2*csgn(I*c)*csgn(I*c*x^n)^5+6*Pi^2*csgn(I
*x^n)^2*csgn(I*c*x^n)^4-12*Pi^2*csgn(I*x^n)*csgn(I*c*x^n)^5+6*Pi^2*csgn(I*c
)^2*csgn(I*c*x^n)^4-3*I*Pi^3*csgn(I*c)^2*csgn(I*x^n)^3*csgn(I*c*x^n)^4+9*I*
Pi^3*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^5+9*I*Pi^3*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)^7-6*Pi^2*ln(c)*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+1
2*Pi^2*ln(c)*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3+12*Pi^2*ln(c)*csgn(I*c
)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-9*I*Pi^3*csgn(I*c)^2*csgn(I*x^n)*csgn(I*c*x
^n)^6+3*I*Pi^3*csgn(I*c)*csgn(I*x^n)^3*csgn(I*c*x^n)^5-9*I*Pi^3*csgn(I*c)*c
sgn(I*x^n)^2*csgn(I*c*x^n)^6)/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn
(I*d)*csgn(I*x)*csgn(I*d*x)+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csg
n(I*d*x)^2-I*Pi*csgn(I*d*x)^3))
```

Maxima [A]
time = 0.27, size = 75, normalized size = 1.01

$$-\frac{3\,d^{n-1}x^n\log\left(cx^n\right)^2}{n}+\frac{(dx)^n\log\left(cx^n\right)^3}{dn}+\frac{6\left(\frac{d^nx^n\log(cx^n)}{n}-\frac{d^nx^n}{n}\right)}{d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n)^3,x, algorithm="maxima")
```

```
[Out] -3*d^(n - 1)*x^n*log(c*x^n)^2/n + (d*x)^n*log(c*x^n)^3/(d*n) + 6*(d^n*x^n*l
og(c*x^n)/n - d^n*x^n/n)/d
```

Fricas [A]
time = 0.36, size = 73, normalized size = 0.99

$$\frac{\left(n^3\log\left(x\right)^3+\log\left(c\right)^3+3\left(n^2\log\left(c\right)-n^2\right)\log\left(x\right)^2-3\,\log\left(c\right)^2+3\left(n\log\left(c\right)^2-2\,n\log\left(c\right)+2\,n\right)\log\left(x\right)+6\,\log\left(c\right)-6\right)d^{n-1}x^n}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n)^3,x, algorithm="fricas")
```

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 128 vs. $2(61) = 122$.
time = 7.80, size = 128, normalized size = 1.73

$$\begin{cases} \tilde{\infty} x \log{(c)}^3 & \text{for}\ d = 0 \wedge n = 0 \\ 0^{n-1} \left(-6n^3x + 6n^2x\log{(cx^n)} - 3nx\log{(cx^n)}^2 + x\log{(cx^n)}^3\right) & \text{for}\ d = 0 \\ \frac{\log{(c)}^3 \log{(x)}}{d} & \text{for}\ n = 0 \\ \frac{(dx)^n \log{(cx^n)}^3}{dn} - \frac{3(dx)^n \log{(cx^n)}^2}{dn} + \frac{6(dx)^n \log{(cx^n)}}{dn} - \frac{6(dx)^n}{dn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(-1+n)*ln(c*x**n)**3,x)
```

```
[Out] Piecewise((zoo*x*log(c)**3, Eq(d, 0) & Eq(n, 0)), (0**(n - 1)*(-6*n**3*x +
6*n**2*x*log(c*x**n) - 3*n*x*log(c*x**n)**2 + x*log(c*x**n)**3), Eq(d, 0)),
 (log(c)**3*log(x)/d, Eq(n, 0)), ((d*x)**n*log(c*x**n)**3/(d*n) - 3*(d*x)**
n*log(c*x**n)**2/(d*n) + 6*(d*x)**n*log(c*x**n)/(d*n) - 6*(d*x)**n/(d*n), T
rue))
```

Giac [B] Leaf count of result is larger than twice the leaf count of optimal. 162 vs. $2(74) = 148$.
time = 3.45, size = 162, normalized size = 2.19

$$\frac{d^n n^2 x^n \log{(x)}^3}{d} + \frac{3\, d^n n x^n \log{(c)} \log{(x)}^2}{d} + \frac{3\, d^n x^n \log{(c)}^2 \log{(x)}}{d} - \frac{3\, d^n n x^n \log{(x)}^2}{d} + \frac{d^n x^n \log{(c)}^3}{dn} - \frac{6\, d^n x^n \log{(c)} \log{(x)}}{d} - \frac{3\, d^n x^n \log{(c)}^2}{dn} + \frac{6\, d^n x^n \log{(x)}}{d} + \frac{6\, d^n x^n \log{(c)}}{dn} - \frac{6\, d^n x^n}{dn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n)^3,x, algorithm="giac")
```

```
[Out] d^n*n^2*x^n*log(x)^3/d + 3*d^n*n*x^n*log(c)*log(x)^2/d + 3*d^n*x^n*log(c)^2
*log(x)/d - 3*d^n*n*x^n*log(x)^2/d + d^n*x^n*log(c)^3/(d*n) - 6*d^n*x^n*log
(c)*log(x)/d - 3*d^n*x^n*log(c)^2/(d*n) + 6*d^n*x^n*log(x)/d + 6*d^n*x^n*lo
g(c)/(d*n) - 6*d^n*x^n/(d*n)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \ln{(c\, x^n)}^3\, {(d\, x)}^{n-1}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x^n)^3*(d*x)^(n - 1),x)
```

```
[Out] int(log(c*x^n)^3*(d*x)^(n - 1), x)
```

3.157 $\int (dx)^{-1+n} \log^2(cx^n)\, dx$

Optimal. Leaf size=53

$$\frac{2(dx)^n}{dn} - \frac{2(dx)^n \log(cx^n)}{dn} + \frac{(dx)^n \log^2(cx^n)}{dn}$$

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

Rubi [A]
time = 0.02, antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2342, 2341}

$$\frac{(dx)^n \log^2(cx^n)}{dn} - \frac{2(dx)^n \log(cx^n)}{dn} + \frac{2(dx)^n}{dn}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(-1 + n)*Log[c*x^n]^2,x]
```

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

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rubi steps

$$\begin{aligned} \int (dx)^{-1+n} \log^2(cx^n)\, dx &= \frac{(dx)^n \log^2(cx^n)}{dn} - 2\int (dx)^{-1+n} \log(cx^n)\, dx \\ &= \frac{2(dx)^n}{dn} - \frac{2(dx)^n \log(cx^n)}{dn} + \frac{(dx)^n \log^2(cx^n)}{dn} \end{aligned}$$

Mathematica [A]
time = 0.01, size = 30, normalized size = 0.57

$$\frac{(dx)^n\left(2-2\log\left(cx^n\right)+\log^2\left(cx^n\right)\right)}{dn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(-1 + n)*Log[c*x^n]^2,x]
```

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

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.06, size = 750, normalized size = 14.15

method	result
risch	$\frac{x\,\mathrm{e}^{\frac{(-1+n)\left(2\ln(d)+2\ln(x)-i\pi\,\mathrm{csgn}(id)\mathrm{csgn}(ix)\mathrm{csgn}(idx)+i\pi\,\mathrm{csgn}(id)\mathrm{csgn}(idx)^2+i\pi\,\mathrm{csgn}(ix)\mathrm{csgn}(idx)^2-i\pi\mathrm{csgn}(idx)^3\right)}{2}}\ln(x^n)^2}{n}+\frac{\left(-i\pi\,\mathrm{csgn}(\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(-1+n)*ln(c*x^n)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+
I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^
3))*ln(x^n)^2+(-I*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*csgn(I*c)*csg
n(I*c*x^n)^2+I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*csgn(I*c*x^n)^3+2*ln(c)-
2)/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)
+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)
^3))*ln(x^n)+1/4*(-Pi^2*csgn(I*c)^2*csgn(I*x^n)^2*csgn(I*c*x^n)^2+2*Pi^2*cs
gn(I*c)^2*csgn(I*x^n)*csgn(I*c*x^n)^3-Pi^2*csgn(I*c)^2*csgn(I*c*x^n)^4+2*Pi
^2*csgn(I*c)*csgn(I*x^n)^2*csgn(I*c*x^n)^3-4*Pi^2*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)^4+2*Pi^2*csgn(I*c)*csgn(I*c*x^n)^5-Pi^2*csgn(I*x^n)^2*csgn(I*c*x
^n)^4+2*Pi^2*csgn(I*x^n)*csgn(I*c*x^n)^5-Pi^2*csgn(I*c*x^n)^6+4*I*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)-4*I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-4*I*Pi*ln(
c)*csgn(I*c*x^n)^3-4*I*Pi*csgn(I*c)*csgn(I*c*x^n)^2+4*ln(c)^2+4*I*Pi*csgn(I
*c*x^n)^3-4*I*Pi*ln(c)*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+4*I*Pi*ln(c)*csg
n(I*x^n)*csgn(I*c*x^n)^2+4*I*Pi*ln(c)*csgn(I*c)*csgn(I*c*x^n)^2-8*ln(c)+8)/
n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+I*
Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^3)
)
```

Maxima [A]
time = 0.29, size = 53, normalized size = 1.00

$$-\frac{2\,d^{n-1}x^n\log\left(cx^n\right)}{n}+\frac{2\,d^{n-1}x^n}{n}+\frac{(dx)^n\log\left(cx^n\right)^2}{dn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [A]
time = 0.35, size = 42, normalized size = 0.79

$$\frac{\left(n^2 \log{(x)}^2 + \log{(c)}^2 + 2\,(n \log{(c)} - n) \log{(x)} - 2\,\log{(c)} + 2\right) d^{n-1} x^n}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n)^2,x, algorithm="fricas")
```

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(42) = 84$.
time = 3.39, size = 94, normalized size = 1.77

$$\begin{cases} \tilde{\infty} x \log{(c)}^2 & \text{for}\ d = 0 \wedge n = 0 \\ 0^{n-1} \cdot \left(2n^2 x - 2nx \log{(cx^n)} + x \log{(cx^n)}^2\right) & \text{for}\ d = 0 \\ \frac{\log{(c)}^2 \log{(x)}}{d} & \text{for}\ n = 0 \\ \frac{(dx)^n \log{(cx^n)}^2}{dn} - \frac{2(dx)^n \log{(cx^n)}}{dn} + \frac{2(dx)^n}{dn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(-1+n)*ln(c*x**n)**2,x)
```

```
[Out] Piecewise((zoo*x*log(c)**2, Eq(d, 0) & Eq(n, 0)), (0**(n - 1)*(2*n**2*x - 2
*n*x*log(c*x**n) + x*log(c*x**n)**2), Eq(d, 0)), (log(c)**2*log(x)/d, Eq(n,
 0)), ((d*x)**n*log(c*x**n)**2/(d*n) - 2*(d*x)**n*log(c*x**n)/(d*n) + 2*(d*
x)**n/(d*n), True))
```

Giac [A]
time = 6.76, size = 91, normalized size = 1.72

$$\frac{d^n n x^n \log{(x)}^2}{d} + \frac{2\,d^n x^n \log{(c)} \log{(x)}}{d} + \frac{d^n x^n \log{(c)}^2}{dn} - \frac{2\,d^n x^n \log{(x)}}{d} - \frac{2\,d^n x^n \log{(c)}}{dn} + \frac{2\,d^n x^n}{dn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n)^2,x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \ln (c\,x^n)^2\,(d\,x)^{n-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x^n)^2*(d*x)^(n - 1),x)
```

```
[Out] int(log(c*x^n)^2*(d*x)^(n - 1), x)
```

3.158 $\int (dx)^{-1+n} \log (cx^n) \, dx$

Optimal. Leaf size=32

$$-\frac{(dx)^n}{dn} + \frac{(dx)^n \log (cx^n)}{dn}$$

[Out] -(d*x)^n/d/n+(d*x)^n*ln(c*x^n)/d/n

Rubi [A]
time = 0.01, antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.071$, Rules used = {2341}

$$\frac{(dx)^n \log (cx^n)}{dn} - \frac{(dx)^n}{dn}$$

Antiderivative was successfully verified.

[In] Int[(d*x)^(-1 + n)*Log[c*x^n],x]

[Out] -((d*x)^n/(d*n)) + ((d*x)^n*Log[c*x^n])/(d*n)

Rule 2341

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

Rubi steps

$$\int (dx)^{-1+n} \log (cx^n) \, dx = -\frac{(dx)^n}{dn} + \frac{(dx)^n \log (cx^n)}{dn}$$

Mathematica [A]
time = 0.00, size = 20, normalized size = 0.62

$$\frac{(dx)^n (-1 + \log (cx^n))}{dn}$$

Antiderivative was successfully verified.

[In] Integrate[(d*x)^(-1 + n)*Log[c*x^n],x]

[Out] ((d*x)^n*(-1 + Log[c*x^n]))/(d*n)

Maple [C] Result contains higher order function than in optimal. Order 9 vs. order 3.
time = 0.04, size = 263, normalized size = 8.22

method	result
risch	$\frac{x\,\mathrm{e}^{\frac{(-1+n)\left(2\ln(d)+2\ln(x)-i\pi\,\mathrm{csgn}(id)\mathrm{csgn}(ix)\mathrm{csgn}(idx)+i\pi\,\mathrm{csgn}(id)\mathrm{csgn}(idx)^2+i\pi\,\mathrm{csgn}(ix)\mathrm{csgn}(idx)^2-i\pi\mathrm{csgn}(idx)^3\right)}{2}}}{n}\ln(x^n)+\frac{\left(-i\pi\,\mathrm{csgn}(i\right.}{}$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(-1+n)*ln(c*x^n),x,method=_RETURNVERBOSE)
```

```
[Out] 1/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*x)+
I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*x)^
3))*ln(x^n)+1/2*(-I*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*Pi*csgn(I*c)*c
sgn(I*c*x^n)^2+I*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*Pi*csgn(I*c*x^n)^3+2*ln(c
)-2)/n*x*exp(1/2*(-1+n)*(2*ln(d)+2*ln(x)-I*Pi*csgn(I*d)*csgn(I*x)*csgn(I*d*
x)+I*Pi*csgn(I*d)*csgn(I*d*x)^2+I*Pi*csgn(I*x)*csgn(I*d*x)^2-I*Pi*csgn(I*d*
x)^3))
```

Maxima [A]
time = 0.27, size = 32, normalized size = 1.00

$$-\frac{d^{n-1}x^n}{n}+\frac{(dx)^n\log(cx^n)}{dn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n),x, algorithm="maxima")
```

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

Fricas [A]
time = 0.38, size = 20, normalized size = 0.62

$$\frac{(n\log(x)+\log(c)-1)d^{n-1}x^n}{n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n),x, algorithm="fricas")
```

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

Sympy [B] Leaf count of result is larger than twice the leaf count of optimal. 53 vs. 2(22) = 44.
time = 1.44, size = 53, normalized size = 1.66

$$\begin{cases} \tilde{\infty}x\log(c) & \text{for } d=0\wedge n=0 \\ 0^{n-1}(-nx+x\log(cx^n)) & \text{for } d=0 \\ \frac{\log(c)\log(x)}{d} & \text{for } n=0 \\ \frac{(dx)^n\log(cx^n)}{dn}-\frac{(dx)^n}{dn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(-1+n)*ln(c*x**n),x)
```

```
[Out] Piecewise((zoo*x*log(c), Eq(d, 0) & Eq(n, 0)), (0**(n - 1)*(-n*x + x*log(c*
x**n)), Eq(d, 0)), (log(c)*log(x)/d, Eq(n, 0)), ((d*x)**n*log(c*x**n)/(d*n)
 - (d*x)**n/(d*n), True))
```

Giac [A]
time = 6.86, size = 42, normalized size = 1.31

$$\frac{d^n x^n \log(x)}{d} + \frac{d^n x^n \log(c)}{dn} - \frac{d^n x^n}{dn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)*log(c*x^n),x, algorithm="giac")
```

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.03

$$\int \ln(c\,x^n)\,(d\,x)^{n-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(log(c*x^n)*(d*x)^(n - 1),x)
```

```
[Out] int(log(c*x^n)*(d*x)^(n - 1), x)
```

3.159 $\int \frac{(dx)^{-1+n}}{\log(cx^n)}\,dx$

Optimal. Leaf size=27

$$\frac{x^{1-n}(dx)^{-1+n}\text{li}(cx^n)}{cn}$$

```
[Out] x^(1-n)*(d*x)^(-1+n)*Li(c*x^n)/c/n
```

Rubi [A]
time = 0.03, antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$, Rules used = {2345, 2344, 2335}

$$\frac{x^{1-n}(dx)^{n-1}\text{li}(cx^n)}{cn}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(-1 + n)/Log[c*x^n],x]
```

```
[Out] (x^(1 - n)*(d*x)^(-1 + n)*LogIntegral[c*x^n])/(c*n)
```

Rule 2335

```
Int[Log[(c_.)*(x_)]^(-1), x_Symbol] :> Simp[LogIntegral[c*x]/c, x] /; FreeQ
[c, x]
```

Rule 2344

```
Int[(x_)^(m_.)/Log[(c_.)*(x_)^(n_)], x_Symbol] :> Dist[1/n, Subst[Int[1/Log
[c*x], x], x, x^n], x] /; FreeQ[{c, m, n}, x] && EqQ[m, n - 1]
```

Rule 2345

```
Int[((d_)*(x_))^(m_.)/Log[(c_.)*(x_)^(n_)], x_Symbol] :> Dist[(d*x)^m/x^m,
Int[x^m/Log[c*x^n], x], x] /; FreeQ[{c, d, m, n}, x] && EqQ[m, n - 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{(dx)^{-1+n}}{\log(cx^n)}\,dx &= \left(x^{1-n}(dx)^{-1+n}\right)\int \frac{x^{-1+n}}{\log(cx^n)}\,dx\\
&= \frac{\left(x^{1-n}(dx)^{-1+n}\right)\text{Subst}\left(\int \frac{1}{\log(cx)}\,dx, x, x^n\right)}{n}\\
&= \frac{x^{1-n}(dx)^{-1+n}\text{li}(cx^n)}{cn}
\end{aligned}$$

Mathematica [A]
time = 0.01, size = 27, normalized size = 1.00

$$\frac{x^{1-n}(dx)^{-1+n}\mathrm{li}(cx^n)}{cn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(-1 + n)/Log[c*x^n],x]
[Out] (x^(1 - n)*(d*x)^(-1 + n)*LogIntegral[c*x^n])/(c*n)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{-1+n}}{\ln(c\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(-1+n)/ln(c*x^n),x)
[Out] int((d*x)^(-1+n)/ln(c*x^n),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.35, size = 20, normalized size = 0.74

$$\frac{d^{n-1}\mathrm{Ei}(n\log(x)+\log(c))}{cn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n),x, algorithm="fricas")
[Out] d^(n - 1)*Ei(n*log(x) + log(c))/(c*n)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{n-1}}{\log(cx^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(-1+n)/ln(c*x**n),x)
```

```
[Out] Integral((d*x)**(n - 1)/log(c*x**n), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n),x, algorithm="giac")
```

```
[Out] integrate((d*x)^(n - 1)/log(c*x^n), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.04

$$\int \frac{(d\,x)^{n-1}}{\ln\left(c\,x^n\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(n - 1)/log(c*x^n),x)
```

```
[Out] int((d*x)^(n - 1)/log(c*x^n), x)
```

3.160 $\int \frac{(dx)^{-1+n}}{\log^2(cx^n)}\,dx$

Optimal. Leaf size=49

$$-\frac{(dx)^n}{dn\log(cx^n)}+\frac{x^{1-n}(dx)^{-1+n}\text{li}(cx^n)}{cn}$$

```
[Out] x^(1-n)*(d*x)^(-1+n)*Li(c*x^n)/c/n-(d*x)^n/d/n/ln(c*x^n)
```

Rubi [A]
time = 0.04, antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2343, 2345, 2344, 2335}

$$\frac{x^{1-n}(dx)^{n-1}\text{li}(cx^n)}{cn}-\frac{(dx)^n}{dn\log(cx^n)}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(-1 + n)/Log[c*x^n]^2,x]
```

```
[Out] -((d*x)^n/(d*n*Log[c*x^n])) + (x^(1 - n)*(d*x)^(-1 + n)*LogIntegral[c*x^n])
/(c*n)
```

Rule 2335

```
Int[Log[(c_.)*(x_)]^(-1), x_Symbol] :> Simp[LogIntegral[c*x]/c, x] /; FreeQ
[c, x]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2344

```
Int[(x_)^(m_.)/Log[(c_.)*(x_)^(n_)], x_Symbol] :> Dist[1/n, Subst[Int[1/Log
[c*x], x], x, x^n], x] /; FreeQ[{c, m, n}, x] && EqQ[m, n - 1]
```

Rule 2345

```
Int[((d_)*(x_))^(m_.)/Log[(c_.)*(x_)^(n_)], x_Symbol] :> Dist[(d*x)^m/x^m,
Int[x^m/Log[c*x^n], x], x] /; FreeQ[{c, d, m, n}, x] && EqQ[m, n - 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(dx)^{-1+n}}{\log^2(cx^n)}\,dx &= -\frac{(dx)^n}{dn\log(cx^n)} + \int \frac{(dx)^{-1+n}}{\log(cx^n)}\,dx \\
&= -\frac{(dx)^n}{dn\log(cx^n)} + \left(x^{1-n}(dx)^{-1+n}\right)\int \frac{x^{-1+n}}{\log(cx^n)}\,dx \\
&= -\frac{(dx)^n}{dn\log(cx^n)} + \frac{\left(x^{1-n}(dx)^{-1+n}\right)\mathrm{Subst}\left(\int \frac{1}{\log(cx)}\,dx, x, x^n\right)}{n} \\
&= -\frac{(dx)^n}{dn\log(cx^n)} + \frac{x^{1-n}(dx)^{-1+n}\mathrm{li}(cx^n)}{cn}
\end{aligned}
$$

Mathematica [A]
time = 0.01, size = 49, normalized size = 1.00

$$
-\frac{x(dx)^{-1+n}}{n\log(cx^n)} + \frac{x^{1-n}(dx)^{-1+n}\mathrm{li}(cx^n)}{cn}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(-1 + n)/Log[c*x^n]^2,x]
[Out] -((x*(d*x)^(-1 + n))/(n*Log[c*x^n])) + (x^(1 - n)*(d*x)^(-1 + n)*LogIntegra
l[c*x^n])/(c*n)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$
\int \frac{(dx)^{-1+n}}{\ln(c\,x^n)^2}\,dx
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(-1+n)/ln(c*x^n)^2,x)
[Out] int((d*x)^(-1+n)/ln(c*x^n)^2,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.40, size = 50, normalized size = 1.02

$$-\frac{d^{n-1}x^n - \frac{(n\log(x)+\log(c))d^{n-1}\text{Ei}(n\log(x)+\log(c))}{c}}{n^2\log(x) + n\log(c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n)^2,x, algorithm="fricas")
```

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

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{n-1}}{\log(cx^n)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(-1+n)/ln(c*x**n)**2,x)
```

```
[Out] Integral((d*x)**(n - 1)/log(c*x**n)**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n)^2,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(n - 1)/log(c*x^n)^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(d\,x)^{n-1}}{\ln(c\,x^n)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(n - 1)/log(c*x^n)^2,x)
```

```
[Out] int((d*x)^(n - 1)/log(c*x^n)^2, x)
```

3.161 $\int \frac{(dx)^{-1+n}}{\log^3(cx^n)}\,dx$

Optimal. Leaf size=77

$$-\frac{(dx)^n}{2dn\log^2\left(cx^n\right)}-\frac{(dx)^n}{2dn\log\left(cx^n\right)}+\frac{x^{1-n}(dx)^{-1+n}\text{li}(cx^n)}{2cn}$$

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

Rubi [A]

time = 0.05, antiderivative size = 77, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {2343, 2345, 2344, 2335}

$$\frac{x^{1-n}(dx)^{n-1}\text{li}(cx^n)}{2cn}-\frac{(dx)^n}{2dn\log^2\left(cx^n\right)}-\frac{(dx)^n}{2dn\log\left(cx^n\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(-1 + n)/Log[c*x^n]^3,x]
```

```
[Out] -1/2*(d*x)^n/(d*n*Log[c*x^n]^2) - (d*x)^n/(2*d*n*Log[c*x^n]) + (x^(1 - n)*(
d*x)^(-1 + n)*LogIntegral[c*x^n])/(2*c*n)
```

Rule 2335

```
Int[Log[(c_.)*(x_)]^(-1), x_Symbol] :> Simp[LogIntegral[c*x]/c, x] /; FreeQ
[c, x]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2344

```
Int[(x_)^(m_.)/Log[(c_.)*(x_)^(n_)], x_Symbol] :> Dist[1/n, Subst[Int[1/Log
[c*x], x], x, x^n], x] /; FreeQ[{c, m, n}, x] && EqQ[m, n - 1]
```

Rule 2345

```
Int[((d_)*(x_))^(m_.)/Log[(c_.)*(x_)^(n_)], x_Symbol] :> Dist[(d*x)^m/x^m,
Int[x^m/Log[c*x^n], x], x] /; FreeQ[{c, d, m, n}, x] && EqQ[m, n - 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(dx)^{-1+n}}{\log^3(cx^n)}\,dx &= -\frac{(dx)^n}{2dn\log^2(cx^n)} + \frac{1}{2}\int \frac{(dx)^{-1+n}}{\log^2(cx^n)}\,dx \\
&= -\frac{(dx)^n}{2dn\log^2(cx^n)} - \frac{(dx)^n}{2dn\log(cx^n)} + \frac{1}{2}\int \frac{(dx)^{-1+n}}{\log(cx^n)}\,dx \\
&= -\frac{(dx)^n}{2dn\log^2(cx^n)} - \frac{(dx)^n}{2dn\log(cx^n)} + \frac{1}{2}\left(x^{1-n}(dx)^{-1+n}\right)\int \frac{x^{-1+n}}{\log(cx^n)}\,dx \\
&= -\frac{(dx)^n}{2dn\log^2(cx^n)} - \frac{(dx)^n}{2dn\log(cx^n)} + \frac{\left(x^{1-n}(dx)^{-1+n}\right)\mathrm{Subst}\left(\int \frac{1}{\log(cx)}\,dx, x, x^n\right)}{2n} \\
&= -\frac{(dx)^n}{2dn\log^2(cx^n)} - \frac{(dx)^n}{2dn\log(cx^n)} + \frac{x^{1-n}(dx)^{-1+n}\mathrm{li}(cx^n)}{2cn}
\end{aligned}
$$

Mathematica [A]
time = 0.02, size = 61, normalized size = 0.79

$$
\frac{x^{-n}(dx)^n\left(-cx^n(1+\log(cx^n)) + \log^2(cx^n)\,\mathrm{li}(cx^n)\right)}{2cdn\log^2(cx^n)}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(-1 + n)/Log[c*x^n]^3,x]
```

```
[Out] ((d*x)^n*(-(c*x^n*(1 + Log[c*x^n])) + Log[c*x^n]^2*LogIntegral[c*x^n]))/(2*
c*d*n*x^n*Log[c*x^n]^2)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$
\int \frac{(dx)^{-1+n}}{\ln(c\,x^n)^3}\,dx
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(-1+n)/ln(c*x^n)^3,x)
```

```
[Out] int((d*x)^(-1+n)/ln(c*x^n)^3,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n)^3,x, algorithm="maxima")
```

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

Fricas [A]
time = 0.34, size = 84, normalized size = 1.09

$$-\frac{(n\log(x)+\log(c)+1)d^{n-1}x^n-\frac{\left(n^2\log(x)^2+2\,n\log(c)\log(x)+\log(c)^2\right)d^{n-1}\mathrm{Ei}(n\log(x)+\log(c))}{c}}{2\left(n^3\log(x)^2+2\,n^2\log(c)\log(x)+n\log(c)^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n)^3,x, algorithm="fricas")
```

```
[Out] -1/2*((n*log(x) + log(c) + 1)*d^(n - 1)*x^n - (n^2*log(x)^2 + 2*n*log(c)*lo
g(x) + log(c)^2)*d^(n - 1)*Ei(n*log(x) + log(c))/c)/(n^3*log(x)^2 + 2*n^2*l
og(c)*log(x) + n*log(c)^2)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(dx)^{n-1}}{\log(cx^n)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(-1+n)/ln(c*x**n)**3,x)
```

```
[Out] Integral((d*x)**(n - 1)/log(c*x**n)**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(-1+n)/log(c*x^n)^3,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(n - 1)/log(c*x^n)^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(d\,x)^{n-1}}{\ln\left(c\,x^n\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(n - 1)/log(c*x^n)^3,x)
```

```
[Out] int((d*x)^(n - 1)/log(c*x^n)^3, x)
```

3.162 $\int x^m \log^{\frac{3}{2}}(ax^n)\, dx$

Optimal. Leaf size=111

$$\frac{3n^{3/2}\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4(1+m)^{5/2}}-\frac{3nx^{1+m}\sqrt{\log(ax^n)}}{2(1+m)^2}+\frac{x^{1+m}\log^{\frac{3}{2}}(ax^n)}{1+m}$$

```
[Out] x^(1+m)*ln(a*x^n)^(3/2)/(1+m)+3/4*n^(3/2)*x^(1+m)*erfi((1+m)^(1/2)*ln(a*x^n
)^(1/2)/n^(1/2))*Pi^(1/2)/(1+m)^(5/2)/((a*x^n)^((1+m)/n))-3/2*n*x^(1+m)*ln(
a*x^n)^(1/2)/(1+m)^2
```

Rubi [A]
time = 0.09, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{3\sqrt{\pi}\,n^{3/2}x^{m+1}(ax^n)^{-\frac{m+1}{n}}\operatorname{Erfi}\left(\frac{\sqrt{m+1}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4(m+1)^{5/2}}+\frac{x^{m+1}\log^{\frac{3}{2}}(ax^n)}{m+1}-\frac{3nx^{m+1}\sqrt{\log(ax^n)}}{2(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Log[a*x^n]^(3/2),x]
```

```
[Out] (3*n^(3/2)*Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n]])
/(4*(1 + m)^(5/2)*(a*x^n)^((1 + m)/n)) - (3*n*x^(1 + m)*Sqrt[Log[a*x^n]])/(
2*(1 + m)^2) + (x^(1 + m)*Log[a*x^n]^(3/2))/(1 + m)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int x^m \log^{\frac{3}{2}}(ax^n)\, dx = \frac{x^{1+m}\log^{\frac{3}{2}}(ax^n)}{1+m} - \frac{(3n)\int x^m\sqrt{\log(ax^n)}\, dx}{2(1+m)}$$

$$= -\frac{3nx^{1+m}\sqrt{\log(ax^n)}}{2(1+m)^2} + \frac{x^{1+m}\log^{\frac{3}{2}}(ax^n)}{1+m} + \frac{(3n^2)\int \frac{x^m}{\sqrt{\log(ax^n)}}\, dx}{4(1+m)^2}$$

$$= -\frac{3nx^{1+m}\sqrt{\log(ax^n)}}{2(1+m)^2} + \frac{x^{1+m}\log^{\frac{3}{2}}(ax^n)}{1+m} + \frac{\left(3nx^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{\sqrt{x}}\, d\right.}{4(1+m)^2}$$

$$= -\frac{3nx^{1+m}\sqrt{\log(ax^n)}}{2(1+m)^2} + \frac{x^{1+m}\log^{\frac{3}{2}}(ax^n)}{1+m} + \frac{\left(3nx^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int e^{\frac{(1+m)x^2}{n}}\, d\right.}{2(1+m)^2}$$

$$= \frac{3n^{3/2}\sqrt{\pi}\, x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{4(1+m)^{5/2}} - \frac{3nx^{1+m}\sqrt{\log(ax^n)}}{2(1+m)^2} + \frac{x^{1-}}{}$$

Mathematica [A]
time = 0.13, size = 101, normalized size = 0.91

$$\frac{x^{1+m}\left(3n^{3/2}\sqrt{\pi}\,(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\sqrt{\log(ax^n)}}{\sqrt{n}}\right) + 2\sqrt{1+m}\sqrt{\log(ax^n)}\,(-3n+2(1+m)\log(ax^n))\right)}{4(1+m)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Log[a*x^n]^(3/2),x]
```

```
[Out] (x^(1 + m)*((3*n^(3/2)*Sqrt[Pi]*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n]
])/(a*x^n)^((1 + m)/n) + 2*Sqrt[1 + m]*Sqrt[Log[a*x^n]]*(-3*n + 2*(1 + m)*L
og[a*x^n])))/(4*(1 + m)^(5/2))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x^m \ln(a\, x^n)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*ln(a*x^n)^(3/2),x)
[Out] int(x^m*ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] integrate(x^m*log(a*x^n)^(3/2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] integral(x^m*log(a*x^n)^(3/2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \log{(ax^n)}^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*ln(a*x**n)**(3/2),x)
[Out] Integral(x**m*log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*log(a*x^n)^(3/2),x, algorithm="giac")
[Out] integrate(x^m*log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^m\,{\ln\left(a\,x^n\right)}^{3/2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*log(a*x^n)^(3/2),x)
[Out] int(x^m*log(a*x^n)^(3/2), x)
```

3.163 $\int x^m \sqrt{\log(ax^n)}\, dx$

Optimal. Leaf size=86

$$-\frac{\sqrt{n}\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2(1+m)^{3/2}}+\frac{x^{1+m}\sqrt{\log(ax^n)}}{1+m}$$

```
[Out] -1/2*x^(1+m)*erfi((1+m)^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*n^(1/2)*Pi^(1/2)/(1+
m)^(3/2)/((a*x^n)^((1+m)/n))+x^(1+m)*ln(a*x^n)^(1/2)/(1+m)
```

Rubi [A]
time = 0.05, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2342, 2347, 2211, 2235}

$$\frac{x^{m+1}\sqrt{\log(ax^n)}}{m+1}-\frac{\sqrt{\pi}\sqrt{n}\,x^{m+1}(ax^n)^{-\frac{m+1}{n}}\operatorname{Erfi}\left(\frac{\sqrt{m+1}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2(m+1)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sqrt[Log[a*x^n]],x]
```

```
[Out] -1/2*(Sqrt[n]*Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n
]])/((1 + m)^(3/2)*(a*x^n)^((1 + m)/n)) + (x^(1 + m)*Sqrt[Log[a*x^n]])/(1 +
 m)
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2342

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Dist[b*n*
(p/(m + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b,
 c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}
\int x^m \sqrt{\log(ax^n)}\,dx &= \frac{x^{1+m}\sqrt{\log(ax^n)}}{1+m} - \frac{n\int \frac{x^m}{\sqrt{\log(ax^n)}}\,dx}{2(1+m)} \\
&= \frac{x^{1+m}\sqrt{\log(ax^n)}}{1+m} - \frac{\left(x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{2(1+m)} \\
&= \frac{x^{1+m}\sqrt{\log(ax^n)}}{1+m} - \frac{\left(x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\operatorname{Subst}\left(\int e^{\frac{(1+m)x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{1+m} \\
&= -\frac{\sqrt{n}\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2(1+m)^{3/2}} + \frac{x^{1+m}\sqrt{\log(ax^n)}}{1+m}
\end{aligned}$$

Mathematica [A]
time = 0.04, size = 86, normalized size = 1.00

$$-\frac{\sqrt{n}\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{2(1+m)^{3/2}} + \frac{x^{1+m}\sqrt{\log(ax^n)}}{1+m}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Sqrt[Log[a*x^n]],x]
```

```
[Out] -1/2*(Sqrt[n]*Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n
]])/((1 + m)^(3/2)*(a*x^n)^((1 + m)/n)) + (x^(1 + m)*Sqrt[Log[a*x^n]])/(1 +
 m)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x^m \sqrt{\ln(a\,x^n)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*ln(a*x^n)^(1/2),x)
```

```
[Out] int(x^m*ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*log(a*x^n)^(1/2),x, algorithm="maxima")
[Out] integrate(x^m*sqrt(log(a*x^n)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*log(a*x^n)^(1/2),x, algorithm="fricas")
[Out] integral(x^m*sqrt(log(a*x^n)), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sqrt{\log (ax^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*ln(a*x**n)**(1/2),x)
[Out] Integral(x**m*sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*log(a*x^n)^(1/2),x, algorithm="giac")
[Out] integrate(x^m*sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^m \sqrt{\ln (a\, x^n)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*log(a*x^n)^(1/2),x)
[Out] int(x^m*log(a*x^n)^(1/2), x)
```

3.164 $\int \frac{x^m}{\sqrt{\log(ax^n)}}\,dx$

Optimal. Leaf size=61

$$\frac{\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\,\mathrm{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{1+m}\,\sqrt{n}}$$

```
[Out] x^(1+m)*erfi((1+m)^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/((a*x^n)^((1+m)/
n))/(1+m)^(1/2)/n^(1/2)
```

Rubi [A]
time = 0.03, antiderivative size = 61, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {2347, 2211, 2235}

$$\frac{\sqrt{\pi}\,x^{m+1}(ax^n)^{-\frac{m+1}{n}}\,\mathrm{Erfi}\left(\frac{\sqrt{m+1}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{m+1}\,\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Sqrt[Log[a*x^n]],x]
```

```
[Out] (Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[1 +
 m]*Sqrt[n]*(a*x^n)^((1 + m)/n))
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \frac{x^m}{\sqrt{\log(ax^n)}}\,dx = \frac{\left(x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n}$$
$$= \frac{\left(2x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int e^{\frac{(1+m)x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n}$$
$$= \frac{\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\,\text{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{1+m}\,\sqrt{n}}$$

Mathematica [A]
time = 0.01, size = 61, normalized size = 1.00

$$\frac{\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\,\text{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{\sqrt{1+m}\,\sqrt{n}}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m/Sqrt[Log[a*x^n]],x]
[Out] (Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(Sqrt[1 +
 m]*Sqrt[n]*(a*x^n)^((1 + m)/n))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\ln(a\,x^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/ln(a*x^n)^(1/2),x)
[Out] int(x^m/ln(a*x^n)^(1/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/sqrt(log(a*x^n)), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(1/2),x, algorithm="fricas")
[Out] integral(x^m/sqrt(log(a*x^n)), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\log(ax^n)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/ln(a*x**n)**(1/2),x)
[Out] Integral(x**m/sqrt(log(a*x**n)), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(1/2),x, algorithm="giac")
[Out] integrate(x^m/sqrt(log(a*x^n)), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{x^m}{\sqrt{\ln\left(a\,x^n\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/log(a*x^n)^(1/2),x)
[Out] int(x^m/log(a*x^n)^(1/2), x)
```

3.165 $\int \frac{x^m}{\log^{\frac{3}{2}}(ax^n)}\,dx$

Optimal. Leaf size=83

$$\frac{2\sqrt{1+m}\,\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}}-\frac{2x^{1+m}}{n\sqrt{\log(ax^n)}}$$

```
[Out] 2*x^(1+m)*erfi((1+m)^(1/2)*ln(a*x^n)^(1/2)/n^(1/2))*(1+m)^(1/2)*Pi^(1/2)/n^
(3/2)/((a*x^n)^((1+m)/n))-2*x^(1+m)/n/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.05, antiderivative size = 83, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{2\sqrt{\pi}\,\sqrt{m+1}\,x^{m+1}(ax^n)^{-\frac{m+1}{n}}\operatorname{Erfi}\left(\frac{\sqrt{m+1}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}}-\frac{2x^{m+1}}{n\sqrt{\log(ax^n)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Log[a*x^n]^(3/2),x]
```

```
[Out] (2*Sqrt[1 + m]*Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[
n]])/(n^(3/2)*(a*x^n)^((1 + m)/n)) - (2*x^(1 + m))/(n*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^m}{\log^{\frac{3}{2}}(ax^n)}\,dx &= -\frac{2x^{1+m}}{n\sqrt{\log(ax^n)}} + \frac{(2(1+m))\int \frac{x^m}{\sqrt{\log(ax^n)}}\,dx}{n} \\
&= -\frac{2x^{1+m}}{n\sqrt{\log(ax^n)}} + \frac{\left(2(1+m)x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{\sqrt{x}}\,dx, x, \log(ax^n)\right)}{n^2} \\
&= -\frac{2x^{1+m}}{n\sqrt{\log(ax^n)}} + \frac{\left(4(1+m)x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int e^{\frac{(1+m)x^2}{n}}\,dx, x, \sqrt{\log(ax^n)}\right)}{n^2} \\
&= \frac{2\sqrt{1+m}\,\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\,\text{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^{1+m}}{n\sqrt{\log(ax^n)}}
\end{aligned}
$$

Mathematica [A]
time = 1.30, size = 86, normalized size = 1.04

$$
\frac{2e^{-\frac{(1+m)(-n\log(x)+\log(ax^n))}{n}}\sqrt{1+m}\,\sqrt{\pi}\,\text{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{n^{3/2}} - \frac{2x^{1+m}}{n\sqrt{\log(ax^n)}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m/Log[a*x^n]^(3/2),x]
[Out] (2*Sqrt[1 + m]*Sqrt[Pi]*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n]])/(E^((
(1 + m)*(-(n*Log[x]) + Log[a*x^n]))/n)*n^(3/2)) - (2*x^(1 + m))/(n*Sqrt[Log
[a*x^n]])
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$
\int \frac{x^m}{\ln(a\,x^n)^{\frac{3}{2}}}\,dx
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/ln(a*x^n)^(3/2),x)
[Out] int(x^m/ln(a*x^n)^(3/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(3/2),x, algorithm="maxima")
[Out] integrate(x^m/log(a*x^n)^(3/2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(3/2),x, algorithm="fricas")
[Out] integral(x^m/log(a*x^n)^(3/2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\log{(ax^n)}^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/ln(a*x**n)**(3/2),x)
[Out] Integral(x**m/log(a*x**n)**(3/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(3/2),x, algorithm="giac")
[Out] integrate(x^m/log(a*x^n)^(3/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{{\ln\left(a\,x^n\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/log(a*x^n)^(3/2),x)
```

```
[Out] int(x^m/log(a*x^n)^(3/2), x)
```

3.166 $\int \frac{x^m}{\log^{\frac{5}{2}}(ax^n)}\,dx$

Optimal. Leaf size=112

$$\frac{4(1+m)^{3/2}\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x^{1+m}}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4(1+m)x^{1+m}}{3n^2\sqrt{\log(ax^n)}}$$

```
[Out] -2/3*x^(1+m)/n/ln(a*x^n)^(3/2)+4/3*(1+m)^(3/2)*x^(1+m)*erfi((1+m)^(1/2)*ln(
a*x^n)^(1/2)/n^(1/2))*Pi^(1/2)/n^(5/2)/((a*x^n)^((1+m)/n))-4/3*(1+m)*x^(1+m
)/n^2/ln(a*x^n)^(1/2)
```

Rubi [A]
time = 0.07, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {2343, 2347, 2211, 2235}

$$\frac{4\sqrt{\pi}\,(m+1)^{3/2}x^{m+1}(ax^n)^{-\frac{m+1}{n}}\operatorname{Erfi}\left(\frac{\sqrt{m+1}\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{4(m+1)x^{m+1}}{3n^2\sqrt{\log(ax^n)}}-\frac{2x^{m+1}}{3n\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Log[a*x^n]^(5/2),x]
```

```
[Out] (4*(1 + m)^(3/2)*Sqrt[Pi]*x^(1 + m)*Erfi[(Sqrt[1 + m]*Sqrt[Log[a*x^n]])/Sqr
t[n]])/(3*n^(5/2)*(a*x^n)^((1 + m)/n)) - (2*x^(1 + m))/(3*n*Log[a*x^n]^(3/2
)) - (4*(1 + m)*x^(1 + m))/(3*n^2*Sqrt[Log[a*x^n]])
```

Rule 2211

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :
> Dist[2/d, Subst[Int[F^(g*(e - c*(f/d)) + f*g*(x^2/d)), x], x, Sqrt[c + d*
x]], x] /; FreeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2235

```
Int[(F_)^((a_.) + (b_.)*((c_.) + (d_.)*(x_))^2), x_Symbol] :> Simp[F^a*Sqrt
[Pi]*(Erfi[(c + d*x)*Rt[b*Log[F], 2]]/(2*d*Rt[b*Log[F], 2])), x] /; FreeQ[{
F, a, b, c, d}, x] && PosQ[b]
```

Rule 2343

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^(p + 1)/(b*d*n*(p + 1))), x] -
Dist[(m + 1)/(b*n*(p + 1)), Int[(d*x)^m*(a + b*Log[c*x^n])^(p + 1), x], x]
```

```
/; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1] && LtQ[p, -1]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x^m}{\log^{\frac{5}{2}}(ax^n)}\,dx &= -\frac{2x^{1+m}}{3n\log^{\frac{3}{2}}(ax^n)}+\frac{(2(1+m))\int \frac{x^m}{\log^{\frac{3}{2}}(ax^n)}\,dx}{3n}\\ &= -\frac{2x^{1+m}}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4(1+m)x^{1+m}}{3n^2\sqrt{\log(ax^n)}}+\frac{(4(1+m)^2)\int \frac{x^m}{\sqrt{\log(ax^n)}}\,dx}{3n^2}\\ &= -\frac{2x^{1+m}}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4(1+m)x^{1+m}}{3n^2\sqrt{\log(ax^n)}}+\frac{\left(4(1+m)^2x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m)x}{n}}}{\sqrt{x}}\,dx,\right.}{3n^3}\\ &= -\frac{2x^{1+m}}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4(1+m)x^{1+m}}{3n^2\sqrt{\log(ax^n)}}+\frac{\left(8(1+m)^2x^{1+m}(ax^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int e^{\frac{(1+m)x^2}{n}}\,dx,\right.}{3n^3}\\ &= \frac{4(1+m)^{3/2}\sqrt{\pi}\,x^{1+m}(ax^n)^{-\frac{1+m}{n}}\operatorname{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)}{3n^{5/2}}-\frac{2x^{1+m}}{3n\log^{\frac{3}{2}}(ax^n)}-\frac{4(1+}{3n^2\sqrt{}}\end{aligned}$$

Mathematica [A]
time = 1.29, size = 123, normalized size = 1.10

$$\frac{e^{\frac{(1+m)(n\log(x)-\log(ax^n))}{n}}\left(4(1+m)^{3/2}\sqrt{\pi}\operatorname{erfi}\left(\frac{\sqrt{1+m}\,\sqrt{\log(ax^n)}}{\sqrt{n}}\right)\log^{\frac{3}{2}}(ax^n)-2\sqrt{n}\,(ax^n)^{\frac{1+m}{n}}(n+2(1+m)\log(ax^n))\right)}{3n^{5/2}\log^{\frac{3}{2}}(ax^n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m/Log[a*x^n]^(5/2),x]
[Out] (E^(((1 + m)*(n*Log[x] - Log[a*x^n]))/n)*(4*(1 + m)^(3/2)*Sqrt[Pi]*Erfi[(Sq
rt[1 + m]*Sqrt[Log[a*x^n]])/Sqrt[n]]*Log[a*x^n]^(3/2) - 2*Sqrt[n]*(a*x^n)^(
(1 + m)/n)*(n + 2*(1 + m)*Log[a*x^n])))/(3*n^(5/2)*Log[a*x^n]^(3/2))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\ln(a\,x^n)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/ln(a*x^n)^(5/2),x)
```

```
[Out] int(x^m/ln(a*x^n)^(5/2),x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/log(a*x^n)^(5/2), x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(5/2),x, algorithm="fricas")
```

```
[Out] integral(x^m/log(a*x^n)^(5/2), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\log{(ax^n)}^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/ln(a*x**n)**(5/2),x)
```

```
[Out] Integral(x**m/log(a*x**n)**(5/2), x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/log(a*x^n)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/log(a*x^n)^(5/2), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\ln\left(a\,x^n\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/log(a*x^n)^(5/2),x)
```

```
[Out] int(x^m/log(a*x^n)^(5/2), x)
```

3.167 $\int (dx)^m (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=106

$$\frac{e^{-\frac{a(1+m)}{bn}}(dx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{d(1+m)}$$

```
[Out] (d*x)^(1+m)*GAMMA(1+p,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/d/exp(a
*(1+m)/b/n)/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]

time = 0.05, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$\frac{(dx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{d(m+1)}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*L
og[c*x^n])^p)/(d*E^((a*(1 + m))/(b*n))*(1 + m)*(c*x^n)^((1 + m)/n)*(-(((1 +
 m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int (dx)^m (a+b\log(cx^n))^p\,dx = \frac{\left((dx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int e^{\frac{(1+m)x}{n}}(a+bx)^p\,dx, x, \log(cx^n)\right)}{dn}$$
$$= \frac{e^{-\frac{a(1+m)}{bn}}(dx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p}{d(1+m)}$$

Mathematica [A]
time = 0.13, size = 107, normalized size = 1.01

$$\frac{e^{-\frac{(1+m)(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-m}(dx)^m\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^m*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x
^n])^p)/(E^(((1 + m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*x^m
*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Maple [F]
time = 0.02, size = 0, normalized size = 0.00

$$\int (dx)^m (a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int((d*x)^m*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((d*x)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (dx)^m (a + b\log(cx^n))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((d*x)**m*(a + b*log(c*x**n))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x)^m*(b*log(c*x^n) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x)^m\,(a + b\,\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((d*x)^m*(a + b*log(c*x^n))^p, x)
```

3.168 $\int x^2(a+b\log(cx^n))^p\,dx$

Optimal. Leaf size=89

$$3^{-1-p}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\Gamma\left(1+p,-\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}$$

```
[Out] 3^(-1-p)*x^3*GAMMA(1+p,-3*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(3*a/b/
n)/((c*x^n)^(3/n))/(((-a-b*ln(c*x^n))/b/n)^p)
```

Rubi [A]
time = 0.05, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2347, 2212}

$$3^{-p-1}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{3(a+b\log(cx^n))}{bn}\right)$$

Antiderivative was successfully verified.

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

```
[Out] (3^(-1 - p)*x^3*Gamma[1 + p, (-3*(a + b*Log[c*x^n]))/(b*n)]*(a + b*Log[c*x^
n])^p)/(E^((3*a)/(b*n))*(c*x^n)^(3/n)*(-((a + b*Log[c*x^n])/(b*n)))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int x^2(a+b\log(cx^n))^p\,dx=\frac{\left(x^3(cx^n)^{-3/n}\right)\text{Subst}\left(\int e^{\frac{3x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{n}$$

$$=3^{-1-p}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\Gamma\left(1+p,-\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+}{}\right.$$

Mathematica [A]
time = 0.08, size = 89, normalized size = 1.00

$$3^{-1-p}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\Gamma\left(1+p,-\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}$$

Antiderivative was successfully verified.

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

```
[Out] (3^(-1 - p)*x^3*Gamma[1 + p, (-3*(a + b*Log[c*x^n]))/(b*n)]*(a + b*Log[c*x^
n])^p)/(E^((3*a)/(b*n))*(c*x^n)^(3/n)*(-((a + b*Log[c*x^n])/(b*n)))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x^2(a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int(x^2*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x^n) + a)^p*x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2(a+b\log(cx^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**n))**p,x)
[Out] Integral(x**2*(a + b*log(c*x**n))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

3.169 $\int x(a+b\log(cx^n))^p\,dx$

Optimal. Leaf size=89

$$2^{-1-p}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\Gamma\left(1+p,-\frac{2(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}$$

```
[Out] 2^(-1-p)*x^2*GAMMA(1+p,-2*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(2*a/b/
n)/((c*x^n)^(2/n))/(((-a-b*ln(c*x^n))/b/n)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2347, 2212}

$$2^{-p-1}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{2(a+b\log(cx^n))}{bn}\right)$$

Antiderivative was successfully verified.

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

```
[Out] (2^(-1 - p)*x^2*Gamma[1 + p, (-2*(a + b*Log[c*x^n]))/(b*n)]*(a + b*Log[c*x^
n])^p)/(E^((2*a)/(b*n))*(c*x^n)^(2/n)*(-((a + b*Log[c*x^n])/(b*n)))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int x(a+b\log(cx^n))^p\,dx = \frac{\left(x^2(cx^n)^{-2/n}\right)\text{Subst}\left(\int e^{\frac{2x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{n}$$

$$= 2^{-1-p}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\Gamma\left(1+p,-\frac{2(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\right.$$

Mathematica [A]
time = 0.07, size = 89, normalized size = 1.00

$$2^{-1-p}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\Gamma\left(1+p,-\frac{2(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}$$

Antiderivative was successfully verified.

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

```
[Out] (2^(-1 - p)*x^2*Gamma[1 + p, (-2*(a + b*Log[c*x^n]))/(b*n)]*(a + b*Log[c*x^
n])^p)/(E^((2*a)/(b*n))*(c*x^n)^(2/n)*(-((a + b*Log[c*x^n])/(b*n)))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x(a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int(x*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x^n) + a)^p*x, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x(a+b\log(cx^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x*(a + b*log(c*x**n))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x^n) + a)^p*x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\left(a+b\ln\left(c\,x^n\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x*(a + b*log(c*x^n))^p, x)
```

3.170 $\int (a+b\log(cx^n))^p\,dx$

Optimal. Leaf size=80

$$e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\Gamma\left(1+p,-\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}$$

```
[Out] x*GAMMA(1+p,(-a-b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a/b/n)/((c*x^n)^(1/
n))/(((-a-b*ln(c*x^n))/b/n)^p)
```

Rubi [A]

time = 0.03, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2337, 2212}

$$xe^{-\frac{a}{bn}}(cx^n)^{-1/n}(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{a+b\log(cx^n)}{bn}\right)$$

Antiderivative was successfully verified.

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

```
[Out] (x*Gamma[1 + p, -((a + b*Log[c*x^n])/(b*n))]*(a + b*Log[c*x^n])^p)/(E^(a/(b
*n))*(c*x^n)^n^(-1)*(-((a + b*Log[c*x^n])/(b*n)))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2337

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[x/(n*(c*x
^n)^(1/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[
{a, b, c, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int (a+b\log(cx^n))^p\,dx &= \frac{\left(x(cx^n)^{-1/n}\right)\text{Subst}\left(\int e^{\frac{x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{n}\\ &= e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\Gamma\left(1+p,-\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right.\end{aligned}$$

Mathematica [A]
time = 0.06, size = 80, normalized size = 1.00

$$e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\Gamma\left(1+p,-\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{bn}\right)^{-p}$$

Antiderivative was successfully verified.

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

```
[Out] (x*Gamma[1 + p, -((a + b*Log[c*x^n])/(b*n))]*(a + b*Log[c*x^n])^p)/(E^(a/(b
*n))*(c*x^n)^n^(-1)*(-((a + b*Log[c*x^n])/(b*n)))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int (a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^p,x)
```

```
[Out] int((a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [A]
time = 0.13, size = 52, normalized size = 0.65

$$e^{\left(-\frac{bnp\log\left(-\frac{1}{bn}\right)+b\log(c)+a}{bn}\right)}\Gamma\left(p+1,-\frac{bn\log(x)+b\log(c)+a}{bn}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] e^(-(b*n*p*log(-1/(b*n)) + b*log(c) + a)/(b*n))*gamma(p + 1, -(b*n*log(x) +
 b*log(c) + a)/(b*n))
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int (a + b\log (cx^n))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*log(c*x**n))**p, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x^n) + a)^p, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int (a + b\,\ln (c\,x^n))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((a + b*log(c*x^n))^p, x)
```

3.171 $\int \frac{(a+b\log(cx^n))^p}{x}\,dx$

Optimal. Leaf size=26

$$\frac{(a+b\log(cx^n))^{1+p}}{bn(1+p)}$$

```
[Out] (a+b*ln(c*x^n))^(1+p)/b/n/(1+p)
```

Rubi [A]
time = 0.02, antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2339, 30}

$$\frac{(a+b\log(cx^n))^{p+1}}{bn(p+1)}$$

Antiderivative was successfully verified.

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

```
[Out] (a + b*Log[c*x^n])^(1 + p)/(b*n*(1 + p))
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^p}{x}\,dx &= \frac{\text{Subst}\left(\int x^p\,dx, x, a+b\log(cx^n)\right)}{bn}\\ &= \frac{(a+b\log(cx^n))^{1+p}}{bn(1+p)}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 26, normalized size = 1.00

$$\frac{(a+b\log(cx^n))^{1+p}}{bn(1+p)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^p/x,x]
[Out] (a + b*Log[c*x^n])^(1 + p)/(b*n*(1 + p))
```

Maple [A]
time = 0.29, size = 27, normalized size = 1.04

method	result	size
derivativedivides	$\frac{(a+b\ln(c\,x^{n}))^{1+p}}{bn(1+p)}$	27
default	$\frac{(a+b\ln(c\,x^{n}))^{1+p}}{bn(1+p)}$	27
risch	$\frac{\left(\ln(x^{n})b+a+b\left(\ln(c)-\frac{i\pi\,\mathrm{csgn}(ic\,x^{n})(-\mathrm{csgn}(ic\,x^{n})+\mathrm{csgn}(ic))(-\mathrm{csgn}(ic\,x^{n})+\mathrm{csgn}(ix^{n}))}{2}\right)\right)^{1+p}}{nb(1+p)}$	76

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^p/x,x,method=_RETURNVERBOSE)
[Out] (a+b*ln(c*x^n))^(1+p)/b/n/(1+p)
```

Maxima [A]
time = 0.29, size = 26, normalized size = 1.00

$$\frac{(b\log(cx^{n})+a)^{p+1}}{bn(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.35, size = 35, normalized size = 1.35

$$\frac{(bn\log(x)+b\log(c)+a)(bn\log(x)+b\log(c)+a)^{p}}{bnp+bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Sympy [A]
time = 0.86, size = 56, normalized size = 2.15

$$-\begin{cases} -a^{p}\log\left(x\right) & \text{for}\: b = 0 \\ -\left(a + b\log\left(c\right)\right)^{p}\log\left(x\right) & \text{for}\: n = 0 \\ -\frac{\begin{cases} \frac{\left(a + b\log\left(cx^{n}\right)\right)^{p+1}}{p+1} & \text{for}\: p \neq -1 \\ \log\left(a + b\log\left(cx^{n}\right)\right) & \text{otherwise} \end{cases}}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -Piecewise((-a**p*log(x), Eq(b, 0)), (-(a + b*log(c))**p*log(x), Eq(n, 0)),
 (-Piecewise(((a + b*log(c*x**n))**(p + 1)/(p + 1), Ne(p, -1)), (log(a + b*
log(c*x**n)), True))/(b*n), True))
```

Giac [A]
time = 2.50, size = 27, normalized size = 1.04

$$\frac{\left(bn\log\left(x\right) + b\log\left(c\right) + a\right)^{p+1}}{bn(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b*n*log(x) + b*log(c) + a)^(p + 1)/(b*n*(p + 1))
```

Mupad [B]
time = 3.67, size = 26, normalized size = 1.00

$$\frac{{\left(a+b\,\ln\left(c\,x^n\right)\right)}^{p+1}}{b\,n\,\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (a + b*log(c*x^n))^(p + 1)/(b*n*(p + 1))
```

3.172 $\int \frac{(a+b\log(cx^n))^p}{x^2}\,dx$

Optimal. Leaf size=78

$$-\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\Gamma\left(1+p,\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x}$$

```
[Out] -exp(a/b/n)*(c*x^n)^(1/n)*GAMMA(1+p,(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/
x/(((a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 78, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2212}

$$-\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}\text{Gamma}\left(p+1,\frac{a+b\log(cx^n)}{bn}\right)}{x}$$

Antiderivative was successfully verified.

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

```
[Out] -((E^(a/(b*n))*(c*x^n)^n^(-1)*Gamma[1 + p, (a + b*Log[c*x^n])/(b*n)]*(a + b
*Log[c*x^n])^p)/(x*((a + b*Log[c*x^n])/(b*n))^p))
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^p}{x^2}\,dx &= \frac{(cx^n)^{\frac{1}{n}}\,\text{Subst}\left(\int e^{-\frac{x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{nx}\\ &= -\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\Gamma\left(1+p,\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 78, normalized size = 1.00

$$-\frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\Gamma\left(1+p,\frac{a+b\log(cx^n)}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x}$$

Antiderivative was successfully verified.

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

```
[Out] -((E^(a/(b*n))*(c*x^n)^n^(-1)*Gamma[1 + p, (a + b*Log[c*x^n])/(b*n)]*(a + b
*Log[c*x^n])^p)/(x*((a + b*Log[c*x^n])/(b*n))^p))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(cx^n))^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^p/x^2,x)
```

```
[Out] int((a+b*ln(c*x^n))^p/x^2,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x^n) + a)^p/x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*log(c*x**n))**p/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x^n) + a)^p/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(a+b\,\ln\left(c\,x^n\right))^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((a + b*log(c*x^n))^p/x^2, x)
```

3.173 $\int \frac{(a+b\log(cx^n))^p}{x^3} \, dx$

Optimal. Leaf size=89

$$-\frac{2^{-1-p}e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\Gamma\left(1+p,\frac{2(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x^2}$$

```
[Out] -2^(-1-p)*exp(2*a/b/n)*(c*x^n)^(2/n)*GAMMA(1+p,2*(a+b*ln(c*x^n))/b/n)*(a+b*
ln(c*x^n))^p/x^2/(((a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2212}

$$-\frac{2^{-p-1}e^{\frac{2a}{bn}}(cx^n)^{2/n}(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}\text{Gamma}\left(p+1,\frac{2(a+b\log(cx^n))}{bn}\right)}{x^2}$$

Antiderivative was successfully verified.

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

```
[Out] -((2^(-1 - p)*E^((2*a)/(b*n))*(c*x^n)^(2/n)*Gamma[1 + p, (2*(a + b*Log[c*x^
n]))/(b*n)]*(a + b*Log[c*x^n])^p)/(x^2*((a + b*Log[c*x^n])/(b*n))^p))
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^p}{x^3}\,dx &= \frac{(cx^n)^{2/n}\,\text{Subst}\left(\int e^{-\frac{2x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{nx^2}\\ &= -\frac{2^{-1-p}e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\Gamma\left(1+p,\frac{2(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x^2}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 89, normalized size = 1.00

$$-\frac{2^{-1-p}e^{\frac{2a}{bn}}(cx^n)^{2/n}\Gamma\left(1+p,\frac{2(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^p/x^3,x]
[Out] -((2^(-1 - p)*E^((2*a)/(b*n))*(c*x^n)^(2/n)*Gamma[1 + p, (2*(a + b*Log[c*x^
n]))/(b*n)]*(a + b*Log[c*x^n])^p)/(x^2*((a + b*Log[c*x^n])/(b*n))^p))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^p/x^3,x)
[Out] int((a+b*ln(c*x^n))^p/x^3,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^p/x^3,x, algorithm="maxima")
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^p/x^3,x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)^p/x^3, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*log(c*x**n))**p/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x^n) + a)^p/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(a+b\,\ln\left(c\,x^n\right)\right)}^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((a + b*log(c*x^n))^p/x^3, x)
```

3.174 $\int \frac{(a+b\log(cx^n))^p}{x^4}\,dx$

Optimal. Leaf size=89

$$-\frac{3^{-1-p}e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\Gamma\left(1+p,\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x^3}$$

```
[Out] -3^(-1-p)*exp(3*a/b/n)*(c*x^n)^(3/n)*GAMMA(1+p,3*(a+b*ln(c*x^n))/b/n)*(a+b*
ln(c*x^n))^p/x^3/(((a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2212}

$$-\frac{3^{-p-1}e^{\frac{3a}{bn}}(cx^n)^{3/n}(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}\text{Gamma}\left(p+1,\frac{3(a+b\log(cx^n))}{bn}\right)}{x^3}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x^n])^p/x^4,x]
```

```
[Out] -((3^(-1 - p)*E^((3*a)/(b*n))*(c*x^n)^(3/n)*Gamma[1 + p, (3*(a + b*Log[c*x^
n]))/(b*n)]*(a + b*Log[c*x^n])^p)/(x^3*((a + b*Log[c*x^n])/(b*n))^p))
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^p}{x^4}\,dx &= \frac{(cx^n)^{3/n}\,\text{Subst}\left(\int e^{-\frac{3x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{nx^3}\\ &= -\frac{3^{-1-p}e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\Gamma\left(1+p,\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x^3}\end{aligned}$$

Mathematica [A]
time = 0.07, size = 89, normalized size = 1.00

$$-\frac{3^{-1-p}e^{\frac{3a}{bn}}(cx^n)^{3/n}\,\Gamma\left(1+p,\frac{3(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(\frac{a+b\log(cx^n)}{bn}\right)^{-p}}{x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x^n])^p/x^4,x]
[Out] -((3^(-1 - p)*E^((3*a)/(b*n))*(c*x^n)^(3/n)*Gamma[1 + p, (3*(a + b*Log[c*x^
n]))/(b*n)]*(a + b*Log[c*x^n])^p)/(x^3*((a + b*Log[c*x^n])/(b*n))^p))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(c\,x^n))^p}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^n))^p/x^4,x)
[Out] int((a+b*ln(c*x^n))^p/x^4,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^p/x^4,x, algorithm="maxima")
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^p/x^4,x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)^p/x^4, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\log(cx^n))^p}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**n))**p/x**4,x)
```

```
[Out] Integral((a + b*log(c*x**n))**p/x**4, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^n))^p/x^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^p/x^4, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^p}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^n))^p/x^4,x)
```

```
[Out] int((a + b*log(c*x^n))^p/x^4, x)
```

3.175 $\int (dx)^m(a+b\log(cx))^p\,dx$

Optimal. Leaf size=86

$$\frac{e^{-\frac{a(1+m)}{b}}(cx)^{-1-m}(dx)^{1+m}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{(1+m)(a+b\log(cx))}{b}\right)^{-p}}{d(1+m)}$$

```
[Out] (c*x)^(-1-m)*(d*x)^(1+m)*GAMMA(1+p,-(1+m)*(a+b*ln(c*x))/b)*(a+b*ln(c*x))^p/
d/exp(a*(1+m)/b)/(1+m)/((-(1+m)*(a+b*ln(c*x))/b)^p)
```

Rubi [A]

time = 0.05, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2212}

$$\frac{e^{-\frac{a(m+1)}{b}}(cx)^{-m-1}(dx)^{m+1}(a+b\log(cx))^p\left(-\frac{(m+1)(a+b\log(cx))}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(m+1)(a+b\log(cx))}{b}\right)}{d(m+1)}$$

Antiderivative was successfully verified.

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

```
[Out] ((c*x)^(-1 - m)*(d*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x]))/b)]
*(a + b*Log[c*x])^p)/(d*E^((a*(1 + m))/b)*(1 + m)*(-(((1 + m)*(a + b*Log[c*
x]))/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int (dx)^m(a+b\log(cx))^p\,dx &= \frac{\left((cx)^{-1-m}(dx)^{1+m}\right)\text{Subst}\left(\int e^{(1+m)x}(a+bx)^p\,dx,x,\log(cx)\right)}{d}\\ &= \frac{e^{-\frac{a(1+m)}{b}}(cx)^{-1-m}(dx)^{1+m}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{(1+m)}{}\right.}{d(1+m)}\end{aligned}$$

Mathematica [A]
time = 0.10, size = 82, normalized size = 0.95

$$\frac{e^{-\frac{a(1+m)}{b}}(cx)^{-m}(dx)^m\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{(1+m)(a+b\log(cx))}{b}\right)^{-p}}{c(1+m)}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x)^m*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x]))/b)]*(a + b*Log[c*x])^p)/
(c*E^((a*(1 + m))/b)*(1 + m)*(c*x)^m*(-(((1 + m)*(a + b*Log[c*x]))/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int (dx)^m (a+b\ln(cx))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a+b*ln(c*x))^p,x)
```

```
[Out] int((d*x)^m*(a+b*ln(c*x))^p,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x)^m*(b*log(c*x) + a)^p, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((d*x)^m*(b*log(c*x) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (dx)^m (a+b\log(cx))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((d*x)**m*(a + b*log(c*x))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x)^m*(b*log(c*x) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (a+b\,\ln(c\,x))^p\,(d\,x)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((a + b*log(c*x))^p*(d*x)^m, x)
```

3.176 $\int x^2(a+b\log(cx))^p\,dx$

Optimal. Leaf size=63

$$\frac{3^{-1-p}e^{-\frac{3a}{b}}\Gamma\left(1+p,-\frac{3(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c^3}$$

```
[Out] 3^(-1-p)*GAMMA(1+p,-3*(a+b*ln(c*x))/b)*(a+b*ln(c*x))^p/c^3/exp(3*a/b)/(((-a
-b*ln(c*x))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2346, 2212}

$$\frac{3^{-p-1}e^{-\frac{3a}{b}}(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{3(a+b\log(cx))}{b}\right)}{c^3}$$

Antiderivative was successfully verified.

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

```
[Out] (3^(-1 - p)*Gamma[1 + p, (-3*(a + b*Log[c*x]))/b]*(a + b*Log[c*x])^p)/(c^3*
E^((3*a)/b)*(-((a + b*Log[c*x])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int x^2(a+b\log(cx))^p\,dx &= \frac{\text{Subst}\left(\int e^{3x}(a+bx)^p\,dx,x,\log(cx)\right)}{c^3}\\ &= \frac{3^{-1-p}e^{-\frac{3a}{b}}\Gamma\left(1+p,-\frac{3(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c^3}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 63, normalized size = 1.00

$$\frac{3^{-1-p}e^{-\frac{3a}{b}}\Gamma\left(1+p,-\frac{3(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c^3}$$

Antiderivative was successfully verified.

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

```
[Out] (3^(-1 - p)*Gamma[1 + p, (-3*(a + b*Log[c*x]))/b]*(a + b*Log[c*x])^p)/(c^3*
E^((3*a)/b)*(-((a + b*Log[c*x])/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x^2(a+b\ln(cx))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x))^p,x)
```

```
[Out] int(x^2*(a+b*ln(c*x))^p,x)
```

Maxima [A]
time = 0.06, size = 44, normalized size = 0.70

$$-\frac{(b\log(cx)+a)^{p+1}e^{\left(-\frac{3a}{b}\right)}E_{-p}\left(-\frac{3(b\log(cx)+a)}{b}\right)}{bc^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(b*log(c*x) + a)^(p + 1)*e^(-3*a/b)*exp_integral_e(-p, -3*(b*log(c*x) + a)
/b)/(b*c^3)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x) + a)^p*x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2(a+b\log(cx))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2*(a + b*log(c*x))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x) + a)^p*x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^2\,{\left(a+b\,\ln\left(c\,x\right)\right)}^p \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x^2*(a + b*log(c*x))^p, x)
```

3.177 $\int x(a+b\log(cx))^p\,dx$

Optimal. Leaf size=63

$$\frac{2^{-1-p}e^{-\frac{2a}{b}}\Gamma\left(1+p,-\frac{2(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c^2}$$

```
[Out] 2^(-1-p)*GAMMA(1+p,-2*(a+b*ln(c*x))/b)*(a+b*ln(c*x))^p/c^2/exp(2*a/b)/(((-a
-b*ln(c*x))/b)^p)
```

Rubi [A]
time = 0.03, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2346, 2212}

$$\frac{2^{-p-1}e^{-\frac{2a}{b}}(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{2(a+b\log(cx))}{b}\right)}{c^2}$$

Antiderivative was successfully verified.

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

```
[Out] (2^(-1 - p)*Gamma[1 + p, (-2*(a + b*Log[c*x]))/b]*(a + b*Log[c*x])^p)/(c^2*
E^((2*a)/b)*(-((a + b*Log[c*x])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int x(a+b\log(cx))^p\,dx &= \frac{\text{Subst}\left(\int e^{2x}(a+bx)^p\,dx,x,\log(cx)\right)}{c^2}\\ &= \frac{2^{-1-p}e^{-\frac{2a}{b}}\Gamma\left(1+p,-\frac{2(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c^2}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 63, normalized size = 1.00

$$\frac{2^{-1-p}e^{-\frac{2a}{b}}\Gamma\left(1+p,-\frac{2(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c^2}$$

Antiderivative was successfully verified.

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

```
[Out] (2^(-1 - p)*Gamma[1 + p, (-2*(a + b*Log[c*x]))/b]*(a + b*Log[c*x])^p)/(c^2*
E^((2*a)/b)*(-((a + b*Log[c*x])/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x(a+b\ln(cx))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x))^p,x)
```

```
[Out] int(x*(a+b*ln(c*x))^p,x)
```

Maxima [A]
time = 0.05, size = 44, normalized size = 0.70

$$-\frac{(b\log(cx)+a)^{p+1}e^{\left(-\frac{2a}{b}\right)}E_{-p}\left(-\frac{2(b\log(cx)+a)}{b}\right)}{bc^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(b*log(c*x) + a)^(p + 1)*e^(-2*a/b)*exp_integral_e(-p, -2*(b*log(c*x) + a)
/b)/(b*c^2)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x) + a)^p*x, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x(a+b\log{(cx)})^p\ dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x))**p,x)
```

```
[Out] Integral(x*(a + b*log(c*x))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x) + a)^p*x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x\,{\left(a+b\,\ln\left(c\,x\right)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x*(a + b*log(c*x))^p, x)
```

3.178 $\int (a+b\log(cx))^p\,dx$

Optimal. Leaf size=56

$$\frac{e^{-\frac{a}{b}}\Gamma\left(1+p,-\frac{a+b\log(cx)}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c}$$

```
[Out] GAMMA(1+p,(-a-b*ln(c*x))/b)*(a+b*ln(c*x))^p/c/exp(a/b)/(((-a-b*ln(c*x))/b)^
p)
```

Rubi [A]
time = 0.02, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2336, 2212}

$$\frac{e^{-\frac{a}{b}}(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{a+b\log(cx)}{b}\right)}{c}$$

Antiderivative was successfully verified.

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

```
[Out] (Gamma[1 + p, -((a + b*Log[c*x])/b)]*(a + b*Log[c*x])^p)/(c*E^(a/b)*(-((a +
 b*Log[c*x])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2336

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[1/(n*c^(1
/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b,
 c, p}, x] && IntegerQ[1/n]
```

Rubi steps

$$\begin{aligned}\int (a+b\log(cx))^p\,dx &= \frac{\text{Subst}\left(\int e^x(a+bx)^p\,dx,x,\log(cx)\right)}{c}\\ &= \frac{e^{-\frac{a}{b}}\Gamma\left(1+p,-\frac{a+b\log(cx)}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 56, normalized size = 1.00

$$\frac{e^{-\frac{a}{b}}\Gamma\left(1+p,-\frac{a+b\log(cx)}{b}\right)(a+b\log(cx))^p\left(-\frac{a+b\log(cx)}{b}\right)^{-p}}{c}$$

Antiderivative was successfully verified.

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

```
[Out] (Gamma[1 + p, -((a + b*Log[c*x])/b)]*(a + b*Log[c*x])^p)/(c*E^(a/b)*(-((a +
 b*Log[c*x])/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int (a+b\ln(cx))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))^p,x)
```

```
[Out] int((a+b*ln(c*x))^p,x)
```

Maxima [A]
time = 0.05, size = 44, normalized size = 0.79

$$-\frac{(b\log(cx)+a)^{p+1}e^{\left(-\frac{a}{b}\right)}E_{-p}\left(-\frac{b\log(cx)+a}{b}\right)}{bc}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(b*log(c*x) + a)^(p + 1)*e^(-a/b)*exp_integral_e(-p, -(b*log(c*x) + a)/b)/
(b*c)
```

Fricas [A]
time = 0.18, size = 38, normalized size = 0.68

$$\frac{e^{\left(-\frac{bp\log\left(-\frac{1}{b}\right)+a}{b}\right)}\Gamma\left(p+1,-\frac{b\log(cx)+a}{b}\right)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] e^(-(b*p*log(-1/b) + a)/b)*gamma(p + 1, -(b*log(c*x) + a)/b)/c
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int (a + b \log (cx))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))**p,x)
[Out] Integral((a + b*log(c*x))**p, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int (a + b \ln (c\,x))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))^p,x)
[Out] int((a + b*log(c*x))^p, x)
```

3.179 $\int \frac{(a+b\log(cx))^p}{x}\,dx$

Optimal. Leaf size=21

$$\frac{(a+b\log(cx))^{1+p}}{b(1+p)}$$

```
[Out] (a+b*ln(c*x))^(1+p)/b/(1+p)
```

Rubi [A]
time = 0.03, antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2339, 30}

$$\frac{(a+b\log(cx))^{p+1}}{b(p+1)}$$

Antiderivative was successfully verified.

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

```
[Out] (a + b*Log[c*x])^(1 + p)/(b*(1 + p))
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx))^p}{x}\,dx &= \frac{\text{Subst}\left(\int x^p\,dx, x, a+b\log(cx)\right)}{b}\\ &= \frac{(a+b\log(cx))^{1+p}}{b(1+p)}\end{aligned}$$

Mathematica [A]
time = 0.01, size = 21, normalized size = 1.00

$$\frac{(a+b\log(cx))^{1+p}}{b(1+p)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])^p/x,x]
[Out] (a + b*Log[c*x])^(1 + p)/(b*(1 + p))
```

Maple [A]
time = 0.02, size = 22, normalized size = 1.05

method	result	size
derivativedivides	$\frac{(a+b\ln(cx))^{1+p}}{b(1+p)}$	22
default	$\frac{(a+b\ln(cx))^{1+p}}{b(1+p)}$	22
norman	$\frac{\ln(cx)\mathrm{e}^{p\ln(a+b\ln(cx))}}{1+p}+\frac{a\,\mathrm{e}^{p\ln(a+b\ln(cx))}}{b(1+p)}$	46

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))^p/x,x,method=_RETURNVERBOSE)
[Out] (a+b*ln(c*x))^(1+p)/b/(1+p)
```

Maxima [A]
time = 0.27, size = 21, normalized size = 1.00

$$\frac{(b\log(cx)+a)^{p+1}}{b(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))^p/x,x, algorithm="maxima")
[Out] (b*log(c*x) + a)^(p + 1)/(b*(p + 1))
```

Fricas [A]
time = 0.37, size = 26, normalized size = 1.24

$$\frac{(b\log(cx)+a)(b\log(cx)+a)^{p}}{bp+b}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Sympy [A]
time = 0.61, size = 39, normalized size = 1.86

$$-\begin{cases} -a^{p}\log(x) & \text{for}\ b=0 \\ -\frac{\begin{cases} \frac{(a+b\log(cx))^{p+1}}{p+1} & \text{for}\ p\neq-1 \\ \log(a+b\log(cx)) & \text{otherwise} \end{cases}}{b} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -Piecewise((-a**p*log(x), Eq(b, 0)), (-Piecewise(((a + b*log(c*x))**(p + 1)
/(p + 1), Ne(p, -1)), (log(a + b*log(c*x)), True))/b, True))
```

Giac [A]
time = 3.48, size = 21, normalized size = 1.00

$$\frac{(b\log(cx)+a)^{p+1}}{b(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b*log(c*x) + a)^(p + 1)/(b*(p + 1))
```

Mupad [B]
time = 3.70, size = 21, normalized size = 1.00

$$\frac{(a+b\,\ln(c\,x))^{p+1}}{b\,(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (a + b*log(c*x))^(p + 1)/(b*(p + 1))
```

3.180 $\int \frac{(a+b\log(cx))^p}{x^2}\,dx$

Optimal. Leaf size=52

$$-ce^{a/b}\Gamma\left(1+p,\frac{a+b\log(cx)}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}$$

```
[Out] -c*exp(a/b)*GAMMA(1+p,(a+b*ln(c*x))/b)*(a+b*ln(c*x))^p/(((a+b*ln(c*x))/b)^p
)
```

Rubi [A]
time = 0.03, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2346, 2212}

$$-ce^{a/b}(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}\text{Gamma}\left(p+1,\frac{a+b\log(cx)}{b}\right)$$

Antiderivative was successfully verified.

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

```
[Out] -((c*E^(a/b)*Gamma[1 + p, (a + b*Log[c*x])/b]*(a + b*Log[c*x])^p)/((a + b*L
og[c*x])/b)^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx))^p}{x^2}\,dx &= c\text{Subst}\left(\int e^{-x}(a+bx)^p\,dx,x,\log(cx)\right)\\ &= -ce^{a/b}\Gamma\left(1+p,\frac{a+b\log(cx)}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 48, normalized size = 0.92

$$-ce^{a/b}\Gamma\left(1+p,\frac{a}{b}+\log(cx)\right)\left(\frac{a}{b}+\log(cx)\right)^{-p}(a+b\log(cx))^{p}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])^p/x^2,x]
```

```
[Out] -((c*E^(a/b)*Gamma[1 + p, a/b + Log[c*x]]*(a + b*Log[c*x])^p)/(a/b + Log[c*
x])^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(cx))^{p}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))^p/x^2,x)
```

```
[Out] int((a+b*ln(c*x))^p/x^2,x)
```

Maxima [A]
time = 0.05, size = 40, normalized size = 0.77

$$-\frac{(b\log(cx)+a)^{p+1}ce^{\frac{a}{b}}E_{-p}\left(\frac{b\log(cx)+a}{b}\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(b*log(c*x) + a)^(p + 1)*c*e^(a/b)*exp_integral_e(-p, (b*log(c*x) + a)/b)/
b
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x) + a)^p/x^2, x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log(cx))^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))**p/x**2,x)
[Out] Integral((a + b*log(c*x))**p/x**2, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(a + b\,\ln(c\,x))^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))^p/x^2,x)
[Out] int((a + b*log(c*x))^p/x^2, x)
```

3.181 $\int \frac{(a+b\log(cx))^p}{x^3}\,dx$

Optimal. Leaf size=63

$$-2^{-1-p}c^2e^{\frac{2a}{b}}\Gamma\left(1+p,\frac{2(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}$$

```
[Out] -2^(-1-p)*c^2*exp(2*a/b)*GAMMA(1+p,2*(a+b*ln(c*x))/b)*(a+b*ln(c*x))^p/(((a+
b*ln(c*x))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2346, 2212}

$$c^2\left(-2^{-p-1}\right)e^{\frac{2a}{b}}(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}\text{Gamma}\left(p+1,\frac{2(a+b\log(cx))}{b}\right)$$

Antiderivative was successfully verified.

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

```
[Out] -((2^(-1 - p)*c^2*E^((2*a)/b)*Gamma[1 + p, (2*(a + b*Log[c*x]))/b]*(a + b*L
og[c*x])^p)/((a + b*Log[c*x])/b)^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx))^p}{x^3}\,dx &= c^2\text{Subst}\left(\int e^{-2x}(a+bx)^p\,dx,x,\log(cx)\right)\\ &= -2^{-1-p}c^2e^{\frac{2a}{b}}\Gamma\left(1+p,\frac{2(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 63, normalized size = 1.00

$$-2^{-1-p}c^2e^{\frac{2a}{b}}\Gamma\left(1+p,\frac{2(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])^p/x^3,x]
```

```
[Out] -((2^(-1 - p)*c^2*E^((2*a)/b)*Gamma[1 + p, (2*(a + b*Log[c*x]))/b]*(a + b*L
og[c*x])^p)/((a + b*Log[c*x])/b)^p)
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(cx))^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))^p/x^3,x)
```

```
[Out] int((a+b*ln(c*x))^p/x^3,x)
```

Maxima [A]
time = 0.05, size = 44, normalized size = 0.70

$$-\frac{(b\log(cx)+a)^{p+1}c^2e^{\left(\frac{2a}{b}\right)}E_{-p}\left(\frac{2(b\log(cx)+a)}{b}\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(b*log(c*x) + a)^(p + 1)*c^2*e^(2*a/b)*exp_integral_e(-p, 2*(b*log(c*x) +
a)/b)/b
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*log(c*x) + a)^p/x^3, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx)})^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))**p/x**3,x)
```

```
[Out] Integral((a + b*log(c*x))**p/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*log(c*x) + a)^p/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(a + b\,\ln{(c\,x)})^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))^p/x^3,x)
```

```
[Out] int((a + b*log(c*x))^p/x^3, x)
```

3.182 $\int \frac{(a+b\log(cx))^p}{x^4}\,dx$

Optimal. Leaf size=63

$$-3^{-1-p}c^3e^{\frac{3a}{b}}\Gamma\left(1+p,\frac{3(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}$$

```
[Out] -3^(-1-p)*c^3*exp(3*a/b)*GAMMA(1+p,3*(a+b*ln(c*x))/b)*(a+b*ln(c*x))^p/(((a+
b*ln(c*x))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2346, 2212}

$$c^3\left(-3^{-p-1}\right)e^{\frac{3a}{b}}(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}\text{Gamma}\left(p+1,\frac{3(a+b\log(cx))}{b}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*x])^p/x^4,x]
```

```
[Out] -((3^(-1 - p)*c^3*E^((3*a)/b)*Gamma[1 + p, (3*(a + b*Log[c*x]))/b]*(a + b*L
og[c*x])^p)/((a + b*Log[c*x])/b)^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2346

```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))^(p_)*(x_)^(m_.), x_Symbol] :> Dist[1/c^
(m + 1), Subst[Int[E^((m + 1)*x)*(a + b*x)^p, x], x, Log[c*x]], x] /; FreeQ
[{a, b, c, p}, x] && IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{(a+b\log(cx))^p}{x^4}\,dx &= c^3\text{Subst}\left(\int e^{-3x}(a+bx)^p\,dx,x,\log(cx)\right)\\ &= -3^{-1-p}c^3e^{\frac{3a}{b}}\Gamma\left(1+p,\frac{3(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}\end{aligned}$$

Mathematica [A]
time = 0.04, size = 63, normalized size = 1.00

$$-3^{-1-p}c^3e^{\frac{3a}{b}}\Gamma\left(1+p,\frac{3(a+b\log(cx))}{b}\right)(a+b\log(cx))^p\left(\frac{a+b\log(cx)}{b}\right)^{-p}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*x])^p/x^4,x]
```

```
[Out] -((3^(-1 - p)*c^3*E^((3*a)/b)*Gamma[1 + p, (3*(a + b*Log[c*x]))/b]*(a + b*L
og[c*x])^p)/((a + b*Log[c*x])/b)^p)
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a+b\ln(cx))^p}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x))^p/x^4,x)
```

```
[Out] int((a+b*ln(c*x))^p/x^4,x)
```

Maxima [A]
time = 0.05, size = 44, normalized size = 0.70

$$-\frac{(b\log(cx)+a)^{p+1}c^3e^{\left(\frac{3a}{b}\right)}E_{-p}\left(\frac{3(b\log(cx)+a)}{b}\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))^p/x^4,x, algorithm="maxima")
```

```
[Out] -(b*log(c*x) + a)^(p + 1)*c^3*e^(3*a/b)*exp_integral_e(-p, 3*(b*log(c*x) +
a)/b)/b
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))^p/x^4,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*x) + a)^p/x^4, x)
```

Sympy [**F**]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(a + b\log{(cx)})^p}{x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x))**p/x**4,x)
```

```
[Out] Integral((a + b*log(c*x))**p/x**4, x)
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x))^p/x^4,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x) + a)^p/x^4, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{(a + b\,\ln{(c\,x)})^p}{x^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x))^p/x^4,x)
```

```
[Out] int((a + b*log(c*x))^p/x^4, x)
```

3.183 $\int (dx)^m \left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx$

Optimal. Leaf size=107

$$\frac{2^{-p}e^{-\frac{2a(1+m)}{b}}\left(c\sqrt{x}\right)^{-2(1+m)}(dx)^{1+m}\Gamma\left(1+p,-\frac{2(1+m)\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{(1+m)\left(a+b\log\left(\right.\right.}{b}\right.}{d(1+m)}$$

```
[Out] (d*x)^(1+m)*GAMMA(1+p,-2*(1+m)*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(1/2)))^p
/(2^p)/d/exp(2*a*(1+m)/b)/(1+m)/((-(1+m)*(a+b*ln(c*x^(1/2)))/b)^p)/((c*x^(1
/2))^(2+2*m))
```

Rubi [A]
time = 0.06, antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2347, 2212}

$$\frac{2^{-p}e^{-\frac{2a(m+1)}{b}}\left(c\sqrt{x}\right)^{-2(m+1)}(dx)^{m+1}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{(m+1)\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{2(m+1)\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)}{d(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^m*(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] ((d*x)^(1 + m)*Gamma[1 + p, (-2*(1 + m)*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*L
og[c*Sqrt[x]])^p)/(2^p*d*E^((2*a*(1 + m))/b)*(1 + m)*(c*Sqrt[x])^(2*(1 + m)
)*(-(((1 + m)*(a + b*Log[c*Sqrt[x]]))/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int (dx)^m \left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx = \frac{\left(2\left(c\sqrt{x}\right)^{-2(1+m)}(dx)^{1+m}\right)\text{Subst}\left(\int e^{2(1+m)x}(a+bx)^p\,dx, x, \log\left(c\sqrt{x}\right)\right)}{d}$$
$$= \frac{2^{-p}e^{-\frac{2a(1+m)}{b}}\left(c\sqrt{x}\right)^{-2(1+m)}(dx)^{1+m}\Gamma\left(1+p,-\frac{2(1+m)\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)(}{d(1+m)}$$

Mathematica [A]
time = 0.16, size = 103, normalized size = 0.96

$$\frac{2^{-p}e^{-\frac{2a(1+m)}{b}}\left(c\sqrt{x}\right)^{-2m}(dx)^m\Gamma\left(1+p,-\frac{2(1+m)\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{(1+m)\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)^{-p}}{c^2(1+m)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^m*(a + b*Log[c*Sqrt[x]])^p,x]
[Out] ((d*x)^m*Gamma[1 + p, (-2*(1 + m)*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*S
qrt[x]])^p)/(2^p*c^2*E^((2*a*(1 + m))/b)*(1 + m)*(c*Sqrt[x])^(2*m)*(-(((1 +
 m)*(a + b*Log[c*Sqrt[x]]))/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int (dx)^m \left(a+b\ln\left(c\sqrt{x}\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a+b*ln(c*x^(1/2)))^p,x)
[Out] int((d*x)^m*(a+b*ln(c*x^(1/2)))^p,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^m*(a+b*log(c*x^(1/2)))^p,x, algorithm="fricas")
[Out] integral((d*x)^m*(b*log(c*sqrt(x)) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (dx)^m \left(a + b\log \left(c\sqrt{x}\right)\right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**m*(a+b*ln(c*x**(1/2)))**p,x)
[Out] Integral((d*x)**m*(a + b*log(c*sqrt(x)))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^m*(a+b*log(c*x^(1/2)))^p,x, algorithm="giac")
[Out] integrate((d*x)^m*(b*log(c*sqrt(x)) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x)^m\,\left(a + b\,\ln \left(c\,\sqrt{x}\right)\right)^p \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^m*(a + b*log(c*x^(1/2)))^p,x)
[Out] int((d*x)^m*(a + b*log(c*x^(1/2)))^p, x)
```

3.184 $\int x^2 \left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx$

Optimal. Leaf size=80

$$\frac{2^{-p}3^{-1-p}e^{-\frac{6a}{b}}\Gamma\left(1+p,-\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^6}$$

```
[Out] 3^(-1-p)*GAMMA(1+p,-6*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(1/2)))^p/(2^p)/c^
6/exp(6*a/b)/(((-a-b*ln(c*x^(1/2)))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$\frac{2^{-p}3^{-p-1}e^{-\frac{6a}{b}}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)}{c^6}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] (3^(-1 - p)*Gamma[1 + p, (-6*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*Sqrt[x
]])^p)/(2^p*c^6*E^((6*a)/b)*(-((a + b*Log[c*Sqrt[x]])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int x^2(a+b\log(c\sqrt{x}))^p\,dx = \frac{2\text{Subst}\left(\int e^{6x}(a+bx)^p\,dx, x, \log(c\sqrt{x})\right)}{c^6}$$

$$= \frac{2^{-p}3^{-1-p}e^{-\frac{6a}{b}}\Gamma\left(1+p, -\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)(a+b\log(c\sqrt{x}))^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right.}{c^6}$$

Mathematica [A]
time = 0.05, size = 80, normalized size = 1.00

$$\frac{2^{-p}3^{-1-p}e^{-\frac{6a}{b}}\Gamma\left(1+p, -\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)(a+b\log(c\sqrt{x}))^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] (3^(-1 - p)*Gamma[1 + p, (-6*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*Sqrt[x
]])^p)/(2^p*c^6*E^((6*a)/b)*(-((a + b*Log[c*Sqrt[x]])/b))^p)
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^2(a+b\ln(c\sqrt{x}))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*ln(c*x^(1/2)))^p,x)
```

```
[Out] int(x^2*(a+b*ln(c*x^(1/2)))^p,x)
```

Maxima [A]
time = 0.05, size = 48, normalized size = 0.60

$$-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}e^{\left(-\frac{6a}{b}\right)}E_{-p}\left(-\frac{6\left(b\log\left(c\sqrt{x}\right)+a\right)}{b}\right)}{bc^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^(1/2)))^p,x, algorithm="maxima")
```

```
[Out] -2*(b*log(c*sqrt(x)) + a)^(p + 1)*e^(-6*a/b)*exp_integral_e(-p, -6*(b*log(c
*sqrt(x)) + a)/b)/(b*c^6)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^(1/2)))^p,x, algorithm="fricas")
[Out] integral((b*log(c*sqrt(x)) + a)^p*x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2}\left(a+b\log\left(c\sqrt{x}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*ln(c*x**(1/2)))**p,x)
[Out] Integral(x**2*(a + b*log(c*sqrt(x)))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*log(c*x^(1/2)))^p,x, algorithm="giac")
[Out] integrate((b*log(c*sqrt(x)) + a)^p*x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\,{\left(a+b\,\ln\left(c\,\sqrt{x}\right)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a + b*log(c*x^(1/2)))^p,x)
[Out] int(x^2*(a + b*log(c*x^(1/2)))^p, x)
```

3.185 $\int x\left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx$

Optimal. Leaf size=75

$$\frac{2^{-1-2p}e^{-\frac{4a}{b}}\Gamma\left(1+p,-\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^4}$$

```
[Out] 2^(-1-2*p)*GAMMA(1+p,-4*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(1/2)))^p/c^4/ex
p(4*a/b)/(((-a-b*ln(c*x^(1/2)))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 75, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2347, 2212}

$$\frac{2^{-2p-1}e^{-\frac{4a}{b}}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)}{c^4}$$

Antiderivative was successfully verified.

```
[In] Int[x*(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] (2^(-1 - 2*p)*Gamma[1 + p, (-4*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*Sqrt
[x]])^p)/(c^4*E^((4*a)/b)*(-((a + b*Log[c*Sqrt[x]])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int x\left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx=\frac{2\mathrm{Subst}\left(\int e^{4x}(a+bx)^p\,dx,x,\log\left(c\sqrt{x}\right)\right)}{c^4}$$

$$=\frac{2^{-1-2p}e^{-\frac{4a}{b}}\Gamma\left(1+p,-\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right.}{c^4}$$

Mathematica [A]
time = 0.05, size = 75, normalized size = 1.00

$$\frac{2^{-1-2p}e^{-\frac{4a}{b}}\Gamma\left(1+p,-\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] (2^(-1 - 2*p)*Gamma[1 + p, (-4*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*Sqrt
[x]])^p)/(c^4*E^((4*a)/b)*(-((a + b*Log[c*Sqrt[x]])/b))^p)
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x\left(a+b\ln\left(c\sqrt{x}\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*ln(c*x^(1/2)))^p,x)
```

```
[Out] int(x*(a+b*ln(c*x^(1/2)))^p,x)
```

Maxima [A]
time = 0.05, size = 48, normalized size = 0.64

$$-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}e^{\left(-\frac{4a}{b}\right)}E_{-p}\left(-\frac{4\left(b\log\left(c\sqrt{x}\right)+a\right)}{b}\right)}{bc^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^(1/2)))^p,x, algorithm="maxima")
```

```
[Out] -2*(b*log(c*sqrt(x)) + a)^(p + 1)*e^(-4*a/b)*exp_integral_e(-p, -4*(b*log(c
*sqrt(x)) + a)/b)/(b*c^4)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^(1/2)))^p,x, algorithm="fricas")
[Out] integral((b*log(c*sqrt(x)) + a)^p*x, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x\left(a + b\log\left(c\sqrt{x}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*ln(c*x**(1/2)))**p,x)
[Out] Integral(x*(a + b*log(c*sqrt(x)))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*log(c*x^(1/2)))^p,x, algorithm="giac")
[Out] integrate((b*log(c*sqrt(x)) + a)^p*x, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int x\,{\left(a+b\,\ln\left(c\,\sqrt{x}\right)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a + b*log(c*x^(1/2)))^p,x)
[Out] int(x*(a + b*log(c*x^(1/2)))^p, x)
```

3.186 $\int \left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx$

Optimal. Leaf size=73

$$\frac{2^{-p}e^{-\frac{2a}{b}}\Gamma\left(1+p,-\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^2}$$

```
[Out] GAMMA(1+p,-2*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(1/2)))^p/(2^p)/c^2/exp(2*a
/b)/(((-a-b*ln(c*x^(1/2)))/b)^p)
```

Rubi [A]
time = 0.02, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2336, 2212}

$$\frac{2^{-p}e^{-\frac{2a}{b}}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)}{c^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] (Gamma[1 + p, (-2*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*Sqrt[x]])^p)/(2^p
*c^2*E^((2*a)/b)*(-((a + b*Log[c*Sqrt[x]])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2336

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_), x_Symbol] :> Dist[1/(n*c^(1
/n)), Subst[Int[E^(x/n)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b,
 c, p}, x] && IntegerQ[1/n]
```

Rubi steps

$$\int \left(a+b\log\left(c\sqrt{x}\right)\right)^p\,dx = \frac{2\mathrm{Subst}\left(\int e^{2x}(a+bx)^p\,dx, x, \log\left(c\sqrt{x}\right)\right)}{c^2}$$
$$= \frac{2^{-p}e^{-\frac{2a}{b}}\Gamma\left(1+p, -\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^2}$$

Mathematica [A]
time = 0.02, size = 73, normalized size = 1.00

$$\frac{2^{-p}e^{-\frac{2a}{b}}\Gamma\left(1+p, -\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(-\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}}{c^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*Sqrt[x]])^p,x]
```

```
[Out] (Gamma[1 + p, (-2*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*Sqrt[x]])^p)/(2^p
*c^2*E^((2*a)/b)*(-((a + b*Log[c*Sqrt[x]])/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int \left(a+b\ln\left(c\sqrt{x}\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^(1/2)))^p,x)
```

```
[Out] int((a+b*ln(c*x^(1/2)))^p,x)
```

Maxima [A]
time = 0.05, size = 48, normalized size = 0.66

$$-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}e^{\left(-\frac{2a}{b}\right)}E_{-p}\left(-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)}{b}\right)}{bc^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p,x, algorithm="maxima")
```

```
[Out] -2*(b*log(c*sqrt(x)) + a)^(p + 1)*e^(-2*a/b)*exp_integral_e(-p, -2*(b*log(c
*sqrt(x)) + a)/b)/(b*c^2)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p,x, algorithm="fricas")
[Out] integral((b*log(c*sqrt(x)) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \left(a + b \log \left(c \sqrt{x}\right)\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**(1/2)))**p,x)
[Out] Integral((a + b*log(c*sqrt(x)))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p,x, algorithm="giac")
[Out] integrate((b*log(c*sqrt(x)) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(a+b\,\ln\left(c\,\sqrt{x}\right)\right)}^p \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^(1/2)))^p,x)
[Out] int((a + b*log(c*x^(1/2)))^p, x)
```

3.187 $\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x}\,dx$

Optimal. Leaf size=26

$$\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)^{1+p}}{b(1+p)}$$

```
[Out] 2*(a+b*ln(c*x^(1/2)))^(1+p)/b/(1+p)
```

Rubi [A]
time = 0.02, antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2339, 30}

$$\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)^{p+1}}{b(p+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*Sqrt[x]])^p/x,x]
```

```
[Out] (2*(a + b*Log[c*Sqrt[x]])^(1 + p))/(b*(1 + p))
```

Rule 30

```
Int[(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)/(m + 1), x] /; FreeQ[m, x] && N
eQ[m, -1]
```

Rule 2339

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Dist[1/(
b*n), Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p},
 x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x}\,dx &= \frac{2\text{Subst}\left(\int x^p\,dx, x, a+b\log\left(c\sqrt{x}\right)\right)}{b}\\
&= \frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)^{1+p}}{b(1+p)}
\end{aligned}$$

Mathematica [A]
time = 0.01, size = 26, normalized size = 1.00

$$\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)^{1+p}}{b(1+p)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*Sqrt[x]])^p/x,x]
[Out] (2*(a + b*Log[c*Sqrt[x]])^(1 + p))/(b*(1 + p))
```

Maple [A]
time = 0.01, size = 25, normalized size = 0.96

method	result	size
derivativedivides	$\frac{2\left(a+b\ln\left(c\sqrt{x}\right)\right)^{1+p}}{b(1+p)}$	25
default	$\frac{2\left(a+b\ln\left(c\sqrt{x}\right)\right)^{1+p}}{b(1+p)}$	25

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^(1/2)))^p/x,x,method=_RETURNVERBOSE)
[Out] 2*(a+b*ln(c*x^(1/2)))^(1+p)/b/(1+p)
```

Maxima [A]
time = 0.28, size = 24, normalized size = 0.92

$$\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}}{b(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

Fricas [A]
time = 0.36, size = 31, normalized size = 1.19

$$\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)\left(b\log\left(c\sqrt{x}\right)+a\right)^{p}}{bp+b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x,x, algorithm="fricas")
[Out] 2*(b*log(c*sqrt(x)) + a)*(b*log(c*sqrt(x)) + a)^p/(b*p + b)
```

Sympy [A]
time = 2.45, size = 48, normalized size = 1.85

$$-\begin{cases} -a^{p}\log\left(x\right) & \text{for}\ b=0 \\ -\frac{2\left(\begin{cases}\frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^{p+1}}{p+1} & \text{for}\ p\neq -1 \\ \log\left(a+b\log\left(c\sqrt{x}\right)\right) & \text{otherwise}\end{cases}\right)}{b} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**(1/2)))**p/x,x)
```

```
[Out] -Piecewise((-a**p*log(x), Eq(b, 0)), (-2*Piecewise(((a + b*log(c*sqrt(x)))*
*(p + 1)/(p + 1), Ne(p, -1)), (log(a + b*log(c*sqrt(x))), True))/b, True))
```

Giac [A]
time = 10.21, size = 25, normalized size = 0.96

$$\frac{2\left(b\log\left(c\right)+\frac{1}{2}\,b\log\left(x\right)+a\right)^{p+1}}{b(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x,x, algorithm="giac")
```

```
[Out] 2*(b*log(c) + 1/2*b*log(x) + a)^(p + 1)/(b*(p + 1))
```

Mupad [B]
time = 3.72, size = 24, normalized size = 0.92

$$\frac{2\left(a+b\,\ln\left(c\,\sqrt{x}\,\right)\right)^{p+1}}{b\,\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^(1/2)))^p/x,x)
```

```
[Out] (2*(a + b*log(c*x^(1/2)))^(p + 1))/(b*(p + 1))
```

3.188 $\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x^2}\,dx$

Optimal. Leaf size=73

$$-2^{-p}c^2e^{\frac{2a}{b}}\Gamma\left(1+p,\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}$$

```
[Out] -c^2*exp(2*a/b)*GAMMA(1+p,2*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(1/2)))^p/(2
^p)/(((a+b*ln(c*x^(1/2)))/b)^p)
```

Rubi [A]
time = 0.05, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$c^2\left(-2^{-p}\right)e^{\frac{2a}{b}}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*Sqrt[x]])^p/x^2,x]
```

```
[Out] -((c^2*E^((2*a)/b)*Gamma[1 + p, (2*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*
Sqrt[x]])^p)/(2^p*((a + b*Log[c*Sqrt[x]])/b)^p))
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x^2}\,dx &= \left(2c^2\right)\text{Subst}\left(\int e^{-2x}(a+bx)^p\,dx,x,\log\left(c\sqrt{x}\right)\right)\\ &= -2^{-p}c^2e^{\frac{2a}{b}}\Gamma\left(1+p,\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right.}{b}\right.\end{aligned}$$

Mathematica [A]
time = 0.05, size = 73, normalized size = 1.00

$$-2^{-p}c^2e^{\frac{2a}{b}}\Gamma\left(1+p,\frac{2\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*Sqrt[x]])^p/x^2,x]
```

```
[Out] -((c^2*E^((2*a)/b)*Gamma[1 + p, (2*(a + b*Log[c*Sqrt[x]]))/b]*(a + b*Log[c*
Sqrt[x]])^p)/(2^p*((a + b*Log[c*Sqrt[x]])/b)^p))
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int\frac{\left(a+b\ln\left(c\sqrt{x}\right)\right)^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^(1/2)))^p/x^2,x)
```

```
[Out] int((a+b*ln(c*x^(1/2)))^p/x^2,x)
```

Maxima [A]
time = 0.05, size = 48, normalized size = 0.66

$$-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}c^2e^{\left(\frac{2a}{b}\right)}E_{-p}\left(\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)}{b}\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^2,x, algorithm="maxima")
```

```
[Out] -2*(b*log(c*sqrt(x)) + a)^(p + 1)*c^2*e^(2*a/b)*exp_integral_e(-p, 2*(b*log
(c*sqrt(x)) + a)/b)/b
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^2,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*sqrt(x)) + a)^p/x^2, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b \log\left(c \sqrt{x}\right)\right)^{p}}{x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**(1/2)))**p/x**2,x)
```

```
[Out] Integral((a + b*log(c*sqrt(x)))**p/x**2, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*sqrt(x)) + a)^p/x^2, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(a+b\,\ln\left(c\,\sqrt{x}\right)\right)}^p}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^(1/2)))^p/x^2,x)
```

```
[Out] int((a + b*log(c*x^(1/2)))^p/x^2, x)
```

3.189 $\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x^3}\,dx$

Optimal. Leaf size=75

$$-2^{-1-2p}c^4e^{\frac{4a}{b}}\Gamma\left(1+p,\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}$$

```
[Out] -2^(-1-2*p)*c^4*exp(4*a/b)*GAMMA(1+p,4*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(
1/2)))^p/(((a+b*ln(c*x^(1/2)))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 75, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$c^4\left(-2^{-2p-1}\right)e^{\frac{4a}{b}}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*Sqrt[x]])^p/x^3,x]
```

```
[Out] -((2^(-1 - 2*p)*c^4*E^((4*a)/b)*Gamma[1 + p, (4*(a + b*Log[c*Sqrt[x]]))/b]*
(a + b*Log[c*Sqrt[x]])^p)/((a + b*Log[c*Sqrt[x]])/b)^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x^3}\,dx &= \left(2c^4\right)\text{Subst}\left(\int e^{-4x}(a+bx)^p\,dx,x,\log\left(c\sqrt{x}\right)\right)\\ &= -2^{-1-2p}c^4e^{\frac{4a}{b}}\Gamma\left(1+p,\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\right.}{b}\right.\end{aligned}$$

Mathematica [A]
time = 0.05, size = 75, normalized size = 1.00

$$-2^{-1-2p}c^4e^{\frac{4a}{b}}\Gamma\left(1+p,\frac{4\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*Sqrt[x]])^p/x^3,x]
[Out] -((2^(-1 - 2*p)*c^4*E^((4*a)/b)*Gamma[1 + p, (4*(a + b*Log[c*Sqrt[x]]))/b]*
(a + b*Log[c*Sqrt[x]])^p)/((a + b*Log[c*Sqrt[x]])/b)^p)
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a+b\ln\left(c\sqrt{x}\right)\right)^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^(1/2)))^p/x^3,x)
[Out] int((a+b*ln(c*x^(1/2)))^p/x^3,x)
```

Maxima [A]
time = 0.05, size = 48, normalized size = 0.64

$$-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}c^4e^{\left(\frac{4a}{b}\right)}E_{-p}\left(\frac{4\left(b\log\left(c\sqrt{x}\right)+a\right)}{b}\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^3,x, algorithm="maxima")
[Out] -2*(b*log(c*sqrt(x)) + a)^(p + 1)*c^4*e^(4*a/b)*exp_integral_e(-p, 4*(b*log
(c*sqrt(x)) + a)/b)/b
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^3,x, algorithm="fricas")
[Out] integral((b*log(c*sqrt(x)) + a)^p/x^3, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\left(a + b \log \left(c \sqrt{x}\right)\right)^{p}}{x^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**(1/2)))**p/x**3,x)
[Out] Integral((a + b*log(c*sqrt(x)))**p/x**3, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^3,x, algorithm="giac")
[Out] integrate((b*log(c*sqrt(x)) + a)^p/x^3, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(a+b\,\ln\left(c\,\sqrt{x}\right)\right)}^p}{x^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^(1/2)))^p/x^3,x)
[Out] int((a + b*log(c*x^(1/2)))^p/x^3, x)
```

3.190 $\int \frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x^4}\,dx$

Optimal. Leaf size=80

$$-2^{-p}3^{-1-p}c^6e^{\frac{6a}{b}}\Gamma\left(1+p,\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}$$

```
[Out] -3^(-1-p)*c^6*exp(6*a/b)*GAMMA(1+p,6*(a+b*ln(c*x^(1/2)))/b)*(a+b*ln(c*x^(1/
2)))^p/(2^p)/(((a+b*ln(c*x^(1/2)))/b)^p)
```

Rubi [A]

time = 0.04, antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$c^6\left(-2^{-p}\right)3^{-p-1}e^{\frac{6a}{b}}\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}\text{Gamma}\left(p+1,\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*Log[c*Sqrt[x]])^p/x^4,x]
```

```
[Out] -((3^(-1 - p)*c^6*E^((6*a)/b)*Gamma[1 + p, (6*(a + b*Log[c*Sqrt[x]]))/b]*(a
 + b*Log[c*Sqrt[x]])^p)/(2^p*((a + b*Log[c*Sqrt[x]])/b)^p))
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int\frac{\left(a+b\log\left(c\sqrt{x}\right)\right)^p}{x^4}\,dx=\left(2c^6\right)\text{Subst}\left(\int e^{-6x}(a+bx)^p\,dx,x,\log\left(c\sqrt{x}\right)\right)$$

$$=-2^{-p}3^{-1-p}c^6e^{\frac{6a}{b}}\Gamma\left(1+p,\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\mathrm{lo}}{}\right.$$

Mathematica [A]
time = 0.05, size = 80, normalized size = 1.00

$$-2^{-p}3^{-1-p}c^6e^{\frac{6a}{b}}\Gamma\left(1+p,\frac{6\left(a+b\log\left(c\sqrt{x}\right)\right)}{b}\right)\left(a+b\log\left(c\sqrt{x}\right)\right)^p\left(\frac{a+b\log\left(c\sqrt{x}\right)}{b}\right)^{-p}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*Log[c*Sqrt[x]])^p/x^4,x]
```

```
[Out] -((3^(-1 - p)*c^6*E^((6*a)/b)*Gamma[1 + p, (6*(a + b*Log[c*Sqrt[x]]))/b]*(a
 + b*Log[c*Sqrt[x]])^p)/(2^p*((a + b*Log[c*Sqrt[x]])/b)^p))
```

Maple [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\left(a+b\ln\left(c\sqrt{x}\right)\right)^p}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*ln(c*x^(1/2)))^p/x^4,x)
```

```
[Out] int((a+b*ln(c*x^(1/2)))^p/x^4,x)
```

Maxima [A]
time = 0.05, size = 48, normalized size = 0.60

$$-\frac{2\left(b\log\left(c\sqrt{x}\right)+a\right)^{p+1}c^6e^{\left(\frac{6a}{b}\right)}E_{-p}\left(\frac{6\left(b\log\left(c\sqrt{x}\right)+a\right)}{b}\right)}{b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^4,x, algorithm="maxima")
```

```
[Out] -2*(b*log(c*sqrt(x)) + a)^(p + 1)*c^6*e^(6*a/b)*exp_integral_e(-p, 6*(b*log
(c*sqrt(x)) + a)/b)/b
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^4,x, algorithm="fricas")
```

```
[Out] integral((b*log(c*sqrt(x)) + a)^p/x^4, x)
```

Sympy [**F(-2)**]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: HeuristicGCDFailed

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*ln(c*x**(1/2)))**p/x**4,x)
[Out] Exception raised: HeuristicGCDFailed >> no luck
```

Giac [**F**]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*log(c*x^(1/2)))^p/x^4,x, algorithm="giac")
[Out] integrate((b*log(c*sqrt(x)) + a)^p/x^4, x)
```

Mupad [**F**]
time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(a+b\,\ln\left(c\,\sqrt{x}\,\right)\right)^p}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*log(c*x^(1/2)))^p/x^4,x)
[Out] int((a + b*log(c*x^(1/2)))^p/x^4, x)
```

3.191 $\int x^{-1+n}(a+b\log(cx^n))^p\,dx$

Optimal. Leaf size=65

$$\frac{e^{-\frac{a}{b}}\Gamma\left(1+p,-\frac{a+b\log(cx^n)}{b}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{b}\right)^{-p}}{cn}$$

```
[Out] GAMMA(1+p,(-a-b*ln(c*x^n))/b)*(a+b*ln(c*x^n))^p/c/exp(a/b)/n/(((-a-b*ln(c*x
^n))/b)^p)
```

Rubi [A]
time = 0.04, antiderivative size = 65, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2347, 2212}

$$\frac{e^{-\frac{a}{b}}(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{b}\right)^{-p}\text{Gamma}\left(p+1,-\frac{a+b\log(cx^n)}{b}\right)}{cn}$$

Antiderivative was successfully verified.

```
[In] Int[x^(-1 + n)*(a + b*Log[c*x^n])^p,x]
```

```
[Out] (Gamma[1 + p, -((a + b*Log[c*x^n])/b)]*(a + b*Log[c*x^n])^p)/(c*E^(a/b)*n*(
-((a + b*Log[c*x^n])/b))^p)
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\begin{aligned}\int x^{-1+n}(a+b\log(cx^n))^p\,dx &= \frac{\text{Subst}\left(\int e^x(a+bx)^p\,dx,x,\log(cx^n)\right)}{cn}\\ &= \frac{e^{-\frac{a}{b}}\Gamma\left(1+p,-\frac{a+b\log(cx^n)}{b}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{b}\right)^{-p}}{cn}\end{aligned}$$

Mathematica [A]
time = 0.02, size = 65, normalized size = 1.00

$$\frac{e^{-\frac{a}{b}}\Gamma\left(1+p,-\frac{a+b\log(cx^n)}{b}\right)(a+b\log(cx^n))^p\left(-\frac{a+b\log(cx^n)}{b}\right)^{-p}}{cn}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^(-1 + n)*(a + b*Log[c*x^n])^p,x]
[Out] (Gamma[1 + p, -((a + b*Log[c*x^n])/b)]*(a + b*Log[c*x^n])^p)/(c*E^(a/b)*n*(
-((a + b*Log[c*x^n])/b))^p)
```

Maple [F]
time = 0.01, size = 0, normalized size = 0.00

$$\int x^{-1+n}(a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(-1+n)*(a+b*ln(c*x^n))^p,x)
[Out] int(x^(-1+n)*(a+b*ln(c*x^n))^p,x)
```

Maxima [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*(a+b*log(c*x^n))^p,x, algorithm="maxima")
[Out] Exception raised: RuntimeError >> ECL says: In function CAR, the value of t
he first argument is  0which is not of the expected type LIST
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*(a+b*log(c*x^n))^p,x, algorithm="fricas")
[Out] integral((b*log(c*x^n) + a)^p*x^(n - 1), x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int x^{n-1}(a+b\log(cx^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**(-1+n)*(a+b*ln(c*x**n))**p,x)
```

```
[Out] Integral(x**(n - 1)*(a + b*log(c*x**n))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^(-1+n)*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate((b*log(c*x^n) + a)^p*x^(n - 1), x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.02

$$\int x^{n-1}\,\left(a+b\,\ln\left(c\,x^n\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^(n - 1)*(a + b*log(c*x^n))^p,x)
```

```
[Out] int(x^(n - 1)*(a + b*log(c*x^n))^p, x)
```

3.192 $\int (dx^q)^m (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=114

$$\frac{e^{-\frac{a+amq}{bn}}x(cx^n)^{-\frac{1+mq}{n}}(dx^q)^m\Gamma\left(1+p,-\frac{(1+mq)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+mq)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+mq}$$

```
[Out] x*(d*x^q)^m*GAMMA(1+p,-(m*q+1)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp((
a*m*q+a)/b/n)/(m*q+1)/((c*x^n)^((m*q+1)/n))/((-(m*q+1)*(a+b*ln(c*x^n))/b/n)
^p)
```

Rubi [A]
time = 0.08, antiderivative size = 114, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.150$, Rules used = {15, 2347, 2212}

$$\frac{x(dx^q)^m e^{-\frac{amq+a}{bn}}(cx^n)^{-\frac{mq+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(mq+1)(a+b\log(cx^n))}{bn}\right)^{-p}\text{Gamma}\left(p+1,-\frac{(mq+1)(a+b\log(cx^n))}{bn}\right)}{mq+1}$$

Antiderivative was successfully verified.

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

```
[Out] (x*(d*x^q)^m*Gamma[1 + p, -(((1 + m*q)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*L
og[c*x^n])^p)/(E^((a + a*m*q)/(b*n))*(1 + m*q)*(c*x^n)^((1 + m*q)/n)*(-(((1
 + m*q)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Rule 15

```
Int[(u_.)*((a_.)*(x_)^(n_))^(m_), x_Symbol] :> Dist[a^IntPart[m]*((a*x^n)^F
racPart[m]/x^(n*FracPart[m])), Int[u*x^(m*n), x], x] /; FreeQ[{a, m, n}, x]
 && !IntegerQ[m]
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int (dx^q)^m (a+b\log(cx^n))^p\,dx = \left(x^{-mq}(dx^q)^m\right)\int x^{mq}(a+b\log(cx^n))^p\,dx$$
$$= \frac{\left(x(cx^n)^{-\frac{1+mq}{n}}(dx^q)^m\right)\text{Subst}\left(\int e^{\frac{(1+mq)x}{n}}(a+bx)^p\,dx,x,\log(cx^n)\right)}{n}$$
$$= \frac{e^{-\frac{a+amq}{bn}}x(cx^n)^{-\frac{1+mq}{n}}(dx^q)^m\,\Gamma\left(1+p,-\frac{(1+mq)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p}{1+mq}$$

Mathematica [A]
time = 0.14, size = 118, normalized size = 1.04

$$\frac{e^{-\frac{(1+mq)(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-mq}(dx^q)^m\,\Gamma\left(1+p,-\frac{(1+mq)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+mq)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+mq}$$

Antiderivative was successfully verified.

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

```
[Out] ((d*x^q)^m*Gamma[1 + p, -(((1 + m*q)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log
[c*x^n])^p)/(E^(((1 + m*q)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 +
m*q)*x^(m*q)*(-(((1 + m*q)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Maple [F]
time = 0.09, size = 0, normalized size = 0.00

$$\int (d\,x^q)^m (a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^q)^m*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int((d*x^q)^m*(a+b*ln(c*x^n))^p,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((d*x^q)^m*(b*log(c*x^n) + a)^p, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x^q)^m*(a+b*log(c*x^n))^p,x, algorithm="fricas")
[Out] integral((d*x^q)^m*(b*log(c*x^n) + a)^p, x)
```

Sympy [F]
time = 0.00, size = 0, normalized size = 0.00

$$\int (dx^q)^m (a + b\log(cx^n))^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x**q)**m*(a+b*ln(c*x**n))**p,x)
[Out] Integral((d*x**q)**m*(a + b*log(c*x**n))**p, x)
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

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

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int (d\,x^q)^m\,(a + b\,\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x^q)^m*(a + b*log(c*x^n))^p,x)
[Out] int((d*x^q)^m*(a + b*log(c*x^n))^p, x)
```

3.193 $\int \left(\text{d1}x^{\text{q1}}\right)^{\text{m1}} \left(\text{d2}x^{\text{q2}}\right)^{\text{m2}} (a+b\log(cx^n))^p \, dx$

Optimal. Leaf size=136

$$\frac{e^{-\frac{a(1+\text{m1q1}+\text{m2q2})}{bn}} x (cx^n)^{-\frac{1+\text{m1q1}+\text{m2q2}}{n}} \left(\text{d1}x^{\text{q1}}\right)^{\text{m1}} \left(\text{d2}x^{\text{q2}}\right)^{\text{m2}} \Gamma\left(1+p,-\frac{(1+\text{m1q1}+\text{m2q2})(a+b\log(cx^n))}{bn}\right) (a+b\log(c}{1+\text{m1q1}+\text{m2q2}}$$

```
[Out] x*(d1*x^q1)^m1*(d2*x^q2)^m2*GAMMA(1+p,-(m1*q1+m2*q2+1)*(a+b*ln(c*x^n))/b/n)
*(a+b*ln(c*x^n))^p/exp(a*(m1*q1+m2*q2+1)/b/n)/(m1*q1+m2*q2+1)/((c*x^n)^((m1
*q1+m2*q2+1)/n))/((-(m1*q1+m2*q2+1)*(a+b*ln(c*x^n))/b/n)^p)
```

Rubi [A]

time = 0.12, antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {15, 2347, 2212}

$$\frac{x\left(\text{d1}x^{\text{q1}}\right)^{\text{m1}} \left(\text{d2}x^{\text{q2}}\right)^{\text{m2}} (a+b\log(cx^n))^p e^{-\frac{a(\text{m1q1}+\text{m2q2}+1)}{bn}} (cx^n)^{-\frac{\text{m1q1}+\text{m2q2}+1}{n}} \left(-\frac{(\text{m1q1}+\text{m2q2}+1)(a+b\log(cx^n))}{bn}\right)^{-p} \text{Gamma}\left(p+1,-\frac{(\text{m1q1}+\text{m2q2}+1)(a+b\log(cx^n))}{bn}\right)}{\text{m1q1}+\text{m2q2}+1}$$

Antiderivative was successfully verified.

```
[In] Int[(d1*x^q1)^m1*(d2*x^q2)^m2*(a + b*Log[c*x^n])^p,x]
```

```
[Out] (x*(d1*x^q1)^m1*(d2*x^q2)^m2*Gamma[1 + p, -(((1 + m1*q1 + m2*q2)*(a + b*Log
[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(1 + m1*q1 + m2*q2))/(b*n))*
(1 + m1*q1 + m2*q2)*(c*x^n)^((1 + m1*q1 + m2*q2)/n)*(-(((1 + m1*q1 + m2*q2)
*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Rule 15

```
Int[(u_.)*((a_.)*(x_)^(n_))^(m_), x_Symbol] :> Dist[a^IntPart[m]*((a*x^n)^F
racPart[m]/x^(n*FracPart[m])), Int[u*x^(m*n), x], x] /; FreeQ[{a, m, n}, x]
 &&  !IntegerQ[m]
```

Rule 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 2347

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Dist[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n)), Subst[Int[E^(((m + 1)/n)
*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

Rubi steps

$$\int \left(\mathrm{d1}x^{\mathrm{q1}}\right)^{\mathrm{m1}}\left(\mathrm{d2}x^{\mathrm{q2}}\right)^{\mathrm{m2}}(a+b\log(cx^n))^p\,dx = \left(x^{-\mathrm{m1q1}}\left(\mathrm{d1}x^{\mathrm{q1}}\right)^{\mathrm{m1}}\right)\int x^{\mathrm{m1q1}}\left(\mathrm{d2}x^{\mathrm{q2}}\right)^{\mathrm{m2}}(a+b\log(cx^n))^p\,dx$$

$$= \left(x^{-\mathrm{m1q1}-\mathrm{m2q2}}\left(\mathrm{d1}x^{\mathrm{q1}}\right)^{\mathrm{m1}}\left(\mathrm{d2}x^{\mathrm{q2}}\right)^{\mathrm{m2}}\right)\int x^{\mathrm{m1q1}+\mathrm{m2q2}}(a+b\log$$

$$= \frac{\left(x(cx^n)^{-\frac{1+\mathrm{m1q1}+\mathrm{m2q2}}{n}}\left(\mathrm{d1}x^{\mathrm{q1}}\right)^{\mathrm{m1}}\left(\mathrm{d2}x^{\mathrm{q2}}\right)^{\mathrm{m2}}\right)\mathrm{Subst}\left(\int e^{\frac{(1+\mathrm{m1}}{}}\right.}{n}$$

$$= \frac{e^{-\frac{a(1+\mathrm{m1q1}+\mathrm{m2q2})}{bn}}x(cx^n)^{-\frac{1+\mathrm{m1q1}+\mathrm{m2q2}}{n}}\left(\mathrm{d1}x^{\mathrm{q1}}\right)^{\mathrm{m1}}\left(\mathrm{d2}x^{\mathrm{q2}}\right)^{\mathrm{m2}}\Gamma\Big(}{}$$

Mathematica [A]
time = 0.20, size = 142, normalized size = 1.04

$$\frac{e^{-\frac{(1+\mathrm{m1q1}+\mathrm{m2q2})(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-\mathrm{m1q1}-\mathrm{m2q2}}\left(\mathrm{d1}x^{\mathrm{q1}}\right)^{\mathrm{m1}}\left(\mathrm{d2}x^{\mathrm{q2}}\right)^{\mathrm{m2}}\Gamma\left(1+p,-\frac{(1+\mathrm{m1q1}+\mathrm{m2q2})(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+\mathrm{m1q1}+\mathrm{m2q2})(a+b\log(cx^n))}{bn}\right)^{-p}}{1+\mathrm{m1q1}+\mathrm{m2q2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d1*x^q1)^m1*(d2*x^q2)^m2*(a + b*Log[c*x^n])^p,x]
```

```
[Out] (x^(-(m1*q1) - m2*q2)*(d1*x^q1)^m1*(d2*x^q2)^m2*Gamma[1 + p, -(((1 + m1*q1
+ m2*q2)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^(((1 + m1*q1
+ m2*q2)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m1*q1 + m2*q2)*(-(
((1 + m1*q1 + m2*q2)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

Maple [F]
time = 5.28, size = 0, normalized size = 0.00

$$\int \left(\mathit{d1}\,x^{\mathit{q1}}\right)^{\mathit{m1}}\left(\mathit{d2}\,x^{\mathit{q2}}\right)^{\mathit{m2}}(a+b\ln(c\,x^n))^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d1*x^q1)^m1*(d2*x^q2)^m2*(a+b*ln(c*x^n))^p,x)
```

```
[Out] int((d1*x^q1)^m1*(d2*x^q2)^m2*(a+b*ln(c*x^n))^p,x)
```

Maxima [F]
time = 0.00, size = 0, normalized size = 0.00

Failed to integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d1*x^q1)^m1*(d2*x^q2)^m2*(a+b*log(c*x^n))^p,x, algorithm="maxima
")
```

```
[Out] integrate((d1*x^q1)^m1*(d2*x^q2)^m2*(b*log(c*x^n) + a)^p, x)
```

Fricas [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d1*x^q1)^m1*(d2*x^q2)^m2*(a+b*log(c*x^n))^p,x, algorithm="fricas
")
```

```
[Out] integral((d1*x^q1)^m1*(d2*x^q2)^m2*(b*log(c*x^n) + a)^p, x)
```

Sympy [F(-2)]
time = 0.00, size = 0, normalized size = 0.00

Exception raised: SystemError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d1*x**q1)**m1*(d2*x**q2)**m2*(a+b*ln(c*x**n))**p,x)
```

```
[Out] Exception raised: SystemError >> excessive stack use: stack is 3005 deep
```

Giac [F]
time = 0.00, size = 0, normalized size = 0.00

could not integrate

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d1*x^q1)^m1*(d2*x^q2)^m2*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate((d1*x^q1)^m1*(d2*x^q2)^m2*(b*log(c*x^n) + a)^p, x)
```

Mupad [F]
time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(d_1\,x^{q_1}\right)}^{m_1}\,{\left(d_2\,x^{q_2}\right)}^{m_2}\,{\left(a+b\,\ln\left(c\,x^n\right)\right)}^p \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d1*x^q1)^m1*(d2*x^q2)^m2*(a + b*log(c*x^n))^p,x)
```

```
[Out] int((d1*x^q1)^m1*(d2*x^q2)^m2*(a + b*log(c*x^n))^p, x)
```

Chapter 4

Appendix

Local contents

4.1 Download section

The following zip files contain the raw integrals used in this test.

Mathematica format Mathematica_syntax.zip

Maple and Mupad format Maple_syntax.zip

Sympy format SYMPY_syntax.zip

Sage math format SAGE_syntax.zip

4.2 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.2.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                       Small rewrite of logic in main function to make it*)
(*                       match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)


(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*          GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)
```

```
GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leafC
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A","none"}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count
                  ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
               finalresult={"A","none"}
            ,(*ELSE*)
               finalresult={"B","Leaf count is larger than twice the leaf count of optimal. $
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "<
            ,
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
```

```
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
```

```
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

4.2.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issues
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);
```

```
        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;


    if ExpnType_result<=ExpnType_optimal then
        if debug then
             print("ExpnType_result<=ExpnType_optimal");
        fi;
        if is_contains_complex(result) then
            if is_contains_complex(optimal) then
                if debug then
                        print("both result and optimal complex");
                fi;
                if leaf_count_result<=2*leaf_count_optimal then
                    return "A","";
                else
                   return "B",cat("Both result and optimal contain complex but leaf count of re
                                convert(leaf_count_result,string)," vs. $2 (",
                                convert(leaf_count_optimal,string)," ) = ",convert(2*leaf_co
                end if
            else #result contains complex but optimal is not
                if debug then
                        print("result contains complex but optimal is not");
                fi;
                return "C","Result contains complex when optimal does not.";
            fi;
        else # result do not contain complex
```

```
             # this assumes optimal do not as well. No check is needed here.
            if debug then
                   print("result do not contain complex, this assumes optimal do not as well"
            fi;
            if leaf_count_result<=2*leaf_count_optimal then
                if debug then
                    print("leaf_count_result<=2*leaf_count_optimal");
                fi;
                return "A","";
            else
                if debug then
                    print("leaf_count_result>2*leaf_count_optimal");
                fi;
                return "B",cat("Leaf count of result is larger than twice the leaf count of o
                               convert(leaf_count_result,string),"$ vs. $2(",
                               convert(leaf_count_optimal,string),")=",convert(2*leaf_cou
            fi;
        fi;
    else #ExpnType(result) > ExpnType(optimal)
        if debug then
            print("ExpnType(result) > ExpnType(optimal)");
        fi;
        return "C",cat("Result contains higher order function than in optimal. Order ",
                       convert(ExpnType_result,string)," vs. order ",
                       convert(ExpnType_optimal,string),".");
    fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
```

```
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
```

```
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

4.2.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#             Port of original Maple grading function by
#             Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#             added 'exp_polar'
from sympy import *

def leaf_count(expr):
   #sympy do not have leaf count function. This is approximation
   return round(1.7*count_ops(expr))

def is_sqrt(expr):
   if isinstance(expr,Pow):
      if expr.args[1] == Rational(1,2):
         return True
      else:
         return False
   else:
      return False

def is_elementary_function(func):
   return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
         asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
         asinh,acosh,atanh,acoth,asech,acsch
      ]

def is_special_function(func):
   return func in [ erf,erfc,erfi,
          fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
          gamma,loggamma,digamma,zeta,polylog,LambertW,
          elliptic_f,elliptic_e,elliptic_pi,exp_polar
       ]

def is_hypergeometric_function(func):
   return func in [hyper]

def is_appell_function(func):
   return func in [appellf1]

def is_atom(expn):
   try:
      if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
        return True
      else:
        return False
```

```
    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
        return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow):   #type(expn,'`^`')
        if isinstance(expn.args[1],Integer):  #type(op(2,expn),'integer')
            return expnType(expn.args[0])   #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational):  #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),ExpnT
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
```

```
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
    else:
        if expnType_result <= expnType_optimal:
            if result.has(I):
                if optimal.has(I): #both result and optimal complex
                    if leaf_count_result <= 2*leaf_count_optimal:
                        grade = "A"
                        grade_annotation =""
                    else:
                        grade = "B"
                        grade_annotation ="Both result and optimal contain complex but leaf count of result is larger
                else: #result contains complex but optimal is not
                    grade = "C"
                    grade_annotation ="Result contains complex when optimal does not."
            else: # result do not contain complex, this assumes optimal do not as well
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =""
                else:
                    grade = "B"
                    grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(lea
        else:
            grade = "C"
            grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType_re
```

```
    #print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

    return grade, grade_annotation
```

4.2.4 SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#          Albert Rich to use with Sagemath. This is used to
#          grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#          'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#          issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    #print("Enter tree_size, expr is ",expr)

    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
    if expr.operator() == operator.pow:   #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
        else:
            return False
    else:
        return False
```

```
def is_elementary_function(func):
    #debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    #debug=False
    if debug:
        print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
          'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
          'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
          'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
          'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m


def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
    return func.name() in ['hypergeometric']   #[appellf1] can't find this in sagemath
```

```
def is_atom(expn):

    #debug=False
    if debug:
        print ("Enter is_atom, expn=",expn)

    if not hasattr(expn, 'parent'):
        return False


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic-
    try:
        if expn.parent() is SR:
            return expn.operator() is None
        if expn.parent() in (ZZ, QQ, AA, QQbar):
            return expn in expn.parent() # Should always return True
        if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
            return expn in expn.parent().base_ring() or expn in expn.parent().gens()

        return False

    except AttributeError as error:
        print("Exception,AttributeError in  is_atom")
        print ("cought exception" , type(error).__name__ )
        return False


def expnType(expn):

    if debug:
        print (">>>>>Enter expnType, expn=", expn)
        print (">>>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list:   #isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if  type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    elif expn.operator() == operator.pow:   #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:   #isinstance(expn.args[1],Integer)
            return expnType(expn.operands()[0])   #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational:   #isinstance(expn.args[1],Rational)
            if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],Rational)
```

```
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    else:
        return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1])) #max(3,expnType(expn.op
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isinstan
        m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
        m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
        return max(3,expnType(expn.operands()[0]))
    elif is_special_function(expn.operator()): #is_special_function(expn.func)
        m1 = max(map(expnType, expn.operands()))     #max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,m1)
    elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,m1)
    elif is_appell_function(expn.operator()):
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(6,m1)
    elif str(expn).find("Integral") != -1: #this will never happen, since it
            #is checked before calling the grading function that is passed.
            #but kept it here.
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):


    if debug:
        print ("Enter grade_antiderivative for sagemath")
        print("Enter grade_antiderivative, result=",result)
        print("Enter grade_antiderivative, optimal=",optimal)
        print("type(anti)=",type(result))
        print("type(optimal)=",type(optimal))

    leaf_count_result  = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    #if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)
```

```
if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

if expnType_result <= expnType_optimal:
    if result.has(I):
        if optimal.has(I): #both result and optimal complex
            if leaf_count_result <= 2*leaf_count_optimal:
                grade = "A"
                grade_annotation ="none"
            else:
                grade = "B"
                grade_annotation ="Both result and optimal contain complex but leaf count of result is larger t
        else: #result contains complex but optimal is not
            grade = "C"
            grade_annotation ="Result contains complex when optimal does not."
    else: # result do not contain complex, this assumes optimal do not as well
        if leaf_count_result <= 2*leaf_count_optimal:
            grade = "A"
            grade_annotation ="none"
        else:
            grade = "B"
            grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(leaf_
else:
    grade = "C"
    grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_resu


print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

return grade, grade_annotation
```