Computer algebra independent integration tests

4-Trig-functions/4.7-Miscellaneous/4.7.5-x^m-trig-a+b-log-c-x^n-^p

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Contents

Chapter 1

Introduction

This report gives the result of running the computer algebra independent integration problems. The listing of the problems are maintained by and can be downloaded from `https://rulebasedintegration.org`

The number of integrals in this report is [330]. This is test number [139].

1.1 Listing of CAS systems tested

The following systems were tested at this time.

1. Mathematica 12.3 (64 bit) on windows 10.
2. Rubi 4.16.1 in Mathematica 12.1 on windows 10.
3. Maple 2021.1 (64 bit) on windows 10.
4. Maxima 5.44 on Linux. (via sagemath 9.3)
5. Fricas 1.3.7 on Linux (via sagemath 9.3)
6. Giac/Xcas 1.7 on Linux. (via sagemath 9.3)
7. Sympy 1.8 under Python 3.8.8 using Anaconda distribution on Ubuntu.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 under windows 10 (64 bit)

Maxima, Fricas and Giac/Xcas were called from inside 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 using 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	% 76.97 (254)	% 23.03 (76)
Mathematica	% 92.42 (305)	% 7.58 (25)
Maple	% 32.42 (107)	% 67.58 (223)
Maxima	% 42.12 (139)	% 57.88 (191)
Fricas	% 44.85 (148)	% 55.15 (182)
Sympy	% 19.70 (65)	% 80.30 (265)
Giac	% 22.42 (74)	% 77.58 (256)
Mupad	% 45.15 (149)	% 54.85 (181)

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.

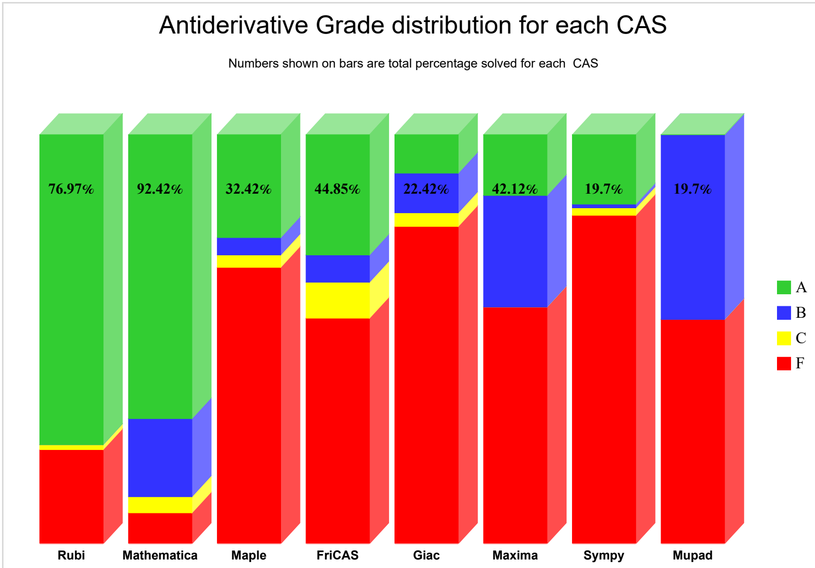
Table 1.2: Description of grading applied to integration result

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

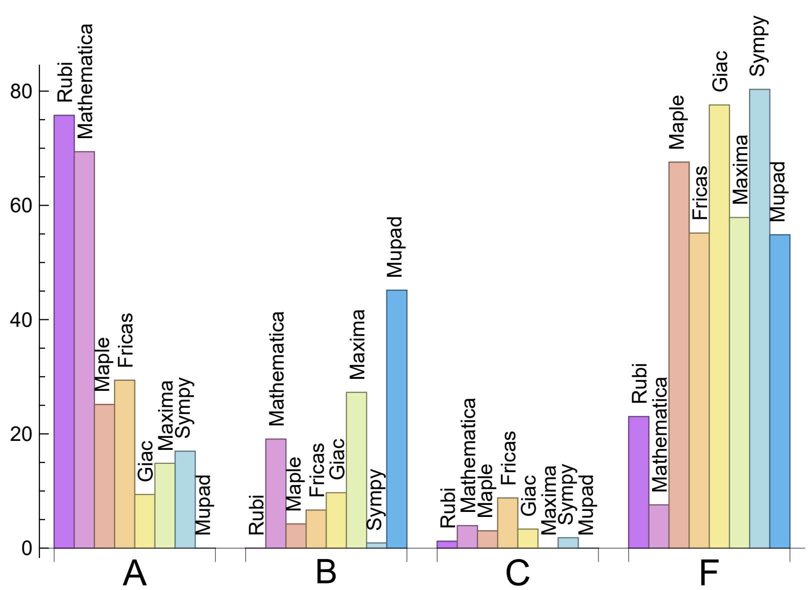
System	% A grade	% B grade	% C grade	% F grade
Rubi	75.76	0.00	1.21	23.03
Mathematica	69.39	19.09	3.94	7.58
Maple	25.15	4.24	3.03	67.58
Maxima	14.85	27.27	0.00	57.88
Fricas	29.39	6.67	8.79	55.15
Sympy	16.97	0.91	1.82	80.30
Giac	9.39	9.70	3.33	77.58
Mupad	0.00	45.15	0.00	54.85

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 timeout failure	Percentage exception failure
Rubi	76	100.00 %	0.00 %	0.00 %
Mathematica	25	100.00 %	0.00 %	0.00 %
Maple	223	100.00 %	0.00 %	0.00 %
Maxima	191	82.72 %	16.23 %	1.05 %
Fricas	182	66.48 %	0.00 %	33.52 %
Sympy	265	80.38 %	19.62 %	0.00 %
Giac	256	64.84 %	33.59 %	1.56 %
Mupad	181	100.00 %	0.00 %	0.00 %

Table 1.4: Time and leaf size performance for each CAS

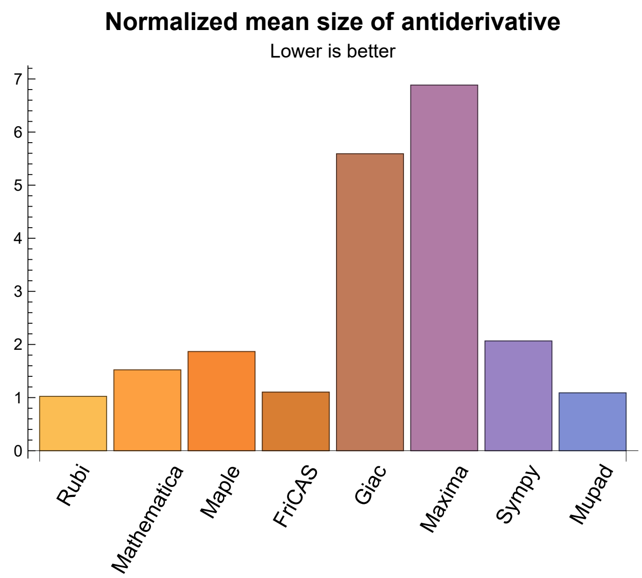
1.3 Performance

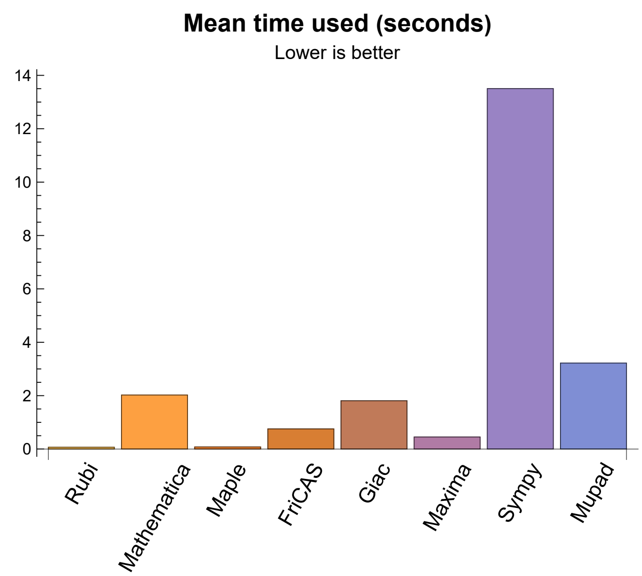
The table below summarizes the performance of each CAS system in terms of CPU time and leaf size of results.

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.07	101.85	1.02	98.00	1.00
Mathematica	2.02	147.69	1.52	120.00	1.13
Maple	0.08	105.01	1.87	63.00	1.15
Maxima	0.45	497.22	6.88	193.00	3.26
Fricas	0.75	79.59	1.10	63.00	0.88
Sympy	13.50	152.34	2.07	54.00	1.42
Giac	1.81	444.84	5.59	81.00	1.71
Mupad	3.22	77.91	1.09	59.00	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 columns from the above table.





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 {259, 260, 262, 301, 302, 304}

Mathematica {53, 54, 56, 57, 58, 59, 61, 62, 63, 65, 67, 74, 75, 76, 77, 78, 79, 80, 81, 82, 84, 85, 110, 112, 114, 116, 118, 120, 127, 128, 129, 130, 131, 132, 133, 134, 153, 155, 156, 157, 177, 178, 204, 206, 207, 208, 228, 229, 243, 244, 245, 247, 248, 249, 250, 252, 253, 254, 255, 257, 258, 266, 268, 270, 272, 274, 276, 278, 279, 281, 282, 283, 284, 285, 286, 287, 288, 295, 297, 299, 306, 307, 308, 310, 312, 314, 316, 318, 320, 322, 323, 324, 325, 326, 327, 328, 329, 330}

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 `AboluteTiming[]` 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 has 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 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 is 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 produced was correct.

Verification phase has 3 minutes time out. An integral whose result was not verified could still be correct. Further investigation is needed on those integrals which failed verifications. Such integrals are 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 these integrals are run in a batch mode, using an automated script, and by using sagemath (SageMath uses Maxima), then any integral where Maxima needs an interactive response from the user to answer a question during evaluation of the integral in order to complete the integration, will fail and is counted as failed.

The exception raised is `ValueError`. Therefore Maxima result below is lower than what could result if Maxima was run directly and each question Maxima asks 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 pecrentage can be higher or lower depending on the specific input test file.

Such integrals can be indentified by looking at the output of the integration in each section for Maxima. The exception message will indicate of the error is due to the interactive question being asked or not.

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 loading of Maxima `abs_integrate` was found to cause some problem. 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 and Giac/XCAS results

There are Few integrals which failed due to SageMath not able to translate the result back to SageMath syntax and not because these CAS system were not able to do the integrations.

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.

Hopefully the next version of SageMath will have complete translation of FriCAS and XCAS syntax and I will re-run all the tests again when this happens.

1.9.3 Important note about finding leaf size of antiderivative

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

The other CAS systems (SageMath and Sympy) do not have special buildin function for this purpose at this time. Therefore the leaf size for Fricas and Sympy and Giac antiderivatives is 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 is called directly from Python, the following code is 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.

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.

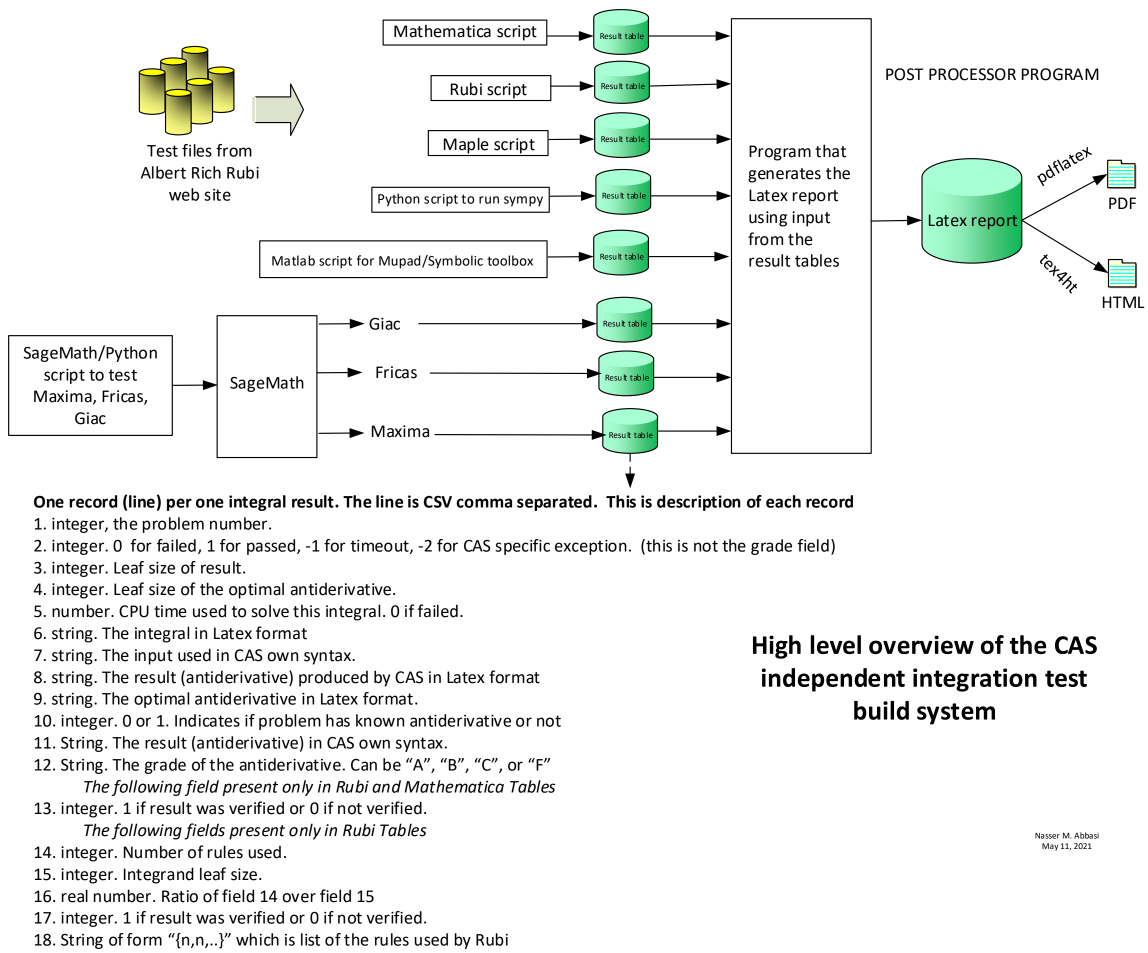
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

```
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

2.1 List of integrals sorted by grade for each CAS

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, 139, 147, 162, 169, 172, 173, 174, 180, 181, 182, 183, 184, 185, 190, 198, 213, 220, 223, 224, 225, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

B grade: { }

C grade: { 259, 260, 301, 302 }

F grade: { 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 146, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 163, 164, 165, 166, 167, 168, 170, 171, 175, 176, 177, 178, 179, 186, 187, 188, 189, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 221, 222, 226, 227, 228, 229, 230 }

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, 30, 37, 40, 44, 48, 50, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 73, 74, 76, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 108, 111, 112, 113, 115, 116, 117, 119, 120, 121, 122, 123, 124, 126, 127, 129, 131, 132, 133, 134, 136, 138, 139, 140, 142, 144, 146, 147, 148, 150, 151, 152, 154, 155, 156, 157, 162, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 177, 179, 181, 183, 187, 189, 190, 191, 193, 195, 197, 199, 201, 202, 203, 205, 206, 207, 208, 213, 216, 217, 218, 219, 221, 222, 223, 225, 226, 228, 230, 232, 234, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 256, 259, 260, 264, 265, 266, 267, 269, 270, 271, 273, 274, 275, 277, 278, 280, 281, 283, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 296, 297, 298, 300, 301, 302, 306, 307, 308, 309, 311, 312, 313, 315, 316, 317, 319, 322, 323, 325, 327, 328, 329, 330 }

B grade: { 75, 77, 89, 110, 114, 118, 128, 130, 135, 137, 141, 143, 145, 149, 153, 158, 159, 160, 161, 163, 164, 176, 178, 186, 188, 192, 194, 196, 200, 204, 209, 210, 211, 212, 214, 215, 227, 229, 254, 255, 257, 258, 261, 262, 263, 268, 272, 276, 279, 282, 284, 292, 299, 303, 304, 305, 310, 314, 318, 320, 321, 324, 326 }

C grade: { 72, 125, 180, 182, 184, 185, 198, 220, 224, 231, 233, 235, 236 }

F grade: { 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 38, 39, 41, 42, 43, 45, 46, 47, 49, 51, 104, 105, 106, 107, 109 }

2.1.3 Maple

A grade: { 4, 10, 16, 22, 30, 37, 44, 55, 60, 64, 66, 68, 89, 94, 99, 102, 119, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 162, 169, 172, 173, 174, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 213, 223, 224, 225, 231, 232, 233, 234, 235, 236, 240, 246, 251, 256, 269, 292, 296, 298, 300, 309, 311, 313, 315, 317, 319 }

B grade: { 25, 48, 50, 52, 111, 113, 115, 121, 220, 267, 271, 273, 275, 277 }

C grade: { 103, 117, 259, 261, 262, 263, 301, 303, 304, 305 }

F grade: { 1, 2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 23, 24, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 45, 46, 47, 49, 51, 53, 54, 56, 57, 58, 59, 61, 62, 63, 65, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 95, 96, 97, 98, 100, 101, 104, 105, 106, 107, 108, 109, 110, 112, 114, 116, 118, 120, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 163, 164, 165, 166, 167, 168, 170, 171, 175, 176, 177, 178, 179, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 221, 222, 226, 227, 228, 229, 230, 237, 238, 239, 241, 242, 243, 244, 245, 247, 248, 249, 250, 252, 253, 254, 255, 257, 258, 260, 264, 265, 266, 268, 270, 272, 274, 276, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 297, 299, 302, 306, 307, 308, 310, 312, 314, 316, 318, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

2.1.4 Maxima

A grade: { 4, 10, 22, 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, 89, 94, 102, 103, 104, 105, 106, 107, 108, 109, 139, 147, 162, 190, 198, 213, 240, 292 }

B grade: { 1, 2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 69, 72, 73, 86, 87, 88, 90, 91, 92, 93, 95, 96, 97, 98, 99, 100, 101, 122, 123, 124, 125, 126, 135, 136, 137, 138, 140, 141, 142, 143, 144, 145, 146, 148, 169, 172, 173, 174, 186, 187, 188, 189, 191, 192, 193, 194, 195, 196, 197, 199, 220, 223, 224, 225, 246, 256, 259, 260, 261, 262, 263, 296, 298, 300, 301, 302, 303, 304, 305 }

C grade: { }

F grade: { 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 127, 128, 129, 130, 131, 132, 133, 134, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 163, 164, 165, 166, 167, 168, 170, 171, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 221, 222, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 241, 242, 243, 244, 245, 247, 248, 249, 250, 251, 252, 253, 254, 255, 257, 258, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 297, 299, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

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, 30, 37, 44, 48, 69, 70, 71, 72, 73, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 122, 123, 124, 125, 126, 135, 136, 137, 138, 139, 141, 142, 143, 144, 145, 148, 149, 162, 172, 186, 188, 190, 191, 192, 193, 194, 196, 197, 199, 200, 213, 223, 246, 251, 256, 259, 261, 262, 264, 296, 300, 301, 303, 304, 306 }

B grade: { 50, 52, 140, 146, 147, 169, 173, 174, 187, 189, 195, 198, 220, 224, 225, 240, 263, 265, 292, 298, 305, 307 }

C grade: { 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 45, 46, 47, 49, 51, 104, 105, 106, 107, 108, 109, 260, 302 }

F grade: { 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 127, 128, 129, 130, 131, 132, 133, 134, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 163, 164, 165, 166, 167, 168, 170, 171, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 221, 222, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 241, 242, 243, 244, 245, 247, 248, 249, 250, 252, 253, 254, 255, 257, 258, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 297, 299, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

2.1.6 Sympy

A grade: { 4, 5, 6, 10, 11, 12, 16, 22, 25, 30, 37, 44, 89, 90, 94, 95, 99, 102, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 162, 172, 173, 174, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 213, 224, 240, 292 }

B grade: { 17, 18, 100 }

C grade: { 31, 32, 38, 39, 45, 46 }

F grade: { 1, 2, 3, 7, 8, 9, 13, 14, 15, 19, 20, 21, 23, 24, 26, 27, 28, 29, 33, 34, 35, 36, 40, 41, 42, 43, 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, 91, 92, 93, 96, 97, 98, 101, 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, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 163, 164, 165, 166, 167, 168, 169, 170, 171, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

2.1.7 Giac

A grade: { 25, 27, 28, 29, 30, 34, 35, 36, 37, 44, 48, 50, 103, 105, 107, 135, 136, 137, 138, 140, 141, 142, 148, 186, 187, 188, 193, 195, 199, 262, 304 }

B grade: { 1, 2, 3, 7, 8, 9, 73, 86, 87, 88, 91, 92, 93, 126, 139, 143, 144, 145, 146, 147, 149, 189, 190, 191, 192, 194, 196, 197, 198, 200, 263, 305 }

C grade: { 26, 33, 40, 47, 49, 51, 104, 106, 108, 260, 302 }

F grade: { 4, 5, 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 31, 32, 38, 39, 41, 42, 43, 45, 46, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 89, 90, 94, 95, 96, 97, 98, 99, 100, 101, 102, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 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, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 261, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 303, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

2.1.8 Mupad

A grade: { }

B grade: { 1, 2, 3, 4, 7, 8, 9, 10, 13, 14, 15, 16, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 33, 34, 35, 36, 37, 40, 42, 43, 44, 47, 49, 51, 55, 60, 64, 66, 68, 69, 70, 71, 72, 73, 83, 86, 87, 88, 89, 91, 92, 93, 94, 96, 97, 98, 99, 101, 102, 103, 104, 105, 106, 107, 108, 109, 111, 113, 115, 117, 119, 121, 122, 123, 124, 125, 126, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 162, 169, 172, 173, 174, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 213, 220, 223, 224, 225, 231, 232, 233, 234, 235, 236, 240, 246, 251, 256, 259, 260, 261, 262, 263, 267, 292, 296, 298, 300, 301, 302, 303, 304, 305, 309 }

C grade: { }

F grade: { 5, 6, 11, 12, 17, 18, 23, 24, 31, 32, 38, 39, 41, 45, 46, 48, 50, 52, 53, 54, 56, 57, 58, 59, 61, 62, 63, 65, 67, 74, 75, 76, 77, 78, 79, 80, 81, 82, 84, 85, 90, 95, 100, 110, 112, 114, 116, 118, 120, 127, 128, 129, 130, 131, 132, 133, 134, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 163, 164, 165, 166, 167, 168, 170, 171, 175, 176, 177, 178, 179, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 221, 222, 226, 227, 228, 229, 230, 237, 238, 239, 241, 242, 243, 244, 245, 247, 248, 249, 250, 252, 253, 254, 255, 257, 258, 264, 265, 266, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 297, 299, 306, 307, 308, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330 }

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 **normalized size** is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$

Problem 1	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	44	0	219	49	0	923	44
normalized size	1	1.00	0.77	0.00	3.84	0.86	0.00	16.19	0.77
time (sec)	N/A	0.017	0.096	0.036	0.352	0.762	0.000	0.338	2.494

Problem 2	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	44	0	219	49	0	923	44
normalized size	1	1.00	0.77	0.00	3.84	0.86	0.00	16.19	0.77
time (sec)	N/A	0.013	0.069	0.026	0.363	0.844	0.000	1.653	2.392

Problem 3	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	40	0	206	45	0	882	40
normalized size	1	1.00	0.77	0.00	3.96	0.87	0.00	16.96	0.77
time (sec)	N/A	0.011	0.055	0.023	0.360	0.905	0.000	0.430	2.329

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	38	20	19	20	39	0	19
normalized size	1	1.00	2.00	1.05	1.00	1.05	2.05	0.00	1.00
time (sec)	N/A	0.015	0.028	0.006	0.318	0.595	0.943	0.000	2.256

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	40	0	209	44	287	0	-1
normalized size	1	1.00	0.70	0.00	3.67	0.77	5.04	0.00	-0.02
time (sec)	N/A	0.018	0.071	0.022	0.356	0.532	7.538	0.000	0.000

Problem 6	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	44	0	216	46	352	0	-1
normalized size	1	1.00	0.77	0.00	3.79	0.81	6.18	0.00	-0.02
time (sec)	N/A	0.015	0.070	0.024	0.349	0.760	24.893	0.000	0.000

Problem 7	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	61	0	301	80	0	833	67
normalized size	1	1.00	0.63	0.00	3.10	0.82	0.00	8.59	0.69
time (sec)	N/A	0.031	0.159	0.078	0.349	0.813	0.000	0.505	3.279

Problem 8	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	57	0	282	78	0	820	67
normalized size	1	1.00	0.58	0.00	2.88	0.80	0.00	8.37	0.68
time (sec)	N/A	0.022	0.122	0.062	0.348	0.509	0.000	0.504	2.565

Problem 9	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	56	0	280	73	0	786	56
normalized size	1	1.00	0.64	0.00	3.18	0.83	0.00	8.93	0.64
time (sec)	N/A	0.019	0.090	0.070	0.360	0.434	0.000	0.400	2.467

Problem 10	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	36	52	55	40	56	0	32
normalized size	1	1.00	0.92	1.33	1.41	1.03	1.44	0.00	0.82
time (sec)	N/A	0.030	0.065	0.023	0.342	0.658	3.870	0.000	2.399

Problem 11	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	57	0	283	71	415	0	-1
normalized size	1	1.00	0.60	0.00	2.98	0.75	4.37	0.00	-0.01
time (sec)	N/A	0.026	0.111	0.068	0.354	0.673	24.231	0.000	0.000

Problem 12	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	58	0	280	69	672	0	-1
normalized size	1	1.00	0.59	0.00	2.86	0.70	6.86	0.00	-0.01
time (sec)	N/A	0.026	0.109	0.062	0.347	0.526	25.802	0.000	0.000

Problem 13	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	160	160	122	0	1008	138	0	0	122
normalized size	1	1.00	0.76	0.00	6.30	0.86	0.00	0.00	0.76
time (sec)	N/A	0.055	0.525	0.071	0.390	0.460	0.000	0.000	3.121

Problem 14	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	125	0	1016	140	0	0	122
normalized size	1	1.00	0.79	0.00	6.43	0.89	0.00	0.00	0.77
time (sec)	N/A	0.045	0.487	0.066	0.387	0.644	0.000	0.000	3.048

Problem 15	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	121	0	990	130	0	0	114
normalized size	1	1.00	0.81	0.00	6.64	0.87	0.00	0.00	0.77
time (sec)	N/A	0.037	0.473	0.071	0.390	0.522	0.000	0.000	2.893

Problem 16	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	45	35	233	37	83	0	37
normalized size	1	1.00	1.05	0.81	5.42	0.86	1.93	0.00	0.86
time (sec)	N/A	0.032	0.059	0.026	0.361	0.624	10.951	0.000	2.432

Problem 17	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	125	0	995	127	1020	0	-1
normalized size	1	1.00	0.79	0.00	6.30	0.80	6.46	0.00	-0.01
time (sec)	N/A	0.047	0.332	0.066	0.403	0.915	125.897	0.000	0.000

Problem 18	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	125	0	1007	129	1197	0	-1
normalized size	1	1.00	0.79	0.00	6.37	0.82	7.58	0.00	-0.01
time (sec)	N/A	0.048	0.389	0.066	0.406	0.698	160.477	0.000	0.000

Problem 19	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	202	202	171	0	1107	178	0	0	127
normalized size	1	1.00	0.85	0.00	5.48	0.88	0.00	0.00	0.63
time (sec)	N/A	0.078	0.498	0.088	0.410	0.499	0.000	0.000	3.116

Problem 20	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	210	169	0	1085	177	0	0	127
normalized size	1	1.00	0.80	0.00	5.17	0.84	0.00	0.00	0.60
time (sec)	N/A	0.061	0.438	0.074	0.409	0.564	0.000	0.000	3.038

Problem 21	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	168	0	1078	165	0	0	117
normalized size	1	1.00	0.88	0.00	5.64	0.86	0.00	0.00	0.61
time (sec)	N/A	0.051	0.392	0.074	0.406	0.456	0.000	0.000	2.864

Problem 22	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	51	84	93	59	110	0	51
normalized size	1	1.00	0.70	1.15	1.27	0.81	1.51	0.00	0.70
time (sec)	N/A	0.049	0.085	0.027	0.362	0.512	22.744	0.000	2.582

Problem 23	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	202	202	170	0	1085	162	0	0	-1
normalized size	1	1.00	0.84	0.00	5.37	0.80	0.00	0.00	-0.00
time (sec)	N/A	0.066	0.509	0.078	0.408	0.573	0.000	0.000	0.000

Problem 24	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	210	169	0	1082	163	0	0	-1
normalized size	1	1.00	0.80	0.00	5.15	0.78	0.00	0.00	-0.00
time (sec)	N/A	0.063	0.455	0.078	0.412	0.629	0.000	0.000	0.000

Problem 25	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	29	76	27	33	56	35	36
normalized size	1	1.00	0.74	1.95	0.69	0.85	1.44	0.90	0.92
time (sec)	N/A	0.014	0.015	0.017	0.324	0.785	0.704	0.159	2.158

Problem 26	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	133	133	0	0	82	62	0	272	135
normalized size	1	1.00	0.00	0.00	0.62	0.47	0.00	2.05	1.02
time (sec)	N/A	0.277	0.356	0.040	0.392	0.758	0.000	2.077	3.942

Problem 27	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	0	0	31	42	0	1	85
normalized size	1	1.00	0.00	0.00	0.35	0.48	0.00	0.01	0.97
time (sec)	N/A	0.099	0.191	0.029	0.358	0.525	0.000	0.574	3.021

Problem 28	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	0	0	31	42	0	1	85
normalized size	1	1.00	0.00	0.00	0.35	0.48	0.00	0.01	0.97
time (sec)	N/A	0.052	0.161	0.026	0.359	0.507	0.000	0.499	2.805

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	0	0	29	42	0	1	81
normalized size	1	1.00	0.00	0.00	0.35	0.51	0.00	0.01	0.99
time (sec)	N/A	0.052	0.113	0.025	0.360	0.566	0.000	0.428	2.726

Problem 30	Optimal	Rubi	Mathematica	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	6	5
normalized size	1	1.00	1.00	1.20	1.00	1.00	1.00	1.20	1.00
time (sec)	N/A	0.004	0.001	0.001	0.311	0.404	0.048	0.265	0.031

Problem 31	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	C	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	0	0	33	45	226	0	-1
normalized size	1	1.00	0.00	0.00	0.38	0.52	2.63	0.00	-0.01
time (sec)	N/A	0.061	0.109	0.023	0.351	0.431	4.888	0.000	0.000

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	C	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	0	0	35	45	252	0	-1
normalized size	1	1.00	0.00	0.00	0.40	0.51	2.86	0.00	-0.01
time (sec)	N/A	0.053	0.123	0.023	0.356	0.471	16.181	0.000	0.000

Problem 33	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	0	0	173	107	0	498	145
normalized size	1	1.00	0.00	0.00	1.48	0.91	0.00	4.26	1.24
time (sec)	N/A	0.159	0.477	0.102	0.404	0.430	0.000	4.958	3.846

Problem 34	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F(-1)	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	0	0	47	59	0	1	92
normalized size	1	1.00	0.00	0.00	0.62	0.78	0.00	0.01	1.21
time (sec)	N/A	0.076	0.292	0.083	0.366	0.481	0.000	5.001	2.967

Problem 35	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	0	0	47	60	0	1	92
normalized size	1	1.00	0.00	0.00	0.62	0.79	0.00	0.01	1.21
time (sec)	N/A	0.058	0.185	0.080	0.364	0.539	0.000	0.958	2.888

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	0	0	41	57	0	1	86
normalized size	1	1.00	0.00	0.00	0.60	0.84	0.00	0.01	1.26
time (sec)	N/A	0.055	0.128	0.086	0.362	0.428	0.000	0.805	2.661

Problem 37	Optimal	Rubi	Mathematica	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	7	7	7	8	7	10	7	8	7
normalized size	1	1.00	1.00	1.14	1.00	1.43	1.00	1.14	1.00
time (sec)	N/A	0.006	0.001	0.002	0.308	0.401	0.048	0.164	0.021

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	C	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	0	0	48	62	240	0	-1
normalized size	1	1.00	0.00	0.00	0.65	0.84	3.24	0.00	-0.01
time (sec)	N/A	0.068	0.212	0.073	0.361	0.429	28.493	0.000	0.000

Problem 39	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	C	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	0	0	54	65	462	0	-1
normalized size	1	1.00	0.00	0.00	0.71	0.86	6.08	0.00	-0.01
time (sec)	N/A	0.062	0.173	0.069	0.370	0.432	16.772	0.000	0.000

Problem 40	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	C	F	C	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	226	169	0	195	128	0	1870	297
normalized size	1	1.00	0.75	0.00	0.86	0.57	0.00	8.27	1.31
time (sec)	N/A	0.079	1.503	0.086	0.453	0.444	0.000	10.245	4.706

Problem 41	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F(-1)	F(-2)	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	172	172	0	0	90	82	0	0	-1
normalized size	1	1.00	0.00	0.00	0.52	0.48	0.00	0.00	-0.01
time (sec)	N/A	0.161	0.310	0.074	0.380	0.496	0.000	0.000	0.000

Problem 42	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F(-1)	F(-2)	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	0	0	112	84	0	0	163
normalized size	1	1.00	0.00	0.00	0.63	0.47	0.00	0.00	0.92
time (sec)	N/A	0.111	0.351	0.073	0.366	0.553	0.000	0.000	3.317

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	F(-2)	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	168	168	0	0	106	84	0	0	155
normalized size	1	1.00	0.00	0.00	0.63	0.50	0.00	0.00	0.92
time (sec)	N/A	0.105	0.211	0.083	0.365	0.463	0.000	0.000	2.985

Problem 44	Optimal	Rubi	Mathematica	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	7	7	7	8	7	12	7	8	7
normalized size	1	1.00	1.00	1.14	1.00	1.71	1.00	1.14	1.00
time (sec)	N/A	0.005	0.001	0.001	0.300	0.389	0.048	0.219	2.116

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	C	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	176	176	0	0	122	87	316	0	-1
normalized size	1	1.00	0.00	0.00	0.69	0.49	1.80	0.00	-0.01
time (sec)	N/A	0.132	0.237	0.075	0.372	0.449	90.205	0.000	0.000

Problem 46	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	C	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	0	0	128	87	352	0	-1
normalized size	1	1.00	0.00	0.00	0.72	0.49	1.98	0.00	-0.01
time (sec)	N/A	0.114	0.258	0.072	0.376	0.450	113.382	0.000	0.000

Problem 47	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	0	0	48	50	0	189	139
normalized size	1	1.00	0.00	0.00	0.43	0.45	0.00	1.69	1.24
time (sec)	N/A	0.194	0.275	0.056	0.351	0.442	0.000	0.793	3.129

Problem 48	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	52	52	44	106	31	24	0	29	-1
normalized size	1	1.00	0.85	2.04	0.60	0.46	0.00	0.56	-0.02
time (sec)	N/A	0.035	0.064	0.038	0.355	0.440	0.000	0.306	0.000

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	0	0	134	75	0	350	149
normalized size	1	1.00	0.00	0.00	1.26	0.71	0.00	3.30	1.41
time (sec)	N/A	0.145	0.355	0.078	0.368	0.443	0.000	1.999	3.044

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	60	173	48	145	0	32	-1
normalized size	1	1.00	1.13	3.26	0.91	2.74	0.00	0.60	-0.02
time (sec)	N/A	0.045	0.104	0.094	0.346	0.831	0.000	0.374	0.000

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	218	218	0	0	206	97	0	1297	291
normalized size	1	1.00	0.00	0.00	0.94	0.44	0.00	5.95	1.33
time (sec)	N/A	0.305	0.515	0.068	0.374	0.429	0.000	3.956	4.078

Problem 52	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	103	284	75	204	0	0	-1
normalized size	1	1.00	1.05	2.90	0.77	2.08	0.00	0.00	-0.01
time (sec)	N/A	0.061	0.131	0.106	0.359	4.418	0.000	0.000	0.000

Problem 53	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	94	0	0	0	0	0	-1
normalized size	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.086	1.386	0.247	0.000	0.000	0.000	0.000	0.000

Problem 54	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	96	0	0	0	0	0	-1
normalized size	1	1.00	0.87	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.075	1.360	0.048	0.000	0.000	0.000	0.000	0.000

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	32	129	0	0	0	0	26
normalized size	1	1.00	1.10	4.45	0.00	0.00	0.00	0.00	0.90
time (sec)	N/A	0.027	0.081	0.072	0.000	0.491	0.000	0.000	2.323

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	99	0	0	0	0	0	-1
normalized size	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.088	1.452	0.050	0.000	0.000	0.000	0.000	0.000

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	95	0	0	0	0	0	-1
normalized size	1	1.00	0.86	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.090	1.435	0.049	0.000	0.000	0.000	0.000	0.000

Problem 58	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	159	0	0	0	0	0	-1
normalized size	1	1.00	1.43	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.078	1.828	0.051	0.000	0.000	0.000	0.000	0.000

Problem 59	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	161	0	0	0	0	0	-1
normalized size	1	1.00	1.48	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.073	1.894	0.051	0.000	0.000	0.000	0.000	0.000

Problem 60	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	58	131	0	0	0	0	65
normalized size	1	1.00	0.85	1.93	0.00	0.00	0.00	0.00	0.96
time (sec)	N/A	0.042	0.136	0.062	0.000	0.477	0.000	0.000	2.532

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	172	0	0	0	0	0	-1
normalized size	1	1.00	1.55	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.088	1.176	0.050	0.000	0.000	0.000	0.000	0.000

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	111	111	168	0	0	0	0	0	-1
normalized size	1	1.00	1.51	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.087	1.202	0.049	0.000	0.000	0.000	0.000	0.000

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	96	0	0	0	0	0	-1
normalized size	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	0.379	0.053	0.000	0.000	0.000	0.000	0.000

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	32	102	0	0	0	0	26
normalized size	1	1.00	1.10	3.52	0.00	0.00	0.00	0.00	0.90
time (sec)	N/A	0.027	0.092	0.049	0.000	0.421	0.000	0.000	2.553

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	96	0	0	0	0	0	-1
normalized size	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	0.919	0.053	0.000	0.000	0.000	0.000	0.000

Problem 66	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	57	190	0	0	0	0	65
normalized size	1	1.00	0.89	2.97	0.00	0.00	0.00	0.00	1.02
time (sec)	N/A	0.042	0.178	0.065	0.000	0.531	0.000	0.000	2.734

Problem 67	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	125	0	0	0	0	0	-1
normalized size	1	1.00	1.15	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.074	1.506	0.066	0.000	0.000	0.000	0.000	0.000

Problem 68	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F(-1)	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	61	131	0	0	0	0	65
normalized size	1	1.00	0.90	1.93	0.00	0.00	0.00	0.00	0.96
time (sec)	N/A	0.042	0.197	0.082	0.000	0.583	0.000	0.000	2.962

Problem 69	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	81	0	402	43	0	0	50
normalized size	1	1.00	1.65	0.00	8.20	0.88	0.00	0.00	1.02
time (sec)	N/A	0.039	0.134	0.293	0.643	0.514	0.000	0.000	2.937

Problem 70	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	337	337	341	0	0	467	0	0	175
normalized size	1	1.00	1.01	0.00	0.00	1.39	0.00	0.00	0.52
time (sec)	N/A	0.170	1.998	0.155	0.000	0.575	0.000	0.000	4.036

Problem 71	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	256	256	326	0	0	293	0	0	161
normalized size	1	1.00	1.27	0.00	0.00	1.14	0.00	0.00	0.63
time (sec)	N/A	0.118	1.310	0.108	0.000	0.565	0.000	0.000	3.926

Problem 72	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	B	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	102	0	2551	155	0	0	95
normalized size	1	1.00	0.66	0.00	16.56	1.01	0.00	0.00	0.62
time (sec)	N/A	0.055	0.303	0.102	0.486	0.651	0.000	0.000	3.052

Problem 73	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	63	0	1263	86	0	5760	80
normalized size	1	1.00	0.68	0.00	13.73	0.93	0.00	62.61	0.87
time (sec)	N/A	0.025	0.166	0.039	0.400	0.487	0.000	0.804	2.864

Problem 74	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	150	145	235	0	0	0	0	0	-1
normalized size	1	0.97	1.57	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.126	2.044	0.348	0.000	0.000	0.000	0.000	0.000

Problem 75	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	149	145	488	0	0	0	0	0	-1
normalized size	1	0.97	3.28	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.112	5.609	0.096	0.000	0.000	0.000	0.000	0.000

Problem 76	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	131	0	0	0	0	0	-1
normalized size	1	1.00	0.87	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.110	0.528	0.101	0.000	0.000	0.000	0.000	0.000

Problem 77	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	150	145	544	0	0	0	0	0	-1
normalized size	1	0.97	3.63	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.113	5.157	0.097	0.000	0.000	0.000	0.000	0.000

Problem 78	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	150	145	214	0	0	0	0	0	-1
normalized size	1	0.97	1.43	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.114	2.442	0.097	0.000	0.000	0.000	0.000	0.000

Problem 79	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	144	144	122	0	0	0	0	0	-1
normalized size	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.123	0.999	0.177	0.000	0.723	0.000	0.000	0.000

Problem 80	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	100	0	0	0	0	0	-1
normalized size	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.095	0.679	0.066	0.000	0.620	0.000	0.000	0.000

Problem 81	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	98	0	0	0	0	0	-1
normalized size	1	1.00	0.86	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.083	0.613	0.043	0.000	0.480	0.000	0.000	0.000

Problem 82	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	98	0	0	0	0	0	-1
normalized size	1	1.00	0.88	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.075	0.559	0.045	0.000	0.586	0.000	0.000	0.000

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	86	0	0	0	0	0	77
normalized size	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.90
time (sec)	N/A	0.060	0.148	0.062	0.000	1.064	0.000	0.000	2.720

Problem 84	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	102	0	0	0	0	0	-1
normalized size	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.095	0.635	0.046	0.000	0.534	0.000	0.000	0.000

Problem 85	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	100	0	0	0	0	0	-1
normalized size	1	1.00	0.87	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.092	0.637	0.045	0.000	0.713	0.000	0.000	0.000

Problem 86	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	43	0	218	48	0	923	43
normalized size	1	1.00	0.77	0.00	3.89	0.86	0.00	16.48	0.77
time (sec)	N/A	0.018	0.091	0.036	0.369	0.638	0.000	0.435	2.455

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	43	0	218	48	0	915	43
normalized size	1	1.00	0.77	0.00	3.89	0.86	0.00	16.34	0.77
time (sec)	N/A	0.012	0.078	0.022	0.364	0.804	0.000	0.372	2.426

Problem 88	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	39	0	205	43	0	878	39
normalized size	1	1.00	0.76	0.00	4.02	0.84	0.00	17.22	0.76
time (sec)	N/A	0.009	0.054	0.039	0.362	0.828	0.000	0.276	2.349

Problem 89	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	37	19	18	19	37	0	18
normalized size	1	1.00	2.06	1.06	1.00	1.06	2.06	0.00	1.00
time (sec)	N/A	0.015	0.030	0.014	0.322	0.566	0.895	0.000	2.283

Problem 90	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	41	0	208	45	286	0	-1
normalized size	1	1.00	0.73	0.00	3.71	0.80	5.11	0.00	-0.02
time (sec)	N/A	0.015	0.074	0.023	0.366	0.977	7.203	0.000	0.000

Problem 91	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	97	97	61	0	301	76	0	833	66
normalized size	1	1.00	0.63	0.00	3.10	0.78	0.00	8.59	0.68
time (sec)	N/A	0.030	0.172	0.068	0.377	0.680	0.000	0.534	2.696

Problem 92	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	54	0	282	74	0	820	66
normalized size	1	1.00	0.55	0.00	2.88	0.76	0.00	8.37	0.67
time (sec)	N/A	0.023	0.106	0.054	0.370	0.442	0.000	0.509	2.629

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	54	0	280	68	0	786	56
normalized size	1	1.00	0.61	0.00	3.18	0.77	0.00	8.93	0.64
time (sec)	N/A	0.016	0.084	0.057	0.367	0.719	0.000	0.418	2.531

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	39	39	36	52	53	39	56	0	32
normalized size	1	1.00	0.92	1.33	1.36	1.00	1.44	0.00	0.82
time (sec)	N/A	0.029	0.066	0.028	0.353	0.638	3.031	0.000	2.437

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	A	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	57	0	285	68	413	0	-1
normalized size	1	1.00	0.60	0.00	3.00	0.72	4.35	0.00	-0.01
time (sec)	N/A	0.027	0.135	0.056	0.368	0.472	16.168	0.000	0.000

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	160	160	120	0	1007	127	0	0	122
normalized size	1	1.00	0.75	0.00	6.29	0.79	0.00	0.00	0.76
time (sec)	N/A	0.051	0.560	0.083	0.410	0.448	0.000	0.000	3.060

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	123	0	1015	129	0	0	122
normalized size	1	1.00	0.78	0.00	6.42	0.82	0.00	0.00	0.77
time (sec)	N/A	0.045	0.504	0.070	0.418	0.512	0.000	0.000	2.948

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	117	0	989	119	0	0	114
normalized size	1	1.00	0.79	0.00	6.64	0.80	0.00	0.00	0.77
time (sec)	N/A	0.036	0.417	0.073	0.412	0.433	0.000	0.000	2.825

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	35	232	36	82	0	37
normalized size	1	1.00	1.00	0.83	5.52	0.86	1.95	0.00	0.88
time (sec)	N/A	0.033	0.056	0.030	0.368	0.616	10.754	0.000	2.353

Problem 100	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	B	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	122	0	994	119	1022	0	-1
normalized size	1	1.00	0.77	0.00	6.29	0.75	6.47	0.00	-0.01
time (sec)	N/A	0.048	0.480	0.072	0.416	0.543	81.739	0.000	0.000

Problem 101	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	191	191	167	0	1078	144	0	0	116
normalized size	1	1.00	0.87	0.00	5.64	0.75	0.00	0.00	0.61
time (sec)	N/A	0.045	0.443	0.078	0.409	0.480	0.000	0.000	2.818

Problem 102	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	51	84	93	59	110	0	50
normalized size	1	1.00	0.70	1.15	1.27	0.81	1.51	0.00	0.68
time (sec)	N/A	0.044	0.101	0.030	0.371	0.464	15.348	0.000	2.550

Problem 103	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	A	A	F	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	22	34	20	25	0	25	21
normalized size	1	1.00	0.76	1.17	0.69	0.86	0.00	0.86	0.72
time (sec)	N/A	0.014	0.012	0.050	0.343	0.435	0.000	0.265	2.168

Problem 104	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	0	0	82	60	0	267	131
normalized size	1	1.00	0.00	0.00	0.81	0.59	0.00	2.64	1.30
time (sec)	N/A	0.146	0.366	0.051	0.412	0.593	0.000	2.102	3.780

Problem 105	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	62	62	0	0	29	40	0	1	83
normalized size	1	1.00	0.00	0.00	0.47	0.65	0.00	0.02	1.34
time (sec)	N/A	0.045	0.113	0.136	0.378	0.442	0.000	0.362	2.775

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	C	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	0	0	172	107	0	498	143
normalized size	1	1.00	0.00	0.00	1.47	0.91	0.00	4.26	1.22
time (sec)	N/A	0.117	0.450	0.087	0.433	0.767	0.000	5.631	3.709

Problem 107	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	A	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	0	0	41	57	0	1	86
normalized size	1	1.00	0.00	0.00	0.60	0.84	0.00	0.01	1.26
time (sec)	N/A	0.056	0.122	0.079	0.383	0.456	0.000	0.890	2.709

Problem 108	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	A	C	F	C	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	226	226	158	0	195	128	0	1870	277
normalized size	1	1.00	0.70	0.00	0.86	0.57	0.00	8.27	1.23
time (sec)	N/A	0.082	1.686	0.105	0.447	0.484	0.000	14.211	4.710

Problem 109	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F	F	A	C	F	F(-2)	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	128	128	0	0	106	84	0	0	158
normalized size	1	1.00	0.00	0.00	0.83	0.66	0.00	0.00	1.23
time (sec)	N/A	0.096	0.216	0.098	0.397	0.609	0.000	0.000	3.015

Problem 110	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	377	0	0	0	0	0	-1
normalized size	1	1.00	3.43	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	3.557	0.132	0.000	0.000	0.000	0.000	0.000

Problem 111	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	181	0	0	0	0	23
normalized size	1	1.00	1.00	7.54	0.00	0.00	0.00	0.00	0.96
time (sec)	N/A	0.027	0.088	0.084	0.000	0.511	0.000	0.000	2.368

Problem 112	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	163	0	0	0	0	0	-1
normalized size	1	1.00	1.50	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.068	1.695	0.050	0.000	0.000	0.000	0.000	0.000

Problem 113	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	54	247	0	0	0	0	56
normalized size	1	1.00	0.86	3.92	0.00	0.00	0.00	0.00	0.89
time (sec)	N/A	0.043	0.116	0.076	0.000	0.738	0.000	0.000	2.300

Problem 114	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	696	0	0	0	0	0	-1
normalized size	1	1.00	6.33	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	7.213	0.050	0.000	0.000	0.000	0.000	0.000

Problem 115	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F(-1)	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	58	280	0	0	0	0	65
normalized size	1	1.00	0.92	4.44	0.00	0.00	0.00	0.00	1.03
time (sec)	N/A	0.042	0.135	0.076	0.000	0.483	0.000	0.000	2.377

Problem 116	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	99	0	0	0	0	0	-1
normalized size	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.067	0.375	0.047	0.000	0.000	0.000	0.000	0.000

Problem 117	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	C	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	24	26	0	0	0	0	23
normalized size	1	1.00	1.00	1.08	0.00	0.00	0.00	0.00	0.96
time (sec)	N/A	0.028	0.080	0.013	0.000	0.623	0.000	0.000	2.366

Problem 118	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	431	0	0	0	0	0	-1
normalized size	1	1.00	3.95	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	3.709	0.049	0.000	0.000	0.000	0.000	0.000

Problem 119	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	54	139	0	0	0	0	65
normalized size	1	1.00	0.92	2.36	0.00	0.00	0.00	0.00	1.10
time (sec)	N/A	0.041	0.149	0.081	0.000	0.456	0.000	0.000	2.672

Problem 120	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	147	0	0	0	0	0	-1
normalized size	1	1.00	1.35	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.073	1.129	0.051	0.000	0.000	0.000	0.000	0.000

Problem 121	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F(-1)	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	63	54	291	0	0	0	0	65
normalized size	1	1.00	0.86	4.62	0.00	0.00	0.00	0.00	1.03
time (sec)	N/A	0.044	0.145	0.078	0.000	0.566	0.000	0.000	2.709

Problem 122	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	82	0	187	39	0	0	48
normalized size	1	1.00	1.71	0.00	3.90	0.81	0.00	0.00	1.00
time (sec)	N/A	0.036	0.118	0.227	0.467	0.607	0.000	0.000	2.792

Problem 123	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	266	260	312	0	3537	273	0	0	152
normalized size	1	0.98	1.17	0.00	13.30	1.03	0.00	0.00	0.57
time (sec)	N/A	0.125	4.025	0.090	0.620	1.008	0.000	0.000	3.592

Problem 124	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	292	0	2352	190	0	0	140
normalized size	1	1.00	1.45	0.00	11.70	0.95	0.00	0.00	0.70
time (sec)	N/A	0.078	1.939	0.084	0.506	0.693	0.000	0.000	3.530

Problem 125	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	F	B	A	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	120	91	0	646	105	0	0	82
normalized size	1	1.00	0.76	0.00	5.38	0.88	0.00	0.00	0.68
time (sec)	N/A	0.032	0.340	0.074	0.396	0.620	0.000	0.000	2.788

Problem 126	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	B	A	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	53	0	313	58	0	5162	70
normalized size	1	1.00	0.76	0.00	4.47	0.83	0.00	73.74	1.00
time (sec)	N/A	0.016	0.154	0.031	0.366	0.554	0.000	3.024	2.672

Problem 127	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	204	0	0	0	0	0	-1
normalized size	1	0.97	1.57	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.101	2.028	0.066	0.000	0.000	0.000	0.000	0.000

Problem 128	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	129	126	436	0	0	0	0	0	-1
normalized size	1	0.98	3.38	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.099	5.365	0.060	0.000	0.000	0.000	0.000	0.000

Problem 129	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	119	0	0	0	0	0	-1
normalized size	1	1.00	0.92	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.093	0.579	0.060	0.000	0.000	0.000	0.000	0.000

Problem 130	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	487	0	0	0	0	0	-1
normalized size	1	0.97	3.75	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.099	5.205	0.062	0.000	0.000	0.000	0.000	0.000

Problem 131	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	205	0	0	0	0	0	-1
normalized size	1	0.97	1.58	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.100	2.254	0.061	0.000	0.000	0.000	0.000	0.000

Problem 132	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	144	144	123	0	0	0	0	0	-1
normalized size	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.104	1.025	0.108	0.000	0.531	0.000	0.000	0.000

Problem 133	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	114	114	102	0	0	0	0	0	-1
normalized size	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.077	0.649	0.049	0.000	0.631	0.000	0.000	0.000

Problem 134	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	102	0	0	0	0	0	-1
normalized size	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.071	0.560	0.043	0.000	0.583	0.000	0.000	0.000

Problem 135	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	0	132	37	90	30	37	34	36
normalized size	1	0.00	2.81	0.79	1.91	0.64	0.79	0.72	0.77
time (sec)	N/A	0.030	0.039	0.062	0.342	0.601	0.208	0.505	2.225

Problem 136	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	0	66	33	151	42	61	26	36
normalized size	1	0.00	1.53	0.77	3.51	0.98	1.42	0.60	0.84
time (sec)	N/A	0.023	0.017	0.056	0.447	0.536	0.201	0.351	2.210

Problem 137	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	33	0	114	26	73	21	26	25	25
normalized size	1	0.00	3.45	0.79	2.21	0.64	0.79	0.76	0.76
time (sec)	N/A	0.017	0.024	0.047	0.338	0.464	0.191	0.316	2.187

Problem 138	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	0	42	22	122	33	27	30	25
normalized size	1	0.00	1.56	0.81	4.52	1.22	1.00	1.11	0.93
time (sec)	N/A	0.007	0.010	0.044	0.497	0.419	0.181	1.419	2.166

Problem 139	Optimal	Rubi	Mathematica	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	14	14	14	17	10	16	17	43	16
normalized size	1	1.00	1.00	1.21	0.71	1.14	1.21	3.07	1.14
time (sec)	N/A	0.013	0.022	0.003	0.335	0.412	0.266	0.241	3.729

Problem 140	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	B	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	0	44	24	127	39	27	28	27
normalized size	1	0.00	1.52	0.83	4.38	1.34	0.93	0.97	0.93
time (sec)	N/A	0.028	0.023	0.046	0.462	0.511	0.226	0.436	2.268

Problem 141	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	35	0	132	36	96	37	39	33	35
normalized size	1	0.00	3.77	1.03	2.74	1.06	1.11	0.94	1.00
time (sec)	N/A	0.027	0.036	0.059	0.359	0.462	0.352	0.526	2.291

Problem 142	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	0	70	35	157	53	53	28	40
normalized size	1	0.00	1.56	0.78	3.49	1.18	1.18	0.62	0.89
time (sec)	N/A	0.027	0.026	0.059	0.464	0.476	0.293	0.292	2.301

Problem 143	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	63	0	155	52	231	64	54	261	51
normalized size	1	0.00	2.46	0.83	3.67	1.02	0.86	4.14	0.81
time (sec)	N/A	0.070	0.181	0.056	0.374	0.688	0.318	0.761	2.252

Problem 144	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	62	0	100	48	269	86	66	141	52
normalized size	1	0.00	1.61	0.77	4.34	1.39	1.06	2.27	0.84
time (sec)	N/A	0.050	0.126	0.053	0.466	0.502	0.324	0.556	2.233

Problem 145	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	0	135	42	193	54	42	221	41
normalized size	1	0.00	2.65	0.82	3.78	1.06	0.82	4.33	0.80
time (sec)	N/A	0.032	0.124	0.046	0.355	0.478	0.286	0.573	2.205

Problem 146	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	0	70	36	226	77	51	114	42
normalized size	1	0.00	1.52	0.78	4.91	1.67	1.11	2.48	0.91
time (sec)	N/A	0.010	0.089	0.043	0.459	0.418	0.269	0.391	2.205

Problem 147	Optimal	Rubi	Mathematica	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	18	18	28	23	17	30	22	38	16
normalized size	1	1.00	1.56	1.28	0.94	1.67	1.22	2.11	0.89
time (sec)	N/A	0.025	0.039	0.006	0.428	0.504	0.302	0.250	2.376

Problem 148	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	60	0	72	38	231	78	54	73	45
normalized size	1	0.00	1.20	0.63	3.85	1.30	0.90	1.22	0.75
time (sec)	N/A	0.049	0.110	0.050	0.473	0.581	0.374	0.557	2.197

Problem 149	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	F(-2)	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	0	150	51	0	74	61	178	56
normalized size	1	0.00	2.73	0.93	0.00	1.35	1.11	3.24	1.02
time (sec)	N/A	0.053	0.187	0.056	0.000	0.489	0.490	0.768	2.211

Problem 150	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	0	124	0	0	0	0	0	-1
normalized size	1	0.00	1.75	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.044	0.200	0.162	0.000	0.504	0.000	0.000	0.000

Problem 151	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	0	86	0	0	0	0	0	-1
normalized size	1	0.00	1.12	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.087	0.162	0.050	0.000	0.731	0.000	0.000	0.000

Problem 152	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	184	0	125	0	0	0	0	0	-1
normalized size	1	0.00	0.68	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.091	0.226	0.061	0.000	0.504	0.000	0.000	0.000

Problem 153	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	142	0	330	0	0	0	0	0	-1
normalized size	1	0.00	2.32	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.024	0.694	0.328	0.000	0.464	0.000	0.000	0.000

Problem 154	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	0	157	0	0	0	0	0	-1
normalized size	1	0.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.130	0.671	0.346	0.000	0.505	0.000	0.000	0.000

Problem 155	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	120	0	240	0	0	0	0	0	-1
normalized size	1	0.00	2.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.021	0.526	0.431	0.000	0.683	0.000	0.000	0.000

Problem 156	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	120	0	240	0	0	0	0	0	-1
normalized size	1	0.00	2.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.020	0.514	0.315	0.000	0.507	0.000	0.000	0.000

Problem 157	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	120	0	240	0	0	0	0	0	-1
normalized size	1	0.00	2.00	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.021	0.503	0.304	0.000	0.464	0.000	0.000	0.000

Problem 158	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	0	146	0	0	0	0	0	-1
normalized size	1	0.00	2.06	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.043	6.344	1.356	0.000	0.431	0.000	0.000	0.000

Problem 159	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	75	0	155	0	0	0	0	0	-1
normalized size	1	0.00	2.07	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.031	5.914	1.126	0.000	0.433	0.000	0.000	0.000

Problem 160	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	0	146	0	0	0	0	0	-1
normalized size	1	0.00	2.12	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.025	6.007	1.010	0.000	0.474	0.000	0.000	0.000

Problem 161	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	0	151	0	0	0	0	0	-1
normalized size	1	0.00	2.25	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.012	11.220	0.877	0.000	0.462	0.000	0.000	0.000

Problem 162	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	25	30	24	35	44	0	38
normalized size	1	1.00	0.96	1.15	0.92	1.35	1.69	0.00	1.46
time (sec)	N/A	0.018	0.055	0.004	0.317	0.453	4.134	0.000	3.783

Problem 163	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	0	153	0	0	0	0	0	-1
normalized size	1	0.00	2.15	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.031	4.135	1.159	0.000	0.420	0.000	0.000	0.000

Problem 164	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	0	147	0	0	0	0	0	-1
normalized size	1	0.00	2.13	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.031	3.762	1.343	0.000	0.471	0.000	0.000	0.000

Problem 165	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F(-1)	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	0	179	0	0	0	0	0	-1
normalized size	1	0.00	1.13	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.090	6.518	0.277	0.000	0.434	0.000	0.000	0.000

Problem 166	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	0	189	0	0	0	0	0	-1
normalized size	1	0.00	1.16	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	6.413	0.608	0.000	0.449	0.000	0.000	0.000

Problem 167	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	0	179	0	0	0	0	0	-1
normalized size	1	0.00	1.13	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.044	6.429	0.189	0.000	0.451	0.000	0.000	0.000

Problem 168	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	0	185	0	0	0	0	0	-1
normalized size	1	0.00	1.20	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.014	11.730	0.151	0.000	0.451	0.000	0.000	0.000

Problem 169	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	51	50	320	85	0	0	39
normalized size	1	1.00	1.76	1.72	11.03	2.93	0.00	0.00	1.34
time (sec)	N/A	0.029	0.080	0.007	0.679	0.620	0.000	0.000	3.836

Problem 170	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	157	0	184	0	0	0	0	0	-1
normalized size	1	0.00	1.17	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.055	4.292	0.231	0.000	0.422	0.000	0.000	0.000

Problem 171	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	156	0	179	0	0	0	0	0	-1
normalized size	1	0.00	1.15	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.054	3.914	0.276	0.000	0.544	0.000	0.000	0.000

Problem 172	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	A	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	38	47	1242	69	70	0	105
normalized size	1	1.00	0.88	1.09	28.88	1.60	1.63	0.00	2.44
time (sec)	N/A	0.034	0.154	0.007	0.384	0.448	3.816	0.000	4.718

Problem 173	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	A	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	62	61	2171	140	66	0	183
normalized size	1	1.00	1.38	1.36	48.24	3.11	1.47	0.00	4.07
time (sec)	N/A	0.038	0.093	0.006	0.433	0.519	9.297	0.000	8.043

Problem 174	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	A	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	67	55	68	4466	129	92	0	247
normalized size	1	1.00	0.82	1.01	66.66	1.93	1.37	0.00	3.69
time (sec)	N/A	0.044	0.160	0.004	0.495	0.450	21.873	0.000	6.587

Problem 175	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	0	186	0	0	0	0	0	-1
normalized size	1	0.00	1.84	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.048	14.692	1.523	0.000	0.411	0.000	0.000	0.000

Problem 176	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	0	550	0	0	0	0	0	-1
normalized size	1	0.00	2.81	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.082	17.553	0.347	0.000	0.451	0.000	0.000	0.000

Problem 177	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	351	0	642	0	0	0	0	0	-1
normalized size	1	0.00	1.83	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.076	17.990	0.349	0.000	0.436	0.000	0.000	0.000

Problem 178	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	190	0	458	0	0	0	0	0	-1
normalized size	1	0.00	2.41	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.015	1.410	0.099	0.000	0.497	0.000	0.000	0.000

Problem 179	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F(-1)	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	0	205	0	0	0	0	0	-1
normalized size	1	0.00	0.98	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.104	1.148	0.099	0.000	0.453	0.000	0.000	0.000

Problem 180	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	50	161	0	0	0	0	79
normalized size	1	1.00	0.25	0.80	0.00	0.00	0.00	0.00	0.39
time (sec)	N/A	0.139	0.253	0.039	0.000	0.000	0.000	0.000	3.387

Problem 181	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	175	161	0	0	0	0	78
normalized size	1	1.00	0.88	0.81	0.00	0.00	0.00	0.00	0.39
time (sec)	N/A	0.128	0.242	0.030	0.000	0.000	0.000	0.000	3.312

Problem 182	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	176	176	48	140	0	0	0	0	131
normalized size	1	1.00	0.27	0.80	0.00	0.00	0.00	0.00	0.74
time (sec)	N/A	0.120	0.097	0.029	0.000	0.000	0.000	0.000	2.628

Problem 183	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	176	176	142	140	0	0	0	0	59
normalized size	1	1.00	0.81	0.80	0.00	0.00	0.00	0.00	0.34
time (sec)	N/A	0.121	0.130	0.032	0.000	0.000	0.000	0.000	2.956

Problem 184	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	46	161	0	0	0	0	79
normalized size	1	1.00	0.23	0.81	0.00	0.00	0.00	0.00	0.40
time (sec)	N/A	0.134	0.110	0.030	0.000	0.000	0.000	0.000	2.921

Problem 185	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	48	161	0	0	0	0	78
normalized size	1	1.00	0.24	0.80	0.00	0.00	0.00	0.00	0.39
time (sec)	N/A	0.128	0.203	0.030	0.000	0.000	0.000	0.000	4.080

Problem 186	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	0	137	39	136	32	39	50	38
normalized size	1	0.00	2.80	0.80	2.78	0.65	0.80	1.02	0.78
time (sec)	N/A	0.026	0.041	0.066	0.343	0.664	0.221	0.551	2.222

Problem 187	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	B	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	0	66	33	130	82	63	47	40
normalized size	1	0.00	1.53	0.77	3.02	1.91	1.47	1.09	0.93
time (sec)	N/A	0.022	0.018	0.059	0.376	1.484	0.203	1.069	2.198

Problem 188	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	35	0	118	28	114	23	27	41	27
normalized size	1	0.00	3.37	0.80	3.26	0.66	0.77	1.17	0.77
time (sec)	N/A	0.015	0.023	0.056	0.341	0.589	0.198	2.495	2.199

Problem 189	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	B	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	27	0	42	22	98	49	29	38	29
normalized size	1	0.00	1.56	0.81	3.63	1.81	1.07	1.41	1.07
time (sec)	N/A	0.007	0.009	0.053	0.358	0.680	0.181	0.438	2.182

Problem 190	Optimal	Rubi	Mathematica	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	14	14	25	17	10	18	17	66	21
normalized size	1	1.00	1.79	1.21	0.71	1.29	1.21	4.71	1.50
time (sec)	N/A	0.013	0.026	0.003	0.347	0.786	0.267	1.208	2.252

Problem 191	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	0	44	24	103	36	29	40	31
normalized size	1	0.00	1.52	0.83	3.55	1.24	1.00	1.38	1.07
time (sec)	N/A	0.025	0.021	0.056	0.377	0.907	0.224	0.597	2.214

Problem 192	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	36	0	136	38	139	39	39	49	37
normalized size	1	0.00	3.78	1.06	3.86	1.08	1.08	1.36	1.03
time (sec)	N/A	0.024	0.030	0.062	0.340	0.744	0.364	0.254	2.232

Problem 193	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	0	70	35	142	55	54	49	44
normalized size	1	0.00	1.56	0.78	3.16	1.22	1.20	1.09	0.98
time (sec)	N/A	0.025	0.021	0.063	0.345	0.593	0.297	0.258	2.212

Problem 194	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	0	162	54	362	70	54	139	55
normalized size	1	0.00	2.42	0.81	5.40	1.04	0.81	2.07	0.82
time (sec)	N/A	0.065	0.179	0.065	0.354	0.592	0.319	0.278	2.231

Problem 195	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	B	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	0	100	48	352	102	60	83	57
normalized size	1	0.00	1.56	0.75	5.50	1.59	0.94	1.30	0.89
time (sec)	N/A	0.051	0.125	0.063	0.355	0.653	0.328	0.669	2.222

Problem 196	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	0	142	44	296	61	42	118	45
normalized size	1	0.00	2.58	0.80	5.38	1.11	0.76	2.15	0.82
time (sec)	N/A	0.036	0.129	0.056	0.350	0.983	0.287	0.275	2.193

Problem 197	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	0	70	36	278	72	42	79	44
normalized size	1	0.00	1.46	0.75	5.79	1.50	0.88	1.65	0.92
time (sec)	N/A	0.011	0.082	0.057	0.376	0.732	0.273	0.458	2.188

Problem 198	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	B	A	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	34	27	19	34	20	76	16
normalized size	1	1.00	1.89	1.50	1.06	1.89	1.11	4.22	0.89
time (sec)	N/A	0.024	0.049	0.006	0.415	0.602	0.307	0.312	2.492

Problem 199	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	A	B	A	A	A	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	0	72	38	285	74	46	87	47
normalized size	1	0.00	1.12	0.59	4.45	1.16	0.72	1.36	0.73
time (sec)	N/A	0.048	0.122	0.062	0.394	0.707	0.379	0.297	2.209

Problem 200	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	A	F(-2)	A	A	B	B
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	0	153	53	0	81	60	190	60
normalized size	1	0.00	2.68	0.93	0.00	1.42	1.05	3.33	1.05
time (sec)	N/A	0.051	0.232	0.067	0.000	0.701	0.493	0.412	2.226

Problem 201	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	0	103	0	0	0	0	0	-1
normalized size	1	0.00	1.47	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.040	0.256	0.118	0.000	0.564	0.000	0.000	0.000

Problem 202	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	0	84	0	0	0	0	0	-1
normalized size	1	0.00	1.09	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	0.167	0.061	0.000	0.663	0.000	0.000	0.000

Problem 203	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	0	122	0	0	0	0	0	-1
normalized size	1	0.00	0.72	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.077	0.226	0.126	0.000	1.654	0.000	0.000	0.000

Problem 204	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	142	0	330	0	0	0	0	0	-1
normalized size	1	0.00	2.32	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.022	0.612	0.354	0.000	0.796	0.000	0.000	0.000

Problem 205	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	0	157	0	0	0	0	0	-1
normalized size	1	0.00	0.97	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.117	0.650	0.352	0.000	1.148	0.000	0.000	0.000

Problem 206	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	120	0	238	0	0	0	0	0	-1
normalized size	1	0.00	1.98	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.020	0.484	0.297	0.000	1.231	0.000	0.000	0.000

Problem 207	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	120	0	238	0	0	0	0	0	-1
normalized size	1	0.00	1.98	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.020	0.468	0.305	0.000	0.803	0.000	0.000	0.000

Problem 208	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	120	0	238	0	0	0	0	0	-1
normalized size	1	0.00	1.98	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.021	0.469	0.309	0.000	1.684	0.000	0.000	0.000

Problem 209	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	0	220	0	0	0	0	0	-1
normalized size	1	0.00	3.14	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.035	5.300	1.656	0.000	0.724	0.000	0.000	0.000

Problem 210	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	0	229	0	0	0	0	0	-1
normalized size	1	0.00	3.09	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.029	5.577	1.421	0.000	2.050	0.000	0.000	0.000

Problem 211	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	0	219	0	0	0	0	0	-1
normalized size	1	0.00	3.22	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.023	5.523	1.241	0.000	0.717	0.000	0.000	0.000

Problem 212	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	0	141	0	0	0	0	0	-1
normalized size	1	0.00	2.14	0.00	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.012	10.319	1.050	0.000	1.176	0.000	0.000	0.000

Problem 213	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	40	30	24	35	46	0	37
normalized size	1	1.00	1.60	1.20	0.96	1.40	1.84	0.00	1.48
time (sec)	N/A	0.018	0.062	0.004	0.321	1.456	4.135	0.000	3.802

Problem 214	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	70	0	217	0	0	0	0	0	-1
normalized size	1	0.00	3.10	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.030	4.590	1.454	0.000	0.610	0.000	0.000	0.000

Problem 215	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	0	211	0	0	0	0	0	-1
normalized size	1	0.00	3.10	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.029	4.158	1.708	0.000	1.510	0.000	0.000	0.000

Problem 216	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	0	175	0	0	0	0	0	-1
normalized size	1	0.00	1.11	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.085	4.636	0.422	0.000	0.535	0.000	0.000	0.000

Problem 217	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	0	185	0	0	0	0	0	-1
normalized size	1	0.00	1.14	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.061	5.322	0.812	0.000	0.560	0.000	0.000	0.000

Problem 218	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	0	175	0	0	0	0	0	-1
normalized size	1	0.00	1.11	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.044	5.204	0.272	0.000	1.653	0.000	0.000	0.000

Problem 219	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	153	0	178	0	0	0	0	0	-1
normalized size	1	0.00	1.16	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.014	11.531	0.204	0.000	0.626	0.000	0.000	0.000

Problem 220	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	B	B	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	51	63	322	78	0	0	39
normalized size	1	1.00	1.70	2.10	10.73	2.60	0.00	0.00	1.30
time (sec)	N/A	0.030	0.118	0.006	0.948	0.771	0.000	0.000	3.863

Problem 221	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	156	0	181	0	0	0	0	0	-1
normalized size	1	0.00	1.16	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.057	4.384	0.325	0.000	0.468	0.000	0.000	0.000

Problem 222	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F(-1)	F	F	F	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	155	0	175	0	0	0	0	0	-1
normalized size	1	0.00	1.13	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.053	3.911	0.402	0.000	1.441	0.000	0.000	0.000

Problem 223	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	52	47	1713	70	0	0	106
normalized size	1	1.00	1.18	1.07	38.93	1.59	0.00	0.00	2.41
time (sec)	N/A	0.037	0.221	0.007	1.894	0.738	0.000	0.000	4.693

Problem 224	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	B	B	A	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	46	69	2172	132	66	0	182
normalized size	1	1.00	1.05	1.57	49.36	3.00	1.50	0.00	4.14
time (sec)	N/A	0.039	0.109	0.007	0.751	0.810	8.050	0.000	8.104

Problem 225	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	69	68	5998	129	0	0	246
normalized size	1	1.00	1.05	1.03	90.88	1.95	0.00	0.00	3.73
time (sec)	N/A	0.046	0.224	0.006	0.584	1.313	0.000	0.000	6.604

Problem 226	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	100	0	182	0	0	0	0	0	-1
normalized size	1	0.00	1.82	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.048	13.671	1.879	0.000	0.424	0.000	0.000	0.000

Problem 227	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F(-1)	F	F	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	0	547	0	0	0	0	0	-1
normalized size	1	0.00	2.81	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.078	16.575	0.447	0.000	1.165	0.000	0.000	0.000

Problem 228	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	350	0	639	0	0	0	0	0	-1
normalized size	1	0.00	1.83	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.073	16.978	0.487	0.000	1.082	0.000	0.000	0.000

Problem 229	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	B	F	F	F	F	F(-1)	F
verified	N/A	N/A	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	190	0	458	0	0	0	0	0	-1
normalized size	1	0.00	2.41	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.015	1.291	0.125	0.000	1.782	0.000	0.000	0.000

Problem 230	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	F	A	F	F	F	F(-1)	F(-1)	F
verified	N/A	N/A	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	0	205	0	0	0	0	0	-1
normalized size	1	0.00	0.98	0.00	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.104	1.110	0.102	0.000	1.064	0.000	0.000	0.000

Problem 231	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	50	161	0	0	0	0	79
normalized size	1	1.00	0.25	0.80	0.00	0.00	0.00	0.00	0.39
time (sec)	N/A	0.139	0.245	0.057	0.000	0.000	0.000	0.000	3.390

Problem 232	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	175	161	0	0	0	0	80
normalized size	1	1.00	0.88	0.81	0.00	0.00	0.00	0.00	0.40
time (sec)	N/A	0.131	0.275	0.045	0.000	0.000	0.000	0.000	3.325

Problem 233	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	176	176	48	140	0	0	0	0	58
normalized size	1	1.00	0.27	0.80	0.00	0.00	0.00	0.00	0.33
time (sec)	N/A	0.121	0.095	0.042	0.000	0.000	0.000	0.000	2.618

Problem 234	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	176	176	142	140	0	0	0	0	57
normalized size	1	1.00	0.81	0.80	0.00	0.00	0.00	0.00	0.32
time (sec)	N/A	0.128	0.141	0.043	0.000	0.000	0.000	0.000	2.937

Problem 235	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	199	199	46	161	0	0	0	0	79
normalized size	1	1.00	0.23	0.81	0.00	0.00	0.00	0.00	0.40
time (sec)	N/A	0.132	0.136	0.042	0.000	0.000	0.000	0.000	2.952

Problem 236	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F(-2)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	201	48	161	0	0	0	0	80
normalized size	1	1.00	0.24	0.80	0.00	0.00	0.00	0.00	0.40
time (sec)	N/A	0.134	0.201	0.043	0.000	0.000	0.000	0.000	4.132

Problem 237	Optimal	Rubi	Mathematica	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	87	87	86	0	0	0	0	0	-1
normalized size	1	1.00	0.99	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.059	0.158	0.335	0.000	0.773	0.000	0.000	0.000

Problem 238	Optimal	Rubi	Mathematica	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	87	87	82	0	0	0	0	0	-1
normalized size	1	1.00	0.94	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.052	0.127	0.271	0.000	1.711	0.000	0.000	0.000

Problem 239	Optimal	Rubi	Mathematica	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	85	85	84	0	0	0	0	0	-1
normalized size	1	1.00	0.99	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.050	0.111	0.241	0.000	1.224	0.000	0.000	0.000

Problem 240	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	32	31	43	51	0	66
normalized size	1	1.00	1.00	1.68	1.63	2.26	2.68	0.00	3.47
time (sec)	N/A	0.016	0.036	0.007	0.404	2.861	2.257	0.000	3.900

Problem 241	Optimal	Rubi	Mathematica	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	87	87	85	0	0	0	0	0	-1
normalized size	1	1.00	0.98	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.061	0.144	0.332	0.000	0.443	0.000	0.000	0.000

Problem 242	Optimal	Rubi	Mathematica	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	87	87	81	0	0	0	0	0	-1
normalized size	1	1.00	0.93	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.056	0.140	0.389	0.000	0.536	0.000	0.000	0.000

Problem 243	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	160	0	0	0	0	0	-1
normalized size	1	1.00	1.84	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.075	5.411	1.312	0.000	1.360	0.000	0.000	0.000

Problem 244	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	149	0	0	0	0	0	-1
normalized size	1	1.00	1.89	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.066	5.201	1.213	0.000	1.090	0.000	0.000	0.000

Problem 245	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	147	0	0	0	0	0	-1
normalized size	1	1.00	1.73	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.063	6.183	1.092	0.000	1.215	0.000	0.000	0.000

Problem 246	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	18	18	18	19	165	33	0	0	29
normalized size	1	1.00	1.00	1.06	9.17	1.83	0.00	0.00	1.61
time (sec)	N/A	0.028	0.076	0.047	0.362	1.004	0.000	0.000	3.840

Problem 247	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	160	0	0	0	0	0	-1
normalized size	1	1.00	1.84	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.076	3.743	1.329	0.000	0.943	0.000	0.000	0.000

Problem 248	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	150	0	0	0	0	0	-1
normalized size	1	1.00	1.90	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.071	3.602	1.464	0.000	0.901	0.000	0.000	0.000

Problem 249	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	118	0	0	0	0	0	-1
normalized size	1	1.00	1.36	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.066	4.713	1.753	0.000	0.588	0.000	0.000	0.000

Problem 250	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	120	0	0	0	0	0	-1
normalized size	1	1.00	1.41	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.063	4.413	1.543	0.000	0.988	0.000	0.000	0.000

Problem 251	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F(-1)	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	55	55	64	0	100	0	0	178
normalized size	1	1.00	1.00	1.16	0.00	1.82	0.00	0.00	3.24
time (sec)	N/A	0.038	0.071	0.112	0.000	3.082	0.000	0.000	6.305

Problem 252	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	123	0	0	0	0	0	-1
normalized size	1	1.00	1.41	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.075	4.611	1.627	0.000	0.566	0.000	0.000	0.000

Problem 253	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	119	0	0	0	0	0	-1
normalized size	1	1.00	1.37	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.073	4.628	1.756	0.000	0.869	0.000	0.000	0.000

Problem 254	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	204	0	0	0	0	0	-1
normalized size	1	1.00	2.58	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	12.409	1.360	0.000	0.643	0.000	0.000	0.000

Problem 255	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	213	0	0	0	0	0	-1
normalized size	1	1.00	2.51	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.063	10.547	0.763	0.000	0.758	0.000	0.000	0.000

Problem 256	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	36	37	1323	52	0	0	49
normalized size	1	1.00	0.86	0.88	31.50	1.24	0.00	0.00	1.17
time (sec)	N/A	0.034	0.109	0.126	0.397	0.804	0.000	0.000	9.056

Problem 257	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	87	87	215	0	0	0	0	0	-1
normalized size	1	1.00	2.47	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.075	9.397	1.460	0.000	2.030	0.000	0.000	0.000

Problem 258	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	79	79	203	0	0	0	0	0	-1
normalized size	1	1.00	2.57	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	9.245	0.819	0.000	0.526	0.000	0.000	0.000

Problem 259	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	C	A	C	B	A	F	F	B
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	41	175	29	525	1696	47	0	0	87
normalized size	1	4.27	0.71	12.80	41.37	1.15	0.00	0.00	2.12
time (sec)	N/A	0.133	0.456	0.645	2.329	3.983	0.000	0.000	3.418

Problem 260	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	C	A	F	B	C	F(-1)	C	B
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	146	198	0	976	81	0	834	176
normalized size	1	1.33	1.80	0.00	8.87	0.74	0.00	7.58	1.60
time (sec)	N/A	0.217	2.073	0.291	1.169	0.945	0.000	18.020	6.962

Problem 261	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	127	209	140	55	0	0	46
normalized size	1	1.00	2.82	4.64	3.11	1.22	0.00	0.00	1.02
time (sec)	N/A	0.043	0.174	0.228	0.368	0.806	0.000	0.000	4.432

Problem 262	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	A	F	A	B
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	48	137	208	154	55	0	74	56
normalized size	1	0.83	2.36	3.59	2.66	0.95	0.00	1.28	0.97
time (sec)	N/A	0.035	0.135	0.198	0.769	1.665	0.000	3.036	4.481

Problem 263	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	B	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	48	48	139	238	166	57	0	83	39
normalized size	1	1.00	2.90	4.96	3.46	1.19	0.00	1.73	0.81
time (sec)	N/A	0.041	0.166	0.204	0.397	0.799	0.000	3.158	6.281

Problem 264	Optimal	Rubi	Mathematica	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	95	95	67	0	0	149	0	0	-1
normalized size	1	1.00	0.71	0.00	0.00	1.57	0.00	0.00	-0.01
time (sec)	N/A	0.091	0.865	0.416	0.000	2.362	0.000	0.000	0.000

Problem 265	Optimal	Rubi	Mathematica	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	70	70	62	0	0	149	0	0	-1
normalized size	1	1.00	0.89	0.00	0.00	2.13	0.00	0.00	-0.01
time (sec)	N/A	0.075	0.844	0.378	0.000	0.648	0.000	0.000	0.000

Problem 266	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	99	0	0	0	0	0	-1
normalized size	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	0.464	0.379	0.000	0.000	0.000	0.000	0.000

Problem 267	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	54	181	0	0	0	0	51
normalized size	1	1.00	1.00	3.35	0.00	0.00	0.00	0.00	0.94
time (sec)	N/A	0.043	0.117	0.157	0.000	1.164	0.000	0.000	2.568

Problem 268	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	415	0	0	0	0	0	-1
normalized size	1	1.00	3.81	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	5.775	0.115	0.000	0.000	0.000	0.000	0.000

Problem 269	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	68	139	0	0	0	0	-1
normalized size	1	1.00	0.76	1.56	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.061	0.150	0.188	0.000	0.468	0.000	0.000	0.000

Problem 270	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	124	0	0	0	0	0	-1
normalized size	1	1.00	1.14	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	1.384	0.109	0.000	0.000	0.000	0.000	0.000

Problem 271	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F(-1)	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	69	291	0	0	0	0	-1
normalized size	1	1.00	0.74	3.13	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.061	0.160	0.177	0.000	1.330	0.000	0.000	0.000

Problem 272	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	380	0	0	0	0	0	-1
normalized size	1	1.00	3.45	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	4.309	0.110	0.000	0.000	0.000	0.000	0.000

Problem 273	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	54	54	54	181	0	0	0	0	-1
normalized size	1	1.00	1.00	3.35	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.044	0.114	0.156	0.000	1.605	0.000	0.000	0.000

Problem 274	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	168	0	0	0	0	0	-1
normalized size	1	1.00	1.54	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	1.613	0.125	0.000	0.000	0.000	0.000	0.000

Problem 275	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	72	247	0	0	0	0	-1
normalized size	1	1.00	0.77	2.66	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.060	0.129	0.190	0.000	0.833	0.000	0.000	0.000

Problem 276	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	867	0	0	0	0	0	-1
normalized size	1	1.00	7.88	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	8.679	0.126	0.000	0.000	0.000	0.000	0.000

Problem 277	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	83	280	0	0	0	0	-1
normalized size	1	1.00	0.89	3.01	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.061	0.177	0.185	0.000	1.002	0.000	0.000	0.000

Problem 278	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	134	0	0	0	0	0	-1
normalized size	1	1.00	1.31	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.089	5.604	1.746	0.000	1.394	0.000	0.000	0.000

Problem 279	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	102	102	482	0	0	0	0	0	-1
normalized size	1	1.00	4.73	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.085	17.184	1.526	0.000	1.619	0.000	0.000	0.000

Problem 280	Optimal	Rubi	Mathematica	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	103	99	94	0	0	0	0	0	-1
normalized size	1	0.96	0.91	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	0.206	0.415	0.000	0.985	0.000	0.000	0.000

Problem 281	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	182	0	0	0	0	0	-1
normalized size	1	0.97	1.40	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.099	2.145	0.125	0.000	0.000	0.000	0.000	0.000

Problem 282	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F(-1)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	470	0	0	0	0	0	-1
normalized size	1	0.97	3.62	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.096	9.486	0.111	0.000	0.000	0.000	0.000	0.000

Problem 283	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	119	0	0	0	0	0	-1
normalized size	1	1.00	0.92	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.091	0.785	0.119	0.000	0.000	0.000	0.000	0.000

Problem 284	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	129	126	437	0	0	0	0	0	-1
normalized size	1	0.98	3.39	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.092	6.929	0.113	0.000	0.000	0.000	0.000	0.000

Problem 285	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	202	0	0	0	0	0	-1
normalized size	1	0.97	1.55	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.096	2.497	0.112	0.000	0.000	0.000	0.000	0.000

Problem 286	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	139	133	169	0	0	0	0	0	-1
normalized size	1	0.96	1.22	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.121	1.634	0.155	0.000	0.536	0.000	0.000	0.000

Problem 287	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	142	0	0	0	0	0	-1
normalized size	1	1.00	1.34	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.083	1.016	0.115	0.000	0.558	0.000	0.000	0.000

Problem 288	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	142	0	0	0	0	0	-1
normalized size	1	1.00	1.33	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	0.809	0.078	0.000	0.657	0.000	0.000	0.000

Problem 289	Optimal	Rubi	Mathematica	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
normalized size	1	1.00	0.95	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.062	1.567	0.580	0.000	0.743	0.000	0.000	0.000

Problem 290	Optimal	Rubi	Mathematica	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	78	0	0	0	0	0	-1
normalized size	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.056	1.507	0.467	0.000	0.478	0.000	0.000	0.000

Problem 291	Optimal	Rubi	Mathematica	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	84	84	80	0	0	0	0	0	-1
normalized size	1	1.00	0.95	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.051	1.318	0.354	0.000	1.661	0.000	0.000	0.000

Problem 292	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	A	A	B	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	54	33	32	45	49	0	68
normalized size	1	1.00	2.70	1.65	1.60	2.25	2.45	0.00	3.40
time (sec)	N/A	0.016	0.061	0.026	0.307	0.433	2.291	0.000	3.997

Problem 293	Optimal	Rubi	Mathematica	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	85	85	82	0	0	0	0	0	-1
normalized size	1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.059	1.166	0.563	0.000	0.907	0.000	0.000	0.000

Problem 294	Optimal	Rubi	Mathematica	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	85	85	78	0	0	0	0	0	-1
normalized size	1	1.00	0.92	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.059	1.126	0.664	0.000	0.859	0.000	0.000	0.000

Problem 295	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F(-1)	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	146	0	0	0	0	0	-1
normalized size	1	1.00	1.74	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.060	5.320	1.387	0.000	0.963	0.000	0.000	0.000

Problem 296	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	19	20	168	34	0	0	29
normalized size	1	1.00	1.00	1.05	8.84	1.79	0.00	0.00	1.53
time (sec)	N/A	0.028	0.090	0.043	1.626	1.307	0.000	0.000	3.896

Problem 297	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	117	0	0	0	0	0	-1
normalized size	1	1.00	1.39	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.062	5.644	1.886	0.000	0.497	0.000	0.000	0.000

Problem 298	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	B	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	55	107	66	2168	110	0	0	177
normalized size	1	1.00	1.95	1.20	39.42	2.00	0.00	0.00	3.22
time (sec)	N/A	0.040	0.079	0.129	0.656	0.891	0.000	0.000	6.433

Problem 299	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	84	84	221	0	0	0	0	0	-1
normalized size	1	1.00	2.63	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.061	13.235	0.340	0.000	0.600	0.000	0.000	0.000

Problem 300	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	43	43	56	36	1332	71	0	0	49
normalized size	1	1.00	1.30	0.84	30.98	1.65	0.00	0.00	1.14
time (sec)	N/A	0.034	0.076	0.122	0.751	0.667	0.000	0.000	9.231

Problem 301	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	C	A	C	B	A	F	F	B
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	172	30	523	1701	50	0	0	85
normalized size	1	4.10	0.71	12.45	40.50	1.19	0.00	0.00	2.02
time (sec)	N/A	0.127	0.436	0.649	0.657	3.564	0.000	0.000	3.261

Problem 302	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	C	A	F	B	C	F(-1)	C	B
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	142	79	0	974	82	0	839	171
normalized size	1	1.29	0.72	0.00	8.85	0.75	0.00	7.63	1.55
time (sec)	N/A	0.184	2.049	0.210	1.462	0.707	0.000	19.506	6.962

Problem 303	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	A	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	127	211	142	56	0	0	45
normalized size	1	1.00	2.59	4.31	2.90	1.14	0.00	0.00	0.92
time (sec)	N/A	0.042	0.206	0.182	0.389	0.883	0.000	0.000	4.408

Problem 304	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	A	F	A	B
verified	N/A	NO	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	58	51	137	209	159	56	0	74	55
normalized size	1	0.88	2.36	3.60	2.74	0.97	0.00	1.28	0.95
time (sec)	N/A	0.035	0.166	0.174	0.399	1.120	0.000	2.663	4.536

Problem 305	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	C	B	B	F	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	137	239	166	56	0	83	38
normalized size	1	1.00	2.69	4.69	3.25	1.10	0.00	1.63	0.75
time (sec)	N/A	0.040	0.173	0.183	0.396	1.457	0.000	2.607	6.317

Problem 306	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	A	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	96	96	155	0	0	150	0	0	-1
normalized size	1	1.00	1.61	0.00	0.00	1.56	0.00	0.00	-0.01
time (sec)	N/A	0.088	2.110	0.249	0.000	0.953	0.000	0.000	0.000

Problem 307	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	B	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	128	0	0	150	0	0	-1
normalized size	1	1.00	1.80	0.00	0.00	2.11	0.00	0.00	-0.01
time (sec)	N/A	0.076	3.104	0.242	0.000	0.832	0.000	0.000	0.000

Problem 308	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	115	0	0	0	0	0	-1
normalized size	1	1.00	1.06	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.071	0.627	0.215	0.000	0.000	0.000	0.000	0.000

Problem 309	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	58	102	0	0	0	0	89
normalized size	1	1.00	0.98	1.73	0.00	0.00	0.00	0.00	1.51
time (sec)	N/A	0.041	0.113	0.124	0.000	0.542	0.000	0.000	2.623

Problem 310	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	411	0	0	0	0	0	-1
normalized size	1	1.00	3.77	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.070	6.035	0.158	0.000	0.000	0.000	0.000	0.000

Problem 311	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	72	190	0	0	0	0	-1
normalized size	1	1.00	0.77	2.02	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.055	0.136	0.167	0.000	1.958	0.000	0.000	0.000

Problem 312	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	174	0	0	0	0	0	-1
normalized size	1	1.00	1.60	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.072	1.727	0.154	0.000	0.000	0.000	0.000	0.000

Problem 313	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F(-1)	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	73	131	0	0	0	0	-1
normalized size	1	1.00	0.74	1.34	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.058	0.178	0.161	0.000	1.079	0.000	0.000	0.000

Problem 314	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	377	0	0	0	0	0	-1
normalized size	1	1.00	3.43	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.069	3.961	0.148	0.000	0.000	0.000	0.000	0.000

Problem 315	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	59	59	58	129	0	0	0	0	-1
normalized size	1	1.00	0.98	2.19	0.00	0.00	0.00	0.00	-0.02
time (sec)	N/A	0.040	0.101	0.159	0.000	0.811	0.000	0.000	0.000

Problem 316	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	109	109	186	0	0	0	0	0	-1
normalized size	1	1.00	1.71	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.071	2.312	0.146	0.000	0.000	0.000	0.000	0.000

Problem 317	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	76	131	0	0	0	0	-1
normalized size	1	1.00	0.78	1.34	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.059	0.161	0.167	0.000	0.549	0.000	0.000	0.000

Problem 318	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	876	0	0	0	0	0	-1
normalized size	1	1.00	7.96	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.073	8.663	0.156	0.000	0.000	0.000	0.000	0.000

Problem 319	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F	F(-1)	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	88	205	0	0	0	0	-1
normalized size	1	1.00	0.90	2.09	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.058	0.201	0.180	0.000	0.564	0.000	0.000	0.000

Problem 320	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F	F(-1)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	367	0	0	0	0	0	-1
normalized size	1	1.00	3.01	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.110	2.294	5.474	0.000	0.845	0.000	0.000	0.000

Problem 321	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F(-1)	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	119	119	534	0	0	0	0	0	-1
normalized size	1	1.00	4.49	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.097	6.531	2.181	0.000	0.974	0.000	0.000	0.000

Problem 322	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	123	118	181	0	0	0	0	0	-1
normalized size	1	0.96	1.47	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.077	0.427	1.115	0.000	0.677	0.000	0.000	0.000

Problem 323	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F(-1)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	165	0	0	0	0	0	-1
normalized size	1	0.97	1.27	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.096	2.987	0.207	0.000	0.000	0.000	0.000	0.000

Problem 324	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F(-1)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	466	0	0	0	0	0	-1
normalized size	1	0.97	3.58	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.092	9.420	0.159	0.000	0.000	0.000	0.000	0.000

Problem 325	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	138	0	0	0	0	0	-1
normalized size	1	1.00	1.06	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.092	0.928	0.171	0.000	0.000	0.000	0.000	0.000

Problem 326	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	B	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	129	126	441	0	0	0	0	0	-1
normalized size	1	0.98	3.42	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.088	7.227	0.159	0.000	0.000	0.000	0.000	0.000

Problem 327	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F(-2)	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	130	126	218	0	0	0	0	0	-1
normalized size	1	0.97	1.68	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.094	2.376	0.163	0.000	0.000	0.000	0.000	0.000

Problem 328	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	139	133	169	0	0	0	0	0	-1
normalized size	1	0.96	1.22	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.113	1.687	0.197	0.000	0.640	0.000	0.000	0.000

Problem 329	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	142	0	0	0	0	0	-1
normalized size	1	1.00	1.34	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.076	1.110	0.167	0.000	0.848	0.000	0.000	0.000

Problem 330	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	F	F	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	107	107	142	0	0	0	0	0	-1
normalized size	1	1.00	1.33	0.00	0.00	0.00	0.00	0.00	-0.01
time (sec)	N/A	0.066	0.866	0.128	0.000	0.557	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 [180] had the largest ratio of [.4737]

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	15	0.067
2	A	1	1	1.00	13	0.077
3	A	1	1	1.00	11	0.091

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
4	A	2	1	1.00	15	0.067
5	A	1	1	1.00	15	0.067
6	A	1	1	1.00	15	0.067
7	A	2	2	1.00	17	0.118
8	A	2	2	1.00	15	0.133
9	A	2	2	1.00	13	0.154
10	A	3	2	1.00	17	0.118
11	A	2	2	1.00	17	0.118
12	A	2	2	1.00	17	0.118
13	A	2	2	1.00	17	0.118
14	A	2	2	1.00	15	0.133
15	A	2	2	1.00	13	0.154
16	A	3	1	1.00	17	0.059
17	A	2	2	1.00	17	0.118
18	A	2	2	1.00	17	0.118
19	A	3	2	1.00	17	0.118
20	A	3	2	1.00	15	0.133
21	A	3	2	1.00	13	0.154
22	A	4	2	1.00	17	0.118
23	A	3	2	1.00	17	0.118
24	A	3	2	1.00	17	0.118
25	A	2	1	1.00	7	0.143
26	A	3	2	1.00	28	0.071
27	A	3	2	1.00	24	0.083
28	A	3	2	1.00	22	0.091
29	A	3	2	1.00	19	0.105

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
30	A	2	2	1.00	6	0.333
31	A	3	2	1.00	23	0.087
32	A	3	2	1.00	24	0.083
33	A	3	2	1.00	33	0.061
34	A	3	2	1.00	28	0.071
35	A	3	2	1.00	23	0.087
36	A	3	2	1.00	24	0.083
37	A	2	2	1.00	8	0.250
38	A	3	2	1.00	28	0.071
39	A	3	2	1.00	25	0.080
40	A	2	2	1.00	33	0.061
41	A	3	2	1.00	25	0.080
42	A	3	2	1.00	26	0.077
43	A	3	2	1.00	24	0.083
44	A	2	2	1.00	8	0.250
45	A	3	2	1.00	28	0.071
46	A	3	2	1.00	28	0.071
47	A	3	2	1.00	28	0.071
48	A	3	2	1.00	15	0.133
49	A	3	2	1.00	30	0.067
50	A	3	2	1.00	17	0.118
51	A	3	2	1.00	30	0.067
52	A	3	2	1.00	17	0.118
53	A	3	3	1.00	17	0.176
54	A	3	3	1.00	15	0.200
55	A	2	1	1.00	19	0.053

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
56	A	3	3	1.00	19	0.158
57	A	3	3	1.00	19	0.158
58	A	3	3	1.00	17	0.176
59	A	3	3	1.00	15	0.200
60	A	3	2	1.00	19	0.105
61	A	3	3	1.00	19	0.158
62	A	3	3	1.00	19	0.158
63	A	3	3	1.00	15	0.200
64	A	2	1	1.00	19	0.053
65	A	3	3	1.00	15	0.200
66	A	3	2	1.00	19	0.105
67	A	3	3	1.00	15	0.200
68	A	3	2	1.00	19	0.105
69	A	3	3	1.00	15	0.200
70	A	3	2	1.00	21	0.095
71	A	2	2	1.00	21	0.095
72	A	2	2	1.00	21	0.095
73	A	1	1	1.00	19	0.053
74	A	3	3	0.97	23	0.130
75	A	3	3	0.97	23	0.130
76	A	3	3	1.00	23	0.130
77	A	3	3	0.97	23	0.130
78	A	3	3	0.97	23	0.130
79	A	3	3	1.00	21	0.143
80	A	3	3	1.00	17	0.176
81	A	3	3	1.00	15	0.200

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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	number of rules / integrand leaf size
82	A	3	3	1.00	13	0.231
83	A	2	1	1.00	17	0.059
84	A	3	3	1.00	17	0.176
85	A	3	3	1.00	17	0.176
86	A	1	1	1.00	15	0.067
87	A	1	1	1.00	13	0.077
88	A	1	1	1.00	11	0.091
89	A	2	1	1.00	15	0.067
90	A	1	1	1.00	15	0.067
91	A	2	2	1.00	17	0.118
92	A	2	2	1.00	15	0.133
93	A	2	2	1.00	13	0.154
94	A	3	2	1.00	17	0.118
95	A	2	2	1.00	17	0.118
96	A	2	2	1.00	17	0.118
97	A	2	2	1.00	15	0.133
98	A	2	2	1.00	13	0.154
99	A	3	1	1.00	17	0.059
100	A	2	2	1.00	17	0.118
101	A	3	2	1.00	13	0.154
102	A	4	2	1.00	17	0.118
103	A	2	1	1.00	7	0.143
104	A	3	2	1.00	28	0.071
105	A	3	2	1.00	19	0.105
106	A	3	2	1.00	33	0.061
107	A	3	2	1.00	24	0.083

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
108	A	2	2	1.00	33	0.061
109	A	3	2	1.00	24	0.083
110	A	3	3	1.00	15	0.200
111	A	2	1	1.00	19	0.053
112	A	3	3	1.00	15	0.200
113	A	3	2	1.00	19	0.105
114	A	3	3	1.00	15	0.200
115	A	3	2	1.00	19	0.105
116	A	3	3	1.00	15	0.200
117	A	2	1	1.00	19	0.053
118	A	3	3	1.00	15	0.200
119	A	3	2	1.00	19	0.105
120	A	3	3	1.00	15	0.200
121	A	3	2	1.00	19	0.105
122	A	3	3	1.00	15	0.200
123	A	3	2	0.98	17	0.118
124	A	2	2	1.00	17	0.118
125	A	2	2	1.00	17	0.118
126	A	1	1	1.00	15	0.067
127	A	3	3	0.97	19	0.158
128	A	3	3	0.98	19	0.158
129	A	3	3	1.00	19	0.158
130	A	3	3	0.97	19	0.158
131	A	3	3	0.97	19	0.158
132	A	3	3	1.00	21	0.143
133	A	3	3	1.00	15	0.200

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
134	A	3	3	1.00	13	0.231
135	F	0	0	N/A	0	N/A
136	F	0	0	N/A	0	N/A
137	F	0	0	N/A	0	N/A
138	F	0	0	N/A	0	N/A
139	A	2	1	1.00	13	0.077
140	F	0	0	N/A	0	N/A
141	F	0	0	N/A	0	N/A
142	F	0	0	N/A	0	N/A
143	F	0	0	N/A	0	N/A
144	F	0	0	N/A	0	N/A
145	F	0	0	N/A	0	N/A
146	F	0	0	N/A	0	N/A
147	A	3	2	1.00	15	0.133
148	F	0	0	N/A	0	N/A
149	F	0	0	N/A	0	N/A
150	F	0	0	N/A	0	N/A
151	F	0	0	N/A	0	N/A
152	F	0	0	N/A	0	N/A
153	F	0	0	N/A	0	N/A
154	F	0	0	N/A	0	N/A
155	F	0	0	N/A	0	N/A
156	F	0	0	N/A	0	N/A
157	F	0	0	N/A	0	N/A
158	F	0	0	N/A	0	N/A

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
159	F	0	0	N/A	0	N/A
160	F	0	0	N/A	0	N/A
161	F	0	0	N/A	0	N/A
162	A	2	1	1.00	17	0.059
163	F	0	0	N/A	0	N/A
164	F	0	0	N/A	0	N/A
165	F	0	0	N/A	0	N/A
166	F	0	0	N/A	0	N/A
167	F	0	0	N/A	0	N/A
168	F	0	0	N/A	0	N/A
169	A	3	2	1.00	19	0.105
170	F	0	0	N/A	0	N/A
171	F	0	0	N/A	0	N/A
172	A	3	2	1.00	17	0.118
173	A	4	2	1.00	17	0.118
174	A	4	2	1.00	17	0.118
175	F	0	0	N/A	0	N/A
176	F	0	0	N/A	0	N/A
177	F	0	0	N/A	0	N/A
178	F	0	0	N/A	0	N/A
179	F	0	0	N/A	0	N/A
180	A	13	9	1.00	19	0.474
181	A	13	9	1.00	19	0.474
182	A	12	8	1.00	19	0.421
183	A	12	8	1.00	19	0.421

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
184	A	13	9	1.00	19	0.474
185	A	13	9	1.00	19	0.474
186	F	0	0	N/A	0	N/A
187	F	0	0	N/A	0	N/A
188	F	0	0	N/A	0	N/A
189	F	0	0	N/A	0	N/A
190	A	2	1	1.00	13	0.077
191	F	0	0	N/A	0	N/A
192	F	0	0	N/A	0	N/A
193	F	0	0	N/A	0	N/A
194	F	0	0	N/A	0	N/A
195	F	0	0	N/A	0	N/A
196	F	0	0	N/A	0	N/A
197	F	0	0	N/A	0	N/A
198	A	3	2	1.00	15	0.133
199	F	0	0	N/A	0	N/A
200	F	0	0	N/A	0	N/A
201	F	0	0	N/A	0	N/A
202	F	0	0	N/A	0	N/A
203	F	0	0	N/A	0	N/A
204	F	0	0	N/A	0	N/A
205	F	0	0	N/A	0	N/A
206	F	0	0	N/A	0	N/A
207	F	0	0	N/A	0	N/A
208	F	0	0	N/A	0	N/A

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
209	F	0	0	N/A	0	N/A
210	F	0	0	N/A	0	N/A
211	F	0	0	N/A	0	N/A
212	F	0	0	N/A	0	N/A
213	A	2	1	1.00	17	0.059
214	F	0	0	N/A	0	N/A
215	F	0	0	N/A	0	N/A
216	F	0	0	N/A	0	N/A
217	F	0	0	N/A	0	N/A
218	F	0	0	N/A	0	N/A
219	F	0	0	N/A	0	N/A
220	A	3	2	1.00	19	0.105
221	F	0	0	N/A	0	N/A
222	F	0	0	N/A	0	N/A
223	A	3	2	1.00	17	0.118
224	A	4	2	1.00	17	0.118
225	A	4	2	1.00	17	0.118
226	F	0	0	N/A	0	N/A
227	F	0	0	N/A	0	N/A
228	F	0	0	N/A	0	N/A
229	F	0	0	N/A	0	N/A
230	F	0	0	N/A	0	N/A
231	A	13	9	1.00	19	0.474
232	A	13	9	1.00	19	0.474
233	A	12	8	1.00	19	0.421

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
234	A	12	8	1.00	19	0.421
235	A	13	9	1.00	19	0.474
236	A	13	9	1.00	19	0.474
237	A	3	3	1.00	15	0.200
238	A	3	3	1.00	13	0.231
239	A	3	3	1.00	11	0.273
240	A	2	1	1.00	15	0.067
241	A	3	3	1.00	15	0.200
242	A	3	3	1.00	15	0.200
243	A	3	3	1.00	17	0.176
244	A	3	3	1.00	15	0.200
245	A	3	3	1.00	13	0.231
246	A	3	2	1.00	17	0.118
247	A	3	3	1.00	17	0.176
248	A	3	3	1.00	17	0.176
249	A	3	3	1.00	15	0.200
250	A	3	3	1.00	13	0.231
251	A	3	2	1.00	17	0.118
252	A	3	3	1.00	17	0.176
253	A	3	3	1.00	17	0.176
254	A	3	3	1.00	15	0.200
255	A	3	3	1.00	13	0.231
256	A	3	1	1.00	17	0.059
257	A	3	3	1.00	17	0.176
258	A	3	3	1.00	17	0.176
259	C	7	3	4.27	44	0.068

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
260	C	3	3	1.33	31	0.097
261	A	3	3	1.00	17	0.176
262	A	3	3	0.83	17	0.176
263	A	3	3	1.00	17	0.176
264	A	3	3	1.00	23	0.130
265	A	3	3	1.00	23	0.130
266	A	3	3	1.00	15	0.200
267	A	3	2	1.00	19	0.105
268	A	3	3	1.00	15	0.200
269	A	4	3	1.00	19	0.158
270	A	3	3	1.00	15	0.200
271	A	4	3	1.00	19	0.158
272	A	3	3	1.00	15	0.200
273	A	3	2	1.00	19	0.105
274	A	3	3	1.00	15	0.200
275	A	4	3	1.00	19	0.158
276	A	3	3	1.00	15	0.200
277	A	4	3	1.00	19	0.158
278	A	3	3	1.00	17	0.176
279	A	3	3	1.00	17	0.176
280	A	3	3	0.96	15	0.200
281	A	3	3	0.97	19	0.158
282	A	3	3	0.97	19	0.158
283	A	3	3	1.00	19	0.158
284	A	3	3	0.98	19	0.158
285	A	3	3	0.97	19	0.158

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
286	A	3	3	0.96	21	0.143
287	A	3	3	1.00	15	0.200
288	A	3	3	1.00	13	0.231
289	A	3	3	1.00	15	0.200
290	A	3	3	1.00	13	0.231
291	A	3	3	1.00	11	0.273
292	A	2	1	1.00	15	0.067
293	A	3	3	1.00	15	0.200
294	A	3	3	1.00	15	0.200
295	A	3	3	1.00	13	0.231
296	A	3	2	1.00	17	0.118
297	A	3	3	1.00	13	0.231
298	A	3	2	1.00	17	0.118
299	A	3	3	1.00	13	0.231
300	A	3	1	1.00	17	0.059
301	C	7	3	4.10	44	0.068
302	C	3	3	1.29	31	0.097
303	A	3	3	1.00	17	0.176
304	A	3	3	0.88	17	0.176
305	A	3	3	1.00	17	0.176
306	A	3	3	1.00	23	0.130
307	A	3	3	1.00	23	0.130
308	A	3	3	1.00	15	0.200
309	A	3	2	1.00	19	0.105
310	A	3	3	1.00	15	0.200
311	A	4	3	1.00	19	0.158

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
312	A	3	3	1.00	15	0.200
313	A	4	3	1.00	19	0.158
314	A	3	3	1.00	15	0.200
315	A	3	2	1.00	19	0.105
316	A	3	3	1.00	15	0.200
317	A	4	3	1.00	19	0.158
318	A	3	3	1.00	15	0.200
319	A	4	3	1.00	19	0.158
320	A	3	3	1.00	21	0.143
321	A	3	3	1.00	21	0.143
322	A	3	3	0.96	19	0.158
323	A	3	3	0.97	19	0.158
324	A	3	3	0.97	19	0.158
325	A	3	3	1.00	19	0.158
326	A	3	3	0.98	19	0.158
327	A	3	3	0.97	19	0.158
328	A	3	3	0.96	21	0.143
329	A	3	3	1.00	15	0.200
330	A	3	3	1.00	13	0.231

Chapter 3

Listing of integrals

3.1 $\int x^2 \sin\left(a + b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=57

$$\frac{3x^3\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}-\frac{bnx^3\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}$$

```
[Out] -b*n*x^3*cos(a+b*ln(c*x^n))/(b^2*n^2+9)+3*x^3*sin(a+b*ln(c*x^n))/(b^2*n^2+9
)
```

Rubi [A] time = 0.02, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4485}

$$\frac{3x^3\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}-\frac{bnx^3\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + b*Log[c*x^n]],x]
```

```
[Out] -((b*n*x^3*Cos[a + b*Log[c*x^n]])/(9 + b^2*n^2)) + (3*x^3*Sin[a + b*Log[c*x
^n]])/(9 + b^2*n^2)
```

Rule 4485

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

```
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2 \sin \left(a+b \log \left(c x^n\right)\right) dx = -\frac{b n x^3 \cos \left(a+b \log \left(c x^n\right)\right)}{9+b^2 n^2}+\frac{3 x^3 \sin \left(a+b \log \left(c x^n\right)\right)}{9+b^2 n^2}$$

Mathematica [A] time = 0.10, size = 44, normalized size = 0.77

$$-\frac{x^3 \left(b n \cos \left(a+b \log \left(c x^n\right)\right)-3 \sin \left(a+b \log \left(c x^n\right)\right)\right)}{b^2 n^2+9}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sin[a + b*Log[c*x^n]],x]
```

```
[Out] -((x^3*(b*n*Cos[a + b*Log[c*x^n]] - 3*Sin[a + b*Log[c*x^n]]))/(9 + b^2*n^2)
)
```

fricas [A] time = 0.76, size = 49, normalized size = 0.86

$$-\frac{b n x^3 \cos \left(b n \log(x)+b \log(c)+a\right)-3 \, x^3 \sin \left(b n \log(x)+b \log(c)+a\right)}{b^2 n^2+9}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.34, size = 923, normalized size = 16.19

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(b*n*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*
b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + b*n*x^3*e^
(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*
log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - b*n*x^3*e^(1/2*pi*b*n*sgn
```

```
(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/
2*b*log(abs(c)))^2 - b*n*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*
sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 - 4*b*n*x
^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*
b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) - 4*b*n*x^3*e^(-1/2*pi*b*n*
sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
 1/2*b*log(abs(c)))*tan(1/2*a) - b*n*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n
+ 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a)^2 - b*n*x^3*e^(-1/2*pi*b*n*sgn(x)
+ 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 + 6*x^3*e^(1/2*pi*b
*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)
) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 6*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*
b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c
)))^2*tan(1/2*a) + 6*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c
) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^2 + 6
*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1
/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^2 + b*n*x^3*e^(1/2*pi*b*
n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b) + b*n*x^3*e^(-1/2*pi*b*
n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b) - 6*x^3*e^(1/2*pi*b*n*s
gn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
1/2*b*log(abs(c))) - 6*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sg
n(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c))) - 6*x^3*e^(1/
2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a) - 6*x
^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2
*a))/(b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 +
 b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + b^2*n^2*tan(1/2*a
)^2 + b^2*n^2 + 9*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)
^2 + 9*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + 9*tan(1/2*a)^2 + 9)
```

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int x^2 \sin(a + b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+b*ln(c*x^n)),x)
```

```
[Out] int(x^2*sin(a+b*ln(c*x^n)),x)
```

maxima [B] time = 0.35, size = 219, normalized size = 3.84

$$-\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\cos\left(b\log(c)\right) + b\sin\left(2\,b\log(c)\right)\sin\left(b\log(c)\right) + b\cos\left(b\log(c)\right)\right)n - 3\,\cos\left(b\log(c)\right)\sin\left(\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)) +
 b*cos(b*log(c)))*n - 3*cos(b*log(c))*sin(2*b*log(c)) + 3*cos(2*b*log(c))*s
in(b*log(c)) - 3*sin(b*log(c)))*x^3*cos(b*log(x^n) + a) - ((b*cos(b*log(c))
*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)) + b*sin(b*log(c)))*n + 3
*cos(2*b*log(c))*cos(b*log(c)) + 3*sin(2*b*log(c))*sin(b*log(c)) + 3*cos(b*
log(c)))*x^3*sin(b*log(x^n) + a))/((b^2*cos(b*log(c))^2 + b^2*sin(b*log(c))
^2)*n^2 + 9*cos(b*log(c))^2 + 9*sin(b*log(c))^2)
```

mupad [B] time = 2.49, size = 44, normalized size = 0.77

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x^{2} \sin{\left(a - \frac{3 i \log{\left(c x^{n} \right)}}{n} \right)}\, dx & \text{for}\: b = - \frac{3 i}{n} \\ \int x^{2} \sin{\left(a + \frac{3 i \log{\left(c x^{n} \right)}}{n} \right)}\, dx & \text{for}\: b = \frac{3 i}{n} \\ - \frac{b n x^{3} \cos{\left(a + b n \log{\left(x \right)} + b \log{\left(c \right)} \right)}}{b^{2} n^{2} + 9} + \frac{3 x^{3} \sin{\left(a + b n \log{\left(x \right)} + b \log{\left(c \right)} \right)}}{b^{2} n^{2} + 9} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x**2*sin(a - 3*I*log(c*x**n)/n), x), Eq(b, -3*I/n)), (I
ntegral(x**2*sin(a + 3*I*log(c*x**n)/n), x), Eq(b, 3*I/n)), (-b*n*x**3*cos(
a + b*n*log(x) + b*log(c))/(b**2*n**2 + 9) + 3*x**3*sin(a + b*n*log(x) + b*
log(c))/(b**2*n**2 + 9), True))
```

3.2 $\int x \sin \left(a+b \log \left(c x^n\right)\right) \, dx$

Optimal. Leaf size=57

$$\frac{2 x^2 \sin \left(a+b \log \left(c x^n\right)\right)}{b^2 n^2+4}-\frac{b n x^2 \cos \left(a+b \log \left(c x^n\right)\right)}{b^2 n^2+4}$$

```
[Out] -b*n*x^2*cos(a+b*ln(c*x^n))/(b^2*n^2+4)+2*x^2*sin(a+b*ln(c*x^n))/(b^2*n^2+4
)
```

Rubi [A] time = 0.01, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {4485}

$$\frac{2 x^2 \sin \left(a+b \log \left(c x^n\right)\right)}{b^2 n^2+4}-\frac{b n x^2 \cos \left(a+b \log \left(c x^n\right)\right)}{b^2 n^2+4}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + b*Log[c*x^n]],x]
```

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

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x \sin \left(a+b \log \left(c x^n\right)\right) \, dx=-\frac{b n x^2 \cos \left(a+b \log \left(c x^n\right)\right)}{4+b^2 n^2}+\frac{2 x^2 \sin \left(a+b \log \left(c x^n\right)\right)}{4+b^2 n^2}$$

Mathematica [A] time = 0.07, size = 44, normalized size = 0.77

$$-\frac{x^2 \left(b n \cos \left(a+b \log \left(c x^n\right)\right)-2 \sin \left(a+b \log \left(c x^n\right)\right)\right)}{b^2 n^2+4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sin[a + b*Log[c*x^n]],x]
```

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

fricas [A] time = 0.84, size = 49, normalized size = 0.86

$$-\frac{bnx^2\cos\left(bn\log(x) + b\log(c) + a\right) - 2x^2\sin\left(bn\log(x) + b\log(c) + a\right)}{b^2n^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 1.65, size = 923, normalized size = 16.19

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(b*n*x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*
b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + b*n*x^2*e^
(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*
log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - b*n*x^2*e^(1/2*pi*b*n*sgn
(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/
2*b*log(abs(c)))^2 - b*n*x^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*
sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 - 4*b*n*x
^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*
b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) - 4*b*n*x^2*e^(-1/2*pi*b*n*
sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
 1/2*b*log(abs(c)))*tan(1/2*a) - b*n*x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n
+ 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a)^2 - b*n*x^2*e^(-1/2*pi*b*n*sgn(x)
+ 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 + 4*x^2*e^(1/2*pi*b
*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)
) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 4*x^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*
b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c
)))^2*tan(1/2*a) + 4*x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c
) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^2 + 4
*x^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1
/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^2 + b*n*x^2*e^(1/2*pi*b*
n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b) + b*n*x^2*e^(-1/2*pi*b*
n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b) - 4*x^2*e^(1/2*pi*b*n*s
```

```
gn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
1/2*b*log(abs(c))) - 4*x^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sg
n(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c))) - 4*x^2*e^(1/
2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a) - 4*x
^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2
*a))/(b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 +
 b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + b^2*n^2*tan(1/2*a
)^2 + b^2*n^2 + 4*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)
^2 + 4*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + 4*tan(1/2*a)^2 + 4)
```

maple [F] time = 0.03, size = 0, normalized size = 0.00

$$\int x \sin\left(a + b \ln\left(c x^{n}\right)\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n)),x)
```

```
[Out] int(x*sin(a+b*ln(c*x^n)),x)
```

maxima [B] time = 0.36, size = 219, normalized size = 3.84

$$-\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\cos\left(b\log(c)\right) + b\sin\left(2\,b\log(c)\right)\sin\left(b\log(c)\right) + b\cos\left(b\log(c)\right)\right)n - 2\,\cos\left(b\log(c)\right)\sin\left(\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)) +
 b*cos(b*log(c)))*n - 2*cos(b*log(c))*sin(2*b*log(c)) + 2*cos(2*b*log(c))*s
in(b*log(c)) - 2*sin(b*log(c)))*x^2*cos(b*log(x^n) + a) - ((b*cos(b*log(c))
*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)) + b*sin(b*log(c)))*n + 2
*cos(2*b*log(c))*cos(b*log(c)) + 2*sin(2*b*log(c))*sin(b*log(c)) + 2*cos(b*
log(c)))*x^2*sin(b*log(x^n) + a))/((b^2*cos(b*log(c))^2 + b^2*sin(b*log(c))
^2)*n^2 + 4*cos(b*log(c))^2 + 4*sin(b*log(c))^2)
```

mupad [B] time = 2.39, size = 44, normalized size = 0.77

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x \sin\left(a - \frac{2i\log(cx^n)}{n}\right) dx & \text{for } b = -\frac{2i}{n} \\ \int x \sin\left(a + \frac{2i\log(cx^n)}{n}\right) dx & \text{for } b = \frac{2i}{n} \\ -\frac{bnx^2\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+4} + \frac{2x^2\sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+4} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x*sin(a - 2*I*log(c*x**n)/n), x), Eq(b, -2*I/n)), (Inte
gral(x*sin(a + 2*I*log(c*x**n)/n), x), Eq(b, 2*I/n)), (-b*n*x**2*cos(a + b*
n*log(x) + b*log(c))/(b**2*n**2 + 4) + 2*x**2*sin(a + b*n*log(x) + b*log(c)
)/(b**2*n**2 + 4), True))
```

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

Optimal. Leaf size=52

$$\frac{x\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}-\frac{bnx\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}$$

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

Rubi [A] time = 0.01, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {4475}

$$\frac{x\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}-\frac{bnx\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]],x]
```

```
[Out] -((b*n*x*Cos[a + b*Log[c*x^n]])/(1 + b^2*n^2)) + (x*Sin[a + b*Log[c*x^n]])/
(1 + b^2*n^2)
```

Rule 4475

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Simp[(x*
Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] - Simp[(b*d*n*x*Cos[d*(a +
 b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[
b^2*d^2*n^2 + 1, 0]
```

Rubi steps

$$\int \sin\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{bnx\cos\left(a+b\log\left(cx^n\right)\right)}{1+b^2n^2}+\frac{x\sin\left(a+b\log\left(cx^n\right)\right)}{1+b^2n^2}$$

Mathematica [A] time = 0.05, size = 40, normalized size = 0.77

$$\frac{x\left(\sin\left(a+b\log\left(cx^n\right)\right)-bn\cos\left(a+b\log\left(cx^n\right)\right)\right)}{b^2n^2+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]],x]
```

```
[Out] (x*(-(b*n*Cos[a + b*Log[c*x^n]]) + Sin[a + b*Log[c*x^n]]))/(1 + b^2*n^2)
```

fricas [A] time = 0.91, size = 45, normalized size = 0.87

$$-\frac{bnx\cos\left(bn\log(x)+b\log(c)+a\right)-x\sin\left(bn\log(x)+b\log(c)+a\right)}{b^2n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.43, size = 882, normalized size = 16.96

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(b*n*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)
*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + b*n*x*e^(-1/
2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(
abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - b*n*x*e^(1/2*pi*b*n*sgn(x) -
1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*lo
g(abs(c)))^2 - b*n*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) +
 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 - 4*b*n*x*e^(1/2*
pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(ab
s(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) - 4*b*n*x*e^(-1/2*pi*b*n*sgn(x) + 1/2
*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(a
bs(c)))*tan(1/2*a) - b*n*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn
(c) - 1/2*pi*b)*tan(1/2*a)^2 - b*n*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1
/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 + 2*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi
*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(
c)))^2*tan(1/2*a) + 2*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c
) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 2
*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*
b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^2 + 2*x*e^(-1/2*pi*b*n*sgn(
x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2
*b*log(abs(c)))*tan(1/2*a)^2 + b*n*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/
2*pi*b*sgn(c) - 1/2*pi*b) + b*n*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*
pi*b*sgn(c) + 1/2*pi*b) - 2*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*
sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c))) - 2*x*e^(-1
```

```
/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log
(abs(x)) + 1/2*b*log(abs(c))) - 2*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2
*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a) - 2*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*
n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a))/(b^2*n^2*tan(1/2*b*n*log(abs(x)
) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1
/2*b*log(abs(c)))^2 + b^2*n^2*tan(1/2*a)^2 + b^2*n^2 + tan(1/2*b*n*log(abs(
x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + tan(1/2*b*n*log(abs(x)) + 1/2*b*l
og(abs(c)))^2 + tan(1/2*a)^2 + 1)
```

maple [**F**] time = 0.02, size = 0, normalized size = 0.00

$$\int \sin\left(a + b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n)),x)
```

```
[Out] int(sin(a+b*ln(c*x^n)),x)
```

maxima [**B**] time = 0.36, size = 206, normalized size = 3.96

$$-\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\cos\left(b\log(c)\right) + b\sin\left(2\,b\log(c)\right)\sin\left(b\log(c)\right) + b\cos\left(b\log(c)\right)\right)n - \cos\left(b\log(c)\right)\sin\left(2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [**B**] time = 2.33, size = 40, normalized size = 0.77

$$\frac{x\,\left(\sin\left(a+b\,\ln\left(c\,x^n\right)\right)-b\,n\,\cos\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}{b^2\,n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \sin\left(a - \frac{i\log(cx^n)}{n}\right)dx & \text{for } b = -\frac{i}{n} \\ \int \sin\left(a + \frac{i\log(cx^n)}{n}\right)dx & \text{for } b = \frac{i}{n} \\ -\frac{bnx\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+1} + \frac{x\sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+1} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(sin(a - I*log(c*x**n)/n), x), Eq(b, -I/n)), (Integral(s
in(a + I*log(c*x**n)/n), x), Eq(b, I/n)), (-b*n*x*cos(a + b*n*log(x) + b*lo
g(c))/(b**2*n**2 + 1) + x*sin(a + b*n*log(x) + b*log(c))/(b**2*n**2 + 1), T
rue))
```

3.4 $\int \frac{\sin(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=19

$$-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] -cos(a+b*ln(c*x^n))/b/n
```

Rubi [A] time = 0.02, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2638}

$$-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]/x,x]
```

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

Rule 2638

```
Int[sin[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Cos[c + d*x]/d, x] /; FreeQ
[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sin(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= -\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{bn}\end{aligned}$$

Mathematica [A] time = 0.03, size = 38, normalized size = 2.00

$$\frac{\sin(a)\sin\left(b\log\left(cx^n\right)\right)}{bn}-\frac{\cos(a)\cos\left(b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]/x,x]
```

```
[Out] -((Cos[a]*Cos[b*Log[c*x^n]])/(b*n)) + (Sin[a]*Sin[b*Log[c*x^n]])/(b*n)
```

fricas [A] time = 0.59, size = 20, normalized size = 1.05

$$-\frac{\cos\left(bn\log(x) + b\log(c) + a\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))/x,x, algorithm="fricas")
[Out] -cos(b*n*log(x) + b*log(c) + a)/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right) + a\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [A] time = 0.01, size = 20, normalized size = 1.05

$$-\frac{\cos\left(a + b\ln\left(c\,x^n\right)\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))/x,x)
[Out] -cos(a+b*ln(c*x^n))/b/n
```

maxima [A] time = 0.32, size = 19, normalized size = 1.00

$$-\frac{\cos\left(b\log\left(cx^n\right) + a\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [B] time = 2.26, size = 19, normalized size = 1.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [A] time = 0.94, size = 39, normalized size = 2.05

$$\begin{cases} \log(x)\sin(a) & \text{for } b = 0 \wedge (b = 0 \vee n = 0) \\ \log(x)\sin\left(a + b\log(c)\right) & \text{for } n = 0 \\ -\frac{\cos\left(a+bn\log(x)+b\log(c)\right)}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*sin(a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*sin(a
+ b*log(c)), Eq(n, 0)), (-cos(a + b*n*log(x) + b*log(c))/(b*n), True))
```

3.5 $\int \frac{\sin(a+b\log(cx^n))}{x^2} dx$

Optimal. Leaf size=57

$$-\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}-\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}$$

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

Rubi [A] time = 0.02, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4485}

$$-\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}-\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]/x^2,x]
```

```
[Out] -((b*n*Cos[a + b*Log[c*x^n]])/((1 + b^2*n^2)*x)) - Sin[a + b*Log[c*x^n]]/((
1 + b^2*n^2)*x)
```

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx=-\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)}{\left(1+b^2n^2\right)x}-\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+b^2n^2\right)x}$$

Mathematica [A] time = 0.07, size = 40, normalized size = 0.70

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

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]/x^2,x]
```

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

fricas [A] time = 0.53, size = 44, normalized size = 0.77

$$-\frac{bn\cos\left(bn\log(x)+b\log(c)+a\right)+\sin\left(bn\log(x)+b\log(c)+a\right)}{\left(b^2n^2+1\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)/x^2, x)
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(a+b\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))/x^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))/x^2,x)
```

maxima [B] time = 0.36, size = 209, normalized size = 3.67

$$-\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\cos\left(b\log(c)\right)+b\sin\left(2\,b\log(c)\right)\sin\left(b\log(c)\right)+b\cos\left(b\log(c)\right)\right)n+\cos\left(b\log(c)\right)\sin\left(2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\sin\left(a + b\ \ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(sin(a + b*log(c*x^n))/x^2, x)
```

sympy [A] time = 7.54, size = 287, normalized size = 5.04

$$\begin{cases} -\frac{\log\left(x\right)\sin\left(-a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2x} - \frac{i\log\left(x\right)\cos\left(-a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2x} + \frac{\sin\left(-a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2x} - \frac{\log\left(c\right)\sin\left(-a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2nx} - \frac{i\log \ldots}{} \\ \frac{\log\left(x\right)\sin\left(a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2x} + \frac{i\log\left(x\right)\cos\left(a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2x} + \frac{i\cos\left(a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2x} + \frac{\log\left(c\right)\sin\left(a+i\log\left(x\right)+\frac{i\log\left(c\right)}{n}\right)}{2nx} + \frac{i\log\left(c\right)\ldots}{} \\ -\frac{bn\cos\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{b^{2}n^{2}x+x} - \frac{\sin\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{b^{2}n^{2}x+x} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((-log(x)*sin(-a + I*log(x) + I*log(c)/n)/(2*x) - I*log(x)*cos(-a
+ I*log(x) + I*log(c)/n)/(2*x) + sin(-a + I*log(x) + I*log(c)/n)/(2*x) - lo
g(c)*sin(-a + I*log(x) + I*log(c)/n)/(2*n*x) - I*log(c)*cos(-a + I*log(x) +
 I*log(c)/n)/(2*n*x), Eq(b, -I/n)), (log(x)*sin(a + I*log(x) + I*log(c)/n)/
(2*x) + I*log(x)*cos(a + I*log(x) + I*log(c)/n)/(2*x) + I*cos(a + I*log(x)
+ I*log(c)/n)/(2*x) + log(c)*sin(a + I*log(x) + I*log(c)/n)/(2*n*x) + I*log
(c)*cos(a + I*log(x) + I*log(c)/n)/(2*n*x), Eq(b, I/n)), (-b*n*cos(a + b*n*
log(x) + b*log(c))/(b**2*n**2*x + x) - sin(a + b*n*log(x) + b*log(c))/(b**2
*n**2*x + x), True))
```

3.6 $\int \frac{\sin\left(a+b\log(cx^n)\right)}{x^3}\,dx$

Optimal. Leaf size=57

$$-\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{x^2\left(b^2n^2+4\right)}-\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(b^2n^2+4\right)}$$

```
[Out] -b*n*cos(a+b*ln(c*x^n))/(b^2*n^2+4)/x^2-2*sin(a+b*ln(c*x^n))/(b^2*n^2+4)/x^
2
```

Rubi [A] time = 0.02, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4485}

$$-\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{x^2\left(b^2n^2+4\right)}-\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(b^2n^2+4\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]/x^3,x]
```

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

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=-\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)}{\left(4+b^2n^2\right)x^2}-\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{\left(4+b^2n^2\right)x^2}$$

Mathematica [A] time = 0.07, size = 44, normalized size = 0.77

$$-\frac{2\sin\left(a+b\log\left(cx^n\right)\right)+bn\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(b^2n^2+4\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]/x^3,x]
```

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

fricas [A] time = 0.76, size = 46, normalized size = 0.81

$$-\frac{bn\cos\left(bn\log(x)+b\log(c)+a\right)+2\sin\left(bn\log(x)+b\log(c)+a\right)}{\left(b^2n^2+4\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\sin\left(b\log\left(cx^n\right)+a\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)/x^3, x)
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int\frac{\sin\left(a+b\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))/x^3,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))/x^3,x)
```

maxima [B] time = 0.35, size = 216, normalized size = 3.79

$$-\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\cos\left(b\log(c)\right)+b\sin\left(2\,b\log(c)\right)\sin\left(b\log(c)\right)+b\cos\left(b\log(c)\right)\right)n+2\cos\left(b\log(c)\right)\sin\left(2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)) +
 b*cos(b*log(c)))*n + 2*cos(b*log(c))*sin(2*b*log(c)) - 2*cos(2*b*log(c))*s
in(b*log(c)) + 2*sin(b*log(c)))*cos(b*log(x^n) + a) - ((b*cos(b*log(c))*sin
(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)) + b*sin(b*log(c)))*n - 2*cos
(2*b*log(c))*cos(b*log(c)) - 2*sin(2*b*log(c))*sin(b*log(c)) - 2*cos(b*log(
c)))*sin(b*log(x^n) + a))/(((b^2*cos(b*log(c))^2 + b^2*sin(b*log(c))^2)*n^2
 + 4*cos(b*log(c))^2 + 4*sin(b*log(c))^2)*x^2)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(sin(a + b*log(c*x^n))/x^3, x)
```

sympy [A] time = 24.89, size = 352, normalized size = 6.18

$$\begin{cases} -\frac{\log(x)\sin\left(-a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{2x^2} - \frac{i\log(x)\cos\left(-a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{2x^2} + \frac{\sin\left(-a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{4x^2} - \frac{\log(c)\sin\left(-a+2i\log(x)+\frac{2i\log}{n}\right.}{2nx^2} \\ \frac{\log(x)\sin\left(a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{2x^2} + \frac{i\log(x)\cos\left(a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{2x^2} - \frac{\sin\left(a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{4x^2} + \frac{\log(c)\sin\left(a+2i\log(x)+\frac{2i\log(c)}{n}\right)}{2nx^2} + \\ -\frac{bn\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2x^2+4x^2} - \frac{2\sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2x^2+4x^2} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((-log(x)*sin(-a + 2*I*log(x) + 2*I*log(c)/n)/(2*x**2) - I*log(x)*
cos(-a + 2*I*log(x) + 2*I*log(c)/n)/(2*x**2) + sin(-a + 2*I*log(x) + 2*I*lo
g(c)/n)/(4*x**2) - log(c)*sin(-a + 2*I*log(x) + 2*I*log(c)/n)/(2*n*x**2) -
I*log(c)*cos(-a + 2*I*log(x) + 2*I*log(c)/n)/(2*n*x**2), Eq(b, -2*I/n)), (l
og(x)*sin(a + 2*I*log(x) + 2*I*log(c)/n)/(2*x**2) + I*log(x)*cos(a + 2*I*lo
g(x) + 2*I*log(c)/n)/(2*x**2) - sin(a + 2*I*log(x) + 2*I*log(c)/n)/(4*x**2)
 + log(c)*sin(a + 2*I*log(x) + 2*I*log(c)/n)/(2*n*x**2) + I*log(c)*cos(a +
2*I*log(x) + 2*I*log(c)/n)/(2*n*x**2), Eq(b, 2*I/n)), (-b*n*cos(a + b*n*log
(x) + b*log(c))/(b**2*n**2*x**2 + 4*x**2) - 2*sin(a + b*n*log(x) + b*log(c)
)/(b**2*n**2*x**2 + 4*x**2), True))
```

3.7 $\int x^2 \sin^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=97

$$\frac{3x^3\sin^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}-\frac{2bnx^3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}+\frac{2b^2n^2x^3}{3\left(4b^2n^2+9\right)}$$

```
[Out] 2/3*b^2*n^2*x^3/(4*b^2*n^2+9)-2*b*n*x^3*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n
))/(4*b^2*n^2+9)+3*x^3*sin(a+b*ln(c*x^n))^2/(4*b^2*n^2+9)
```

Rubi [A] time = 0.03, antiderivative size = 97, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 30}

$$\frac{3x^3\sin^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}-\frac{2bnx^3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}+\frac{2b^2n^2x^3}{3\left(4b^2n^2+9\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (2*b^2*n^2*x^3)/(3*(9 + 4*b^2*n^2)) - (2*b*n*x^3*Cos[a + b*Log[c*x^n]]*Sin[
a + b*Log[c*x^n]])/(9 + 4*b^2*n^2) + (3*x^3*Sin[a + b*Log[c*x^n]]^2)/(9 + 4
*b^2*n^2)
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2 \sin^2\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{2bnx^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{9+4b^2n^2}+\frac{3x^3\sin^2\left(a+b\log\left(cx^n\right)\right)}{9+4b^2n^2}$$
$$=\frac{2b^2n^2x^3}{3\left(9+4b^2n^2\right)}-\frac{2bnx^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{9+4b^2n^2}+\frac{3x^3\sin^2\left(a\right.}{9+}$$

Mathematica [A] time = 0.16, size = 61, normalized size = 0.63

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

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sin[a + b*Log[c*x^n]]^2,x]
```

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

fricas [A] time = 0.81, size = 80, normalized size = 0.82

$$-\frac{6\,bnx^3\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+9\,x^3\cos\left(bn\log(x)+b\log(c)+a\right)^2-\left(2\right.}{3\left(4\,b^2n^2+9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.50, size = 833, normalized size = 8.59

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/6*x^3 + 1/4*(4*b*n*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*ta
n(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 4*b*n*x^3*e^(-pi*b*n*sgn(x) +
 pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)
```

```
 + 4*b*n*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(ab
s(x)) + b*log(abs(c)))*tan(a)^2 + 4*b*n*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi
*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a)^2 - 3*x^3*e^(
pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(ab
s(c)))^2*tan(a)^2 - 3*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*
tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 - 4*b*n*x^3*e^(pi*b*n*sgn(x
) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 4*b
*n*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x))
 + b*log(abs(c))) - 4*b*n*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*
b)*tan(a) - 4*b*n*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(
a) + 3*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(
x)) + b*log(abs(c)))^2 + 3*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + p
i*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + 12*x^3*e^(pi*b*n*sgn(x) - pi*
b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a) + 12*
x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) +
b*log(abs(c)))*tan(a) + 3*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*
b)*tan(a)^2 + 3*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a)
^2 - 3*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b) - 3*x^3*e^(-pi*b
*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b))/(4*b^2*n^2*tan(b*n*log(abs(x)) +
b*log(abs(c)))^2*tan(a)^2 + 4*b^2*n^2*tan(b*n*log(abs(x)) + b*log(abs(c)))^
2 + 4*b^2*n^2*tan(a)^2 + 4*b^2*n^2 + 9*tan(b*n*log(abs(x)) + b*log(abs(c)))
^2*tan(a)^2 + 9*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + 9*tan(a)^2 + 9)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int x^2 \left(\sin^2\left(a + b\ln\left(c\,x^n\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(x^2*sin(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.35, size = 301, normalized size = 3.10

$$-\frac{3\left(2\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right) - b\cos\left(4\,b\log(c)\right)\sin\left(2\,b\log(c)\right) + b\sin\left(2\,b\log(c)\right)\right)n + 3\,\cos\left(4\,b\log\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/12*(3*(2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*
log(c)) + b*sin(2*b*log(c)))*n + 3*cos(4*b*log(c))*cos(2*b*log(c)) + 3*sin(
```

```
4*b*log(c))*sin(2*b*log(c)) + 3*cos(2*b*log(c)))*x^3*cos(2*b*log(x^n) + 2*a
) + 3*(2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log
(c)) + b*cos(2*b*log(c)))*n - 3*cos(2*b*log(c))*sin(4*b*log(c)) + 3*cos(4*b
*log(c))*sin(2*b*log(c)) - 3*sin(2*b*log(c)))*x^3*sin(2*b*log(x^n) + 2*a) -
 2*(4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + 9*cos(2*b*log(c
))^2 + 9*sin(2*b*log(c))^2)*x^3)/(4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*lo
g(c))^2)*n^2 + 9*cos(2*b*log(c))^2 + 9*sin(2*b*log(c))^2)
```

mupad [B] time = 3.28, size = 67, normalized size = 0.69

$$\frac{x^3}{6} - \frac{x^3\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{(c\,x^n)^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n + 12\mathrm{i}} - \frac{x^3\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}}{12 + b\,n\,8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^3/6 - (x^3*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 12i) - (x^3*exp(a*2i)*(
c*x^n)^(b*2i))/(b*n*8i + 12)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.8 $\int x\sin^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=98

$$\frac{x^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(b^2n^2+1\right)}-\frac{bnx^2\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{2\left(b^2n^2+1\right)}+\frac{b^2n^2x^2}{4\left(b^2n^2+1\right)}$$

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

Rubi [A] time = 0.02, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {4487, 30}

$$\frac{x^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(b^2n^2+1\right)}-\frac{bnx^2\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{2\left(b^2n^2+1\right)}+\frac{b^2n^2x^2}{4\left(b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (b^2*n^2*x^2)/(4*(1 + b^2*n^2)) - (b*n*x^2*Cos[a + b*Log[c*x^n]]*Sin[a + b*
Log[c*x^n]])/(2*(1 + b^2*n^2)) + (x^2*Sin[a + b*Log[c*x^n]]^2)/(2*(1 + b^2*
n^2))
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x\sin^2\left(a+b\log\left(cx^n\right)\right)dx=-\frac{bnx^2\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)}+\frac{x^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)}+\frac{(}{2}$$

$$=\frac{b^2n^2x^2}{4\left(1+b^2n^2\right)}-\frac{bnx^2\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)}+\frac{x^2\sin^2\left(a+b\,\mathrm{l}\right.}{2\left(1+b^2\right.}$$

Mathematica [A] time = 0.12, size = 57, normalized size = 0.58

$$\frac{x^2\left(-bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)-\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+b^2n^2+1\right)}{4b^2n^2+4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sin[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^2*(1 + b^2*n^2 - Cos[2*(a + b*Log[c*x^n])] - b*n*Sin[2*(a + b*Log[c*x^n]
)]))/(4 + 4*b^2*n^2)
```

fricas [A] time = 0.51, size = 78, normalized size = 0.80

$$-\frac{2\,bnx^2\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+2\,x^2\cos\left(bn\log(x)+b\log(c)+a\right)^2-\left(b^2\right.}{4\left(b^2n^2+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.50, size = 820, normalized size = 8.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*x^2 + 1/8*(2*b*n*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*ta
n(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 2*b*n*x^2*e^(-pi*b*n*sgn(x) +
 pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)
```

```
 + 2*b*n*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(ab
s(x)) + b*log(abs(c)))*tan(a)^2 + 2*b*n*x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi
*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a)^2 - x^2*e^(pi
*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(
c)))^2*tan(a)^2 - x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(
b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 - 2*b*n*x^2*e^(pi*b*n*sgn(x) -
pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 2*b*n*x
^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b
*log(abs(c))) - 2*b*n*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*t
an(a) - 2*b*n*x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a) +
 x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) +
b*log(abs(c)))^2 + x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan
(b*n*log(abs(x)) + b*log(abs(c)))^2 + 4*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*
b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a) + 4*x^2*e^(-pi
*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(
c)))*tan(a) + x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(a)^2
+ x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a)^2 - x^2*e^(pi
*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b) - x^2*e^(-pi*b*n*sgn(x) + pi*b*n
 - pi*b*sgn(c) + pi*b))/(b^2*n^2*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan
(a)^2 + b^2*n^2*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + b^2*n^2*tan(a)^2 +
 b^2*n^2 + tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 + tan(b*n*log(ab
s(x)) + b*log(abs(c)))^2 + tan(a)^2 + 1)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int x\left(\sin^2\left(a+b\ln\left(c\,x^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(x*sin(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.35, size = 282, normalized size = 2.88

$$-\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right)-b\cos\left(4\,b\log(c)\right)\sin\left(2\,b\log(c)\right)+b\sin\left(2\,b\log(c)\right)\right)n+\cos\left(4\,b\log(c)\right)\mathrm{co}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/8*(((b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c
)) + b*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c
```

```
))*sin(2*b*log(c)) + cos(2*b*log(c)))*x^2*cos(2*b*log(x^n) + 2*a) + ((b*cos
(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)) + b*cos(2*
b*log(c)))*n - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*lo
g(c)) - sin(2*b*log(c)))*x^2*sin(2*b*log(x^n) + 2*a) - 2*((b^2*cos(2*b*log(
c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2 + sin(2*b*log(c))^2)
*x^2)/((b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c)
)^2 + sin(2*b*log(c))^2)
```

mupad [B] time = 2.57, size = 67, normalized size = 0.68

$$\frac{x^2}{4} - \frac{x^2\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{(c\,x^n)^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n + 8\mathrm{i}} - \frac{x^2\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}}{8 + b\,n\,8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^2/4 - (x^2*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 8i) - (x^2*exp(a*2i)*(c
*x^n)^(b*2i))/(b*n*8i + 8)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x\sin^2\left(a - \frac{i\log(cx^n)}{n}\right)dx \\ \int x\sin^2\left(a + \frac{i\log(cx^n)}{n}\right)dx \\ \frac{b^2n^2x^2\sin^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+4} + \frac{b^2n^2x^2\cos^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+4} - \frac{2bnx^2\sin\left(a+bn\log(x)+b\log(c)\right)\cos\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+4} + \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x*sin(a - I*log(c*x**n)/n)**2, x), Eq(b, -I/n)), (Integ
ral(x*sin(a + I*log(c*x**n)/n)**2, x), Eq(b, I/n)), (b**2*n**2*x**2*sin(a +
 b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 4) + b**2*n**2*x**2*cos(a + b*n*l
og(x) + b*log(c))**2/(4*b**2*n**2 + 4) - 2*b*n*x**2*sin(a + b*n*log(x) + b*
log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*n**2 + 4) + 2*x**2*sin(a + b
*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 4), True))
```

3.9 $\int \sin^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=88

$$\frac{x\sin^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}-\frac{2bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{2b^2n^2x}{4b^2n^2+1}$$

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

Rubi [A] time = 0.02, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {4477, 8}

$$\frac{x\sin^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}-\frac{2bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{2b^2n^2x}{4b^2n^2+1}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (2*b^2*n^2*x)/(1 + 4*b^2*n^2) - (2*b*n*x*Cos[a + b*Log[c*x^n]]*Sin[a + b*Lo
g[c*x^n]])/(1 + 4*b^2*n^2) + (x*Sin[a + b*Log[c*x^n]]^2)/(1 + 4*b^2*n^2)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 4477

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

Rubi steps

$$\int \sin^2\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{2bnx\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{x\sin^2\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{\left(2b^2\right.}{1+}$$

$$=\frac{2b^2n^2x}{1+4b^2n^2}-\frac{2bnx\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{x\sin^2\left(a+b\log\left(cx\right.\right.}{1+4b^2n^2}$$

Mathematica [A] time = 0.09, size = 56, normalized size = 0.64

$$\frac{x\left(-2bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)-\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+4b^2n^2+1\right)}{8b^2n^2+2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x*(1 + 4*b^2*n^2 - Cos[2*(a + b*Log[c*x^n])] - 2*b*n*Sin[2*(a + b*Log[c*x^
n])]))/(2 + 8*b^2*n^2)
```

fricas [A] time = 0.43, size = 73, normalized size = 0.83

$$-\frac{2\,bnx\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+x\cos\left(bn\log(x)+b\log(c)+a\right)^2-\left(2\,b^2n\right.}{4\,b^2n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.40, size = 786, normalized size = 8.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x + 1/4*(4*b*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*
n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 4*b*n*x*e^(-pi*b*n*sgn(x) + pi*b*
n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 4*b
*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) +
b*log(abs(c)))*tan(a)^2 + 4*b*n*x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c)
+ pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a)^2 - x*e^(pi*b*n*sgn(x)
- pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a
)^2 - x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)
) + b*log(abs(c)))^2*tan(a)^2 - 4*b*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sg
n(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 4*b*n*x*e^(-pi*b*n*sgn(
x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 4*
b*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(a) - 4*b*n*x*e^(-
pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a) + x*e^(pi*b*n*sgn(x) -
pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + x*e^(
```

```
-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(a
bs(c)))^2 + 4*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log
(abs(x)) + b*log(abs(c)))*tan(a) + 4*x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sg
n(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a) + x*e^(pi*b*n*sgn(
x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(a)^2 + x*e^(-pi*b*n*sgn(x) + pi*b*n -
 pi*b*sgn(c) + pi*b)*tan(a)^2 - x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) -
 pi*b) - x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b))/(4*b^2*n^2*tan
(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 + 4*b^2*n^2*tan(b*n*log(abs(x)
) + b*log(abs(c)))^2 + 4*b^2*n^2*tan(a)^2 + 4*b^2*n^2 + tan(b*n*log(abs(x))
 + b*log(abs(c)))^2*tan(a)^2 + tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + tan
(a)^2 + 1)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \sin^2\left(a + b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.36, size = 280, normalized size = 3.18

$$-\frac{\left(2\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right) - b\cos\left(4\,b\log(c)\right)\sin\left(2\,b\log(c)\right) + b\sin\left(2\,b\log(c)\right)\right)n + \cos\left(4\,b\log(c)\right)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/4*((2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log
(c)) + b*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log
(c))*sin(2*b*log(c)) + cos(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) + (2*(b*c
os(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)) + b*cos(
2*b*log(c)))*n - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*
log(c)) - sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) - 2*(4*(b^2*cos(2*b*lo
g(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2 + sin(2*b*log(c))^
2)*x)/(4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(
c))^2 + sin(2*b*log(c))^2)
```

mupad [B] time = 2.47, size = 56, normalized size = 0.64

$$\frac{x\,\left(2\,{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}^2+4\,b^2\,n^2-2\,b\,n\,\sin\left(2\,a+2\,b\,\ln\left(c\,x^n\right)\right)\right)}{8\,b^2\,n^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*(2*sin(a + b*log(c*x^n))^2 + 4*b^2*n^2 - 2*b*n*sin(2*a + 2*b*log(c*x^n))
))/(8*b^2*n^2 + 2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \sin^2\left(a - \frac{i\log(cx^n)}{2n}\right) dx \\ \int \sin^2\left(a + \frac{i\log(cx^n)}{2n}\right) dx \\ \frac{2b^2n^2x\sin^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+1} + \frac{2b^2n^2x\cos^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+1} - \frac{2bnx\sin\left(a+bn\log(x)+b\log(c)\right)\cos\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+1} + \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(sin(a - I*log(c*x**n)/(2*n))**2, x), Eq(b, -I/(2*n))),
(Integral(sin(a + I*log(c*x**n)/(2*n))**2, x), Eq(b, I/(2*n))), (2*b**2*n**
2*x*sin(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 1) + 2*b**2*n**2*x*cos
(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 1) - 2*b*n*x*sin(a + b*n*log(
x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*n**2 + 1) + x*sin(a +
 b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 1), True))
```

3.10 $\int \frac{\sin^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=39

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

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

Rubi [A] time = 0.03, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2635, 8}

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

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^2/x,x]
```

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

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rubi steps

$$\begin{aligned}
\int \frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sin^2(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= -\frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2bn}+\frac{\text{Subst}\left(\int 1\,dx,x,\log\left(cx^n\right)\right)}{2n}\\
&= \frac{\log(x)}{2}-\frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2bn}
\end{aligned}$$

Mathematica [A] time = 0.06, size = 36, normalized size = 0.92

$$-\frac{\sin \left(2 \left(a+b \log \left(c x^n\right)\right)\right)-2 \left(a+b \log \left(c x^n\right)\right)}{4 b n}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^2/x,x]
```

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

fricas [A] time = 0.66, size = 40, normalized size = 1.03

$$\frac{b n \log(x) - \cos\left(b n \log(x) + b \log(c) + a\right) \sin\left(b n \log(x) + b \log(c) + a\right)}{2 \, b n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(b*n*log(x) - cos(b*n*log(x) + b*log(c) + a)*sin(b*n*log(x) + b*log(c)
+ a))/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b \log\left(c x^{n}\right) + a\right)^{2}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^2/x, x)
```

maple [A] time = 0.02, size = 52, normalized size = 1.33

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^2/x,x)
```

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

maxima [A] time = 0.34, size = 55, normalized size = 1.41

$$\frac{2 \, b n \log(x) - \cos\left(2 \, b \log\left(x^{n}\right) + 2 \, a\right) \sin\left(2 \, b \log(c)\right) - \cos\left(2 \, b \log(c)\right) \sin\left(2 \, b \log\left(x^{n}\right) + 2 \, a\right)}{4 \, b n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 2.40, size = 32, normalized size = 0.82

$$\frac{\ln(x^n)}{2\,n}-\frac{\sin(2\,a+2\,b\,\ln(c\,x^n))}{4\,b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [A] time = 3.87, size = 56, normalized size = 1.44

$$-\frac{\begin{cases}\log(x)\cos(2a) & \text{for } b=0 \wedge (b=0 \vee n=0)\\ \log(x)\cos\left(2a+2b\log(c)\right) & \text{for } n=0\\ \frac{\sin\left(2a+2bn\log(x)+2b\log(c)\right)}{2bn} & \text{otherwise}\end{cases}}{2}+\frac{\log(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -Piecewise((log(x)*cos(2*a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cos
(2*a + 2*b*log(c)), Eq(n, 0)), (sin(2*a + 2*b*n*log(x) + 2*b*log(c))/(2*b*n
), True))/2 + log(x)/2
```

3.11 $\int \frac{\sin^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=95

$$-\frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}-\frac{2bn\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}-\frac{2b^2n^2}{x\left(4b^2n^2+1\right)}$$

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

Rubi [A] time = 0.03, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 30}

$$-\frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}-\frac{2bn\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}-\frac{2b^2n^2}{x\left(4b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^2/x^2,x]
```

```
[Out] (-2*b^2*n^2)/((1 + 4*b^2*n^2)*x) - (2*b*n*Cos[a + b*Log[c*x^n]]*Sin[a + b*L
og[c*x^n]])/((1 + 4*b^2*n^2)*x) - Sin[a + b*Log[c*x^n]]^2/((1 + 4*b^2*n^2)*
x)
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{2bn\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x} - \frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x} + \frac{\left(2b^2n^2\right)}{1+4}$$

$$= -\frac{2b^2n^2}{\left(1+4b^2n^2\right)x} - \frac{2bn\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x} - \frac{\sin^2\left(a+b\log\left(\right.\right.}{\left(1+4b^2n^2\right)}$$

Mathematica [A] time = 0.11, size = 57, normalized size = 0.60

$$\frac{-2bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)-4b^2n^2-1}{2\left(4b^2n^2x+x\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^2/x^2,x]
```

```
[Out] (-1 - 4*b^2*n^2 + Cos[2*(a + b*Log[c*x^n])] - 2*b*n*Sin[2*(a + b*Log[c*x^n]
)])/(2*(x + 4*b^2*n^2*x))
```

fricas [A] time = 0.67, size = 71, normalized size = 0.75

$$-\frac{2\,b^2n^2+2\,bn\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)-\cos\left(bn\log(x)+b\log(c)+a\right)^2+1}{\left(4\,b^2n^2+1\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^2/x^2, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\sin^2(a + b\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^2/x^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^2/x^2,x)
```

maxima [B] time = 0.35, size = 283, normalized size = 2.98

$$-\frac{8\left(b^2\cos\left(2\,b\log(c)\right)^2 + b^2\sin\left(2\,b\log(c)\right)^2\right)n^2 + 2\,\cos\left(2\,b\log(c)\right)^2 + \left(2\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right) - b\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/4*(8*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + 2*cos(2*b*log
(c))^2 + (2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*
log(c)) + b*sin(2*b*log(c)))*n - cos(4*b*log(c))*cos(2*b*log(c)) - sin(4*b*
log(c))*sin(2*b*log(c)) - cos(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*sin(
2*b*log(c))^2 + (2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*s
in(2*b*log(c)) + b*cos(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - c
os(4*b*log(c))*sin(2*b*log(c)) + sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))/
((4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2
 + sin(2*b*log(c))^2)*x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a + b\,\ln\left(c\,x^n\right)\right)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(sin(a + b*log(c*x^n))^2/x^2, x)
```

sympy [A] time = 24.23, size = 415, normalized size = 4.37

$$\begin{cases} \frac{i\log(x)\sin\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x} - \frac{\log(x)\cos\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x} + \frac{i\sin\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x} - \frac{1}{2x} + \frac{i\log(c)\sin\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4nx} \\ \frac{i\log(x)\sin\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x} - \frac{\log(x)\cos\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x} + \frac{\cos\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x} - \frac{1}{2x} + \frac{i\log(c)\sin\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4nx} \\ -\frac{2b^2n^2\sin^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2x+x} - \frac{2b^2n^2\cos^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2x+x} - \frac{2bn\sin\left(a+bn\log(x)+b\log(c)\right)\cos\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2x+x} - \sin^2 \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((I*log(x)*sin(-2*a + I*log(x) + I*log(c)/n)/(4*x) - log(x)*cos(-2
*a + I*log(x) + I*log(c)/n)/(4*x) + I*sin(-2*a + I*log(x) + I*log(c)/n)/(4*
x) - 1/(2*x) + I*log(c)*sin(-2*a + I*log(x) + I*log(c)/n)/(4*n*x) - log(c)*
cos(-2*a + I*log(x) + I*log(c)/n)/(4*n*x), Eq(b, -I/(2*n))), (I*log(x)*sin(
2*a + I*log(x) + I*log(c)/n)/(4*x) - log(x)*cos(2*a + I*log(x) + I*log(c)/n
)/(4*x) + cos(2*a + I*log(x) + I*log(c)/n)/(4*x) - 1/(2*x) + I*log(c)*sin(2
*a + I*log(x) + I*log(c)/n)/(4*n*x) - log(c)*cos(2*a + I*log(x) + I*log(c)/
n)/(4*n*x), Eq(b, I/(2*n))), (-2*b**2*n**2*sin(a + b*n*log(x) + b*log(c))**
2/(4*b**2*n**2*x + x) - 2*b**2*n**2*cos(a + b*n*log(x) + b*log(c))**2/(4*b*
*2*n**2*x + x) - 2*b*n*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) +
b*log(c))/(4*b**2*n**2*x + x) - sin(a + b*n*log(x) + b*log(c))**2/(4*b**2*n
**2*x + x), True))
```

3.12 $\int \frac{\sin^2(a+b\log(cx^n))}{x^3} dx$

Optimal. Leaf size=98

$$-\frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(b^2n^2+1\right)}-\frac{bn\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(b^2n^2+1\right)}-\frac{b^2n^2}{4x^2\left(b^2n^2+1\right)}$$

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

Rubi [A] time = 0.03, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 30}

$$-\frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(b^2n^2+1\right)}-\frac{bn\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(b^2n^2+1\right)}-\frac{b^2n^2}{4x^2\left(b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^2/x^3,x]
```

```
[Out] -(b^2*n^2)/(4*(1 + b^2*n^2)*x^2) - (b*n*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log
[c*x^n]])/(2*(1 + b^2*n^2)*x^2) - Sin[a + b*Log[c*x^n]]^2/(2*(1 + b^2*n^2)*
x^2)
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = -\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)x^2} - \frac{\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)x^2} + \frac{\left(b^2n^2\right)\int}{2\left(1+b^2\right.}$$

$$= -\frac{b^2n^2}{4\left(1+b^2n^2\right)x^2} - \frac{bn\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)x^2} - \frac{\sin^2\left(a+b\log\left(\right.\right.}{2\left(1+b^2n^2\right)}$$

Mathematica [A] time = 0.11, size = 58, normalized size = 0.59

$$-\frac{bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)-\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+b^2n^2+1}{4x^2\left(b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^2/x^3,x]
```

```
[Out] -1/4*(1 + b^2*n^2 - Cos[2*(a + b*Log[c*x^n])] + b*n*Sin[2*(a + b*Log[c*x^n]
)])/((1 + b^2*n^2)*x^2)
```

fricas [A] time = 0.53, size = 69, normalized size = 0.70

$$-\frac{b^2n^2+2\,bn\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)-2\,\cos\left(bn\log(x)+b\log(c)+a\right)^2+2}{4\left(b^2n^2+1\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^2/x^3, x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{\sin^2\left(a + b\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^2/x^3,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^2/x^3,x)
```

maxima [B] time = 0.35, size = 280, normalized size = 2.86

$$-\frac{2\left(b^2\cos\left(2\,b\log(c)\right)^2 + b^2\sin\left(2\,b\log(c)\right)^2\right)n^2 + 2\,\cos\left(2\,b\log(c)\right)^2 + \left(\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right) - b\,c}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/8*(2*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + 2*cos(2*b*log
(c))^2 + ((b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*lo
g(c)) + b*sin(2*b*log(c)))*n - cos(4*b*log(c))*cos(2*b*log(c)) - sin(4*b*lo
g(c))*sin(2*b*log(c)) - cos(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*sin(2*
b*log(c))^2 + ((b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2
*b*log(c)) + b*cos(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4
*b*log(c))*sin(2*b*log(c)) + sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))/(((b
^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2 + sin
(2*b*log(c))^2)*x^2)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a + b\,\ln\left(c\,x^n\right)\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^2/x^3,x)
```

```
[Out] int(sin(a + b*log(c*x^n))^2/x^3, x)
```

sympy [A] time = 25.80, size = 672, normalized size = 6.86

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**2/x**3,x)
```

```
[Out] Piecewise((log(x)*sin(-a + I*log(x) + I*log(c)/n)**2/(4*x**2) + I*log(x)*si
n(-a + I*log(x) + I*log(c)/n)*cos(-a + I*log(x) + I*log(c)/n)/(2*x**2) - lo
g(x)*cos(-a + I*log(x) + I*log(c)/n)**2/(4*x**2) - sin(-a + I*log(x) + I*lo
g(c)/n)**2/(2*x**2) - I*sin(-a + I*log(x) + I*log(c)/n)*cos(-a + I*log(x) +
 I*log(c)/n)/(4*x**2) + log(c)*sin(-a + I*log(x) + I*log(c)/n)**2/(4*n*x**2
) + I*log(c)*sin(-a + I*log(x) + I*log(c)/n)*cos(-a + I*log(x) + I*log(c)/n
)/(2*n*x**2) - log(c)*cos(-a + I*log(x) + I*log(c)/n)**2/(4*n*x**2), Eq(b,
-I/n)), (log(x)*sin(a + I*log(x) + I*log(c)/n)**2/(4*x**2) + I*log(x)*sin(a
 + I*log(x) + I*log(c)/n)*cos(a + I*log(x) + I*log(c)/n)/(2*x**2) - log(x)*
cos(a + I*log(x) + I*log(c)/n)**2/(4*x**2) + 3*I*sin(a + I*log(x) + I*log(c
)/n)*cos(a + I*log(x) + I*log(c)/n)/(4*x**2) - cos(a + I*log(x) + I*log(c)/
n)**2/(2*x**2) + log(c)*sin(a + I*log(x) + I*log(c)/n)**2/(4*n*x**2) + I*lo
g(c)*sin(a + I*log(x) + I*log(c)/n)*cos(a + I*log(x) + I*log(c)/n)/(2*n*x**
2) - log(c)*cos(a + I*log(x) + I*log(c)/n)**2/(4*n*x**2), Eq(b, I/n)), (-b*
*2*n**2*sin(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2*x**2 + 4*x**2) - b**
2*n**2*cos(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2*x**2 + 4*x**2) - 2*b*
n*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*n**
2*x**2 + 4*x**2) - 2*sin(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2*x**2 +
4*x**2), True))
```

3.13 $\int x^2 \sin^3\left(a + b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=160

$$\frac{x^3\sin^3\left(a+b\log\left(cx^n\right)\right)}{3\left(b^2n^2+1\right)}-\frac{bnx^3\sin^2\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{3\left(b^2n^2+1\right)}+\frac{2b^2n^2x^3\sin\left(a+b\log\left(cx^n\right)\right)}{b^4n^4+10b^2n^2+9}-\frac{2b^3n^3}{3}$$

```
[Out] -2/3*b^3*n^3*x^3*cos(a+b*ln(c*x^n))/(b^4*n^4+10*b^2*n^2+9)+2*b^2*n^2*x^3*si
n(a+b*ln(c*x^n))/(b^4*n^4+10*b^2*n^2+9)-1/3*b*n*x^3*cos(a+b*ln(c*x^n))*sin(
a+b*ln(c*x^n))^2/(b^2*n^2+1)+1/3*x^3*sin(a+b*ln(c*x^n))^3/(b^2*n^2+1)
```

Rubi [A] time = 0.06, antiderivative size = 160, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 4485}

$$\frac{x^3\sin^3\left(a+b\log\left(cx^n\right)\right)}{3\left(b^2n^2+1\right)}+\frac{2b^2n^2x^3\sin\left(a+b\log\left(cx^n\right)\right)}{b^4n^4+10b^2n^2+9}-\frac{2b^3n^3x^3\cos\left(a+b\log\left(cx^n\right)\right)}{3\left(b^4n^4+10b^2n^2+9\right)}-\frac{bnx^3\sin^2\left(a+b\log\left(cx\right.\right.}{3\left(b^2n\right.}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (-2*b^3*n^3*x^3*Cos[a + b*Log[c*x^n]])/(3*(9 + 10*b^2*n^2 + b^4*n^4)) + (2*
b^2*n^2*x^3*Sin[a + b*Log[c*x^n]])/(9 + 10*b^2*n^2 + b^4*n^4) - (b*n*x^3*Co
s[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^2)/(3*(1 + b^2*n^2)) + (x^3*Sin[a
 + b*Log[c*x^n]]^3)/(3*(1 + b^2*n^2))
```

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2 \sin^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{bnx^3\cos\left(a+b\log\left(cx^n\right)\right)\sin^2\left(a+b\log\left(cx^n\right)\right)}{3\left(1+b^2n^2\right)} + \frac{x^3\sin^3\left(a+b\log\left(cx^n\right)\right)}{3\left(1+b^2n^2\right)} + \cdots$$

$$= -\frac{2b^3n^3x^3\cos\left(a+b\log\left(cx^n\right)\right)}{3\left(9+10b^2n^2+b^4n^4\right)} + \frac{2b^2n^2x^3\sin\left(a+b\log\left(cx^n\right)\right)}{9+10b^2n^2+b^4n^4} - \frac{bnx^3\cos\left(a+\cdots\right.}{\cdots}$$

Mathematica [A] time = 0.52, size = 122, normalized size = 0.76

$$\frac{x^3\left(-9bn\left(b^2n^2+1\right)\cos\left(a+b\log\left(cx^n\right)\right)+bn\left(b^2n^2+9\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)-2\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2\cdots\right.\right.}{12\left(b^4n^4+10b^2n^2+9\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sin[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^3*(-9*b*n*(1 + b^2*n^2)*Cos[a + b*Log[c*x^n]] + b*n*(9 + b^2*n^2)*Cos[3*
(a + b*Log[c*x^n])] - 2*(-9 - 13*b^2*n^2 + (9 + b^2*n^2)*Cos[2*(a + b*Log[c
*x^n])])*Sin[a + b*Log[c*x^n]]))/(12*(9 + 10*b^2*n^2 + b^4*n^4))
```

fricas [A] time = 0.46, size = 138, normalized size = 0.86

$$\frac{\left(b^3n^3+9\,bn\right)x^3\cos\left(bn\log(x)+b\log(c)+a\right)^3-3\left(b^3n^3+3\,bn\right)x^3\cos\left(bn\log(x)+b\log(c)+a\right)-\left(\left(b^2n^2+9\right)x\cdots\right.}{3\left(b^4n^4+10\,b^2n^2+9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] 1/3*((b^3*n^3 + 9*b*n)*x^3*cos(b*n*log(x) + b*log(c) + a)^3 - 3*(b^3*n^3 +
3*b*n)*x^3*cos(b*n*log(x) + b*log(c) + a) - ((b^2*n^2 + 9)*x^3*cos(b*n*log(
x) + b*log(c) + a)^2 - (7*b^2*n^2 + 9)*x^3)*sin(b*n*log(x) + b*log(c) + a))
/(b^4*n^4 + 10*b^2*n^2 + 9)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^2 \left(\sin^3 (a + b \ln (c x^n))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+b*ln(c*x^n))^3,x)
```

```
[Out] int(x^2*sin(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.39, size = 1008, normalized size = 6.30

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

```
[Out] 1/24*(((b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*l
og(c)) + b^3*cos(3*b*log(c)))*n^3 - (b^2*cos(3*b*log(c))*sin(6*b*log(c)) -
b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 9*(b*cos(6
*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3*b*
log(c)))*n - 9*cos(3*b*log(c))*sin(6*b*log(c)) + 9*cos(6*b*log(c))*sin(3*b*
log(c)) - 9*sin(3*b*log(c)))*x^3*cos(3*b*log(x^n) + 3*a) - 9*((b^3*cos(4*b*
log(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b
*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 - 3*(b^
2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c)) + b
^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(c)))*n
^2 + (b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log(c))
 + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n
 - 3*cos(3*b*log(c))*sin(4*b*log(c)) + 3*cos(4*b*log(c))*sin(3*b*log(c)) -
3*cos(2*b*log(c))*sin(3*b*log(c)) + 3*cos(3*b*log(c))*sin(2*b*log(c)))*x^3*
cos(b*log(x^n) + a) - ((b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*l
og(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c)))*n^3 + (b^2*cos(6*b*log(c))*co
s(3*b*log(c)) + b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*
n^2 + 9*(b*cos(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(
c)) + b*sin(3*b*log(c)))*n + 9*cos(6*b*log(c))*cos(3*b*log(c)) + 9*sin(6*b*
log(c))*sin(3*b*log(c)) + 9*cos(3*b*log(c)))*x^3*sin(3*b*log(x^n) + 3*a) +
9*((b^3*cos(3*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c
)) + b^3*cos(2*b*log(c))*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(
c)))*n^3 + 3*(b^2*cos(4*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos
(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*si
n(2*b*log(c)))*n^2 + (b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))
*sin(3*b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*si
```

```
n(2*b*log(c)))*n + 3*cos(4*b*log(c))*cos(3*b*log(c)) + 3*cos(3*b*log(c))*co
s(2*b*log(c)) + 3*sin(4*b*log(c))*sin(3*b*log(c)) + 3*sin(3*b*log(c))*sin(2
*b*log(c)))*x^3*sin(b*log(x^n) + a))/((b^4*cos(3*b*log(c))^2 + b^4*sin(3*b*
log(c))^2)*n^4 + 10*(b^2*cos(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2)*n^2 + 9
*cos(3*b*log(c))^2 + 9*sin(3*b*log(c))^2)
```

mupad [B] time = 3.12, size = 122, normalized size = 0.76

$$-\frac{x^3\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}\,3\mathrm{i}}{-24+b\,n\,8\mathrm{i}}-\frac{3\,x^3\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{8\,b\,n-24\mathrm{i}}+\frac{x^3\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}\,1\mathrm{i}}{-24+b\,n\,24\mathrm{i}}+\frac{x^3\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}{24\,b\,n-24\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a + b*log(c*x^n))^3,x)
```

```
[Out] (x^3*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(b*n*24i - 24) - (3*x^3*exp(a*1i)*(c*x^n
)^(b*1i))/(8*b*n - 24i) - (x^3*exp(-a*1i)/(c*x^n)^(b*1i)*3i)/(b*n*8i - 24)
+ (x^3*exp(a*3i)*(c*x^n)^(b*3i))/(24*b*n - 24i)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sin(a+b*ln(c*x**n))**3,x)
```

```
[Out] Timed out
```

3.14 $\int x\sin^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=158

$$\frac{2x^2\sin^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+4}-\frac{3bnx^2\sin^2\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+4}+\frac{12b^2n^2x^2\sin\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+40b^2n^2+16}-\frac{6b\ldots}{\ldots}$$

```
[Out] -6*b^3*n^3*x^2*cos(a+b*ln(c*x^n))/(9*b^4*n^4+40*b^2*n^2+16)+12*b^2*n^2*x^2*
sin(a+b*ln(c*x^n))/(9*b^4*n^4+40*b^2*n^2+16)-3*b*n*x^2*cos(a+b*ln(c*x^n))*s
in(a+b*ln(c*x^n))^2/(9*b^2*n^2+4)+2*x^2*sin(a+b*ln(c*x^n))^3/(9*b^2*n^2+4)
```

Rubi [A] time = 0.04, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {4487, 4485}

$$\frac{2x^2\sin^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+4}+\frac{12b^2n^2x^2\sin\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+40b^2n^2+16}-\frac{6b^3n^3x^2\cos\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+40b^2n^2+16}-\frac{3bnx^2\sin^2\left(a+b\log\ldots\right.}{9b\ldots}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (-6*b^3*n^3*x^2*Cos[a + b*Log[c*x^n]])/(16 + 40*b^2*n^2 + 9*b^4*n^4) + (12*
b^2*n^2*x^2*Sin[a + b*Log[c*x^n]])/(16 + 40*b^2*n^2 + 9*b^4*n^4) - (3*b*n*x
^2*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^2)/(4 + 9*b^2*n^2) + (2*x^2*
Sin[a + b*Log[c*x^n]]^3)/(4 + 9*b^2*n^2)
```

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x\sin^3\left(a+b\log\left(cx^n\right)\right)dx = -\frac{3bnx^2\cos\left(a+b\log\left(cx^n\right)\right)\sin^2\left(a+b\log\left(cx^n\right)\right)}{4+9b^2n^2}+\frac{2x^2\sin^3\left(a+b\log\left(cx^n\right)\right)}{4+9b^2n^2}+$$

$$= -\frac{6b^3n^3x^2\cos\left(a+b\log\left(cx^n\right)\right)}{16+40b^2n^2+9b^4n^4}+\frac{12b^2n^2x^2\sin\left(a+b\log\left(cx^n\right)\right)}{16+40b^2n^2+9b^4n^4}-\frac{3bnx^2\cos\left(a+\right.}{}$$

Mathematica [A] time = 0.49, size = 125, normalized size = 0.79

$$\frac{x^2\left(-3bn\left(9b^2n^2+4\right)\cos\left(a+b\log\left(cx^n\right)\right)+3bn\left(b^2n^2+4\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)-4\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2\right.\right.}{4\left(9b^4n^4+40b^2n^2+16\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sin[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^2*(-3*b*n*(4 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] + 3*b*n*(4 + b^2*n^2)*Co
s[3*(a + b*Log[c*x^n])] - 4*(-4 - 13*b^2*n^2 + (4 + b^2*n^2)*Cos[2*(a + b*L
og[c*x^n])])*Sin[a + b*Log[c*x^n]]))/(4*(16 + 40*b^2*n^2 + 9*b^4*n^4))
```

fricas [A] time = 0.64, size = 140, normalized size = 0.89

$$\frac{3\left(b^3n^3+4\,bn\right)x^2\cos\left(bn\log(x)+b\log(c)+a\right)^3-3\left(3\,b^3n^3+4\,bn\right)x^2\cos\left(bn\log(x)+b\log(c)+a\right)-2\left(\left(b^2n^2\right.\right.}{9\,b^4n^4+40\,b^2n^2+16}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*(b^3*n^3 + 4*b*n)*x^2*cos(b*n*log(x) + b*log(c) + a)^3 - 3*(3*b^3*n^3 +
4*b*n)*x^2*cos(b*n*log(x) + b*log(c) + a) - 2*((b^2*n^2 + 4)*x^2*cos(b*n*lo
g(x) + b*log(c) + a)^2 - (7*b^2*n^2 + 4)*x^2)*sin(b*n*log(x) + b*log(c) + a
))/(9*b^4*n^4 + 40*b^2*n^2 + 16)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x\left(\sin^3\left(a+b\ln\left(c\,x^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n))^3,x)
```

```
[Out] int(x*sin(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.39, size = 1016, normalized size = 6.43

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*
log(c)) + b^3*cos(3*b*log(c)))*n^3 - 2*(b^2*cos(3*b*log(c))*sin(6*b*log(c))
 - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 12*(b*c
os(6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(
3*b*log(c)))*n - 8*cos(3*b*log(c))*sin(6*b*log(c)) + 8*cos(6*b*log(c))*sin(
3*b*log(c)) - 8*sin(3*b*log(c)))*x^2*cos(3*b*log(x^n) + 3*a) - 3*(9*(b^3*co
s(4*b*log(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*s
in(4*b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 -
 18*(b^2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(
c)) + b^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log
(c)))*n^2 + 4*(b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*
b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*l
og(c)))*n - 8*cos(3*b*log(c))*sin(4*b*log(c)) + 8*cos(4*b*log(c))*sin(3*b*l
og(c)) - 8*cos(2*b*log(c))*sin(3*b*log(c)) + 8*cos(3*b*log(c))*sin(2*b*log(
c)))*x^2*cos(b*log(x^n) + a) - (3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^
3*cos(6*b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c)))*n^3 + 2*(b^2*cos(6
*b*log(c))*cos(3*b*log(c)) + b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(
3*b*log(c)))*n^2 + 12*(b*cos(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c)
)*sin(3*b*log(c)) + b*sin(3*b*log(c)))*n + 8*cos(6*b*log(c))*cos(3*b*log(c)
) + 8*sin(6*b*log(c))*sin(3*b*log(c)) + 8*cos(3*b*log(c)))*x^2*sin(3*b*log(
x^n) + 3*a) + 3*(9*(b^3*cos(3*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c
))*sin(3*b*log(c)) + b^3*cos(2*b*log(c))*sin(3*b*log(c)) - b^3*cos(3*b*log(
c))*sin(2*b*log(c)))*n^3 + 18*(b^2*cos(4*b*log(c))*cos(3*b*log(c)) + b^2*co
s(3*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(3*b*log(c)) + b^2*s
in(3*b*log(c))*sin(2*b*log(c)))*n^2 + 4*(b*cos(3*b*log(c))*sin(4*b*log(c))
- b*cos(4*b*log(c))*sin(3*b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b
*cos(3*b*log(c))*sin(2*b*log(c)))*n + 8*cos(4*b*log(c))*cos(3*b*log(c)) + 8
```

```
*cos(3*b*log(c))*cos(2*b*log(c)) + 8*sin(4*b*log(c))*sin(3*b*log(c)) + 8*si
n(3*b*log(c))*sin(2*b*log(c)))*x^2*sin(b*log(x^n) + a))/(9*(b^4*cos(3*b*log
(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 40*(b^2*cos(3*b*log(c))^2 + b^2*sin(3
*b*log(c))^2)*n^2 + 16*cos(3*b*log(c))^2 + 16*sin(3*b*log(c))^2)
```

mupad [B] time = 3.05, size = 122, normalized size = 0.77

$$-\frac{x^2\,{\mathrm{e}}^{-a\,1{}\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1{}\mathrm{i}}}\,3{}\mathrm{i}}{-16+b\,n\,8{}\mathrm{i}}-\frac{3\,x^2\,{\mathrm{e}}^{a\,1{}\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1{}\mathrm{i}}}{8\,b\,n-16{}\mathrm{i}}+\frac{x^2\,{\mathrm{e}}^{-a\,3{}\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3{}\mathrm{i}}}\,1{}\mathrm{i}}{-16+b\,n\,24{}\mathrm{i}}+\frac{x^2\,{\mathrm{e}}^{a\,3{}\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3{}\mathrm{i}}}{24\,b\,n-16{}\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x^2*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(b*n*24i - 16) - (3*x^2*exp(a*1i)*(c*x^n
)^(b*1i))/(8*b*n - 16i) - (x^2*exp(-a*1i)/(c*x^n)^(b*1i)*3i)/(b*n*8i - 16)
+ (x^2*exp(a*3i)*(c*x^n)^(b*3i))/(24*b*n - 16i)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.15 $\int \sin^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=149

$$\frac{x\sin^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+1}-\frac{3bnx\sin^2\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+1}+\frac{6b^2n^2x\sin\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+10b^2n^2+1}-\frac{6b^3n^3x}{9b^4}$$

```
[Out] -6*b^3*n^3*x*cos(a+b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)+6*b^2*n^2*x*sin(a+
b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)-3*b*n*x*cos(a+b*ln(c*x^n))*sin(a+b*ln
(c*x^n))^2/(9*b^2*n^2+1)+x*sin(a+b*ln(c*x^n))^3/(9*b^2*n^2+1)
```

Rubi [A] time = 0.04, antiderivative size = 149, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {4477, 4475}

$$\frac{x\sin^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+1}+\frac{6b^2n^2x\sin\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+10b^2n^2+1}-\frac{6b^3n^3x\cos\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+10b^2n^2+1}-\frac{3bnx\sin^2\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (-6*b^3*n^3*x*Cos[a + b*Log[c*x^n]])/(1 + 10*b^2*n^2 + 9*b^4*n^4) + (6*b^2*
n^2*x*Sin[a + b*Log[c*x^n]])/(1 + 10*b^2*n^2 + 9*b^4*n^4) - (3*b*n*x*Cos[a
+ b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^2)/(1 + 9*b^2*n^2) + (x*Sin[a + b*Log
[c*x^n]]^3)/(1 + 9*b^2*n^2)
```

Rule 4475

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Simp[(x*
Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] - Simp[(b*d*n*x*Cos[d*(a +
 b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[
b^2*d^2*n^2 + 1, 0]
```

Rule 4477

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

Rubi steps

$$\int \sin^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{3bnx\cos\left(a+b\log\left(cx^n\right)\right)\sin^2\left(a+b\log\left(cx^n\right)\right)}{1+9b^2n^2} + \frac{x\sin^3\left(a+b\log\left(cx^n\right)\right)}{1+9b^2n^2} + \frac{(6b^2\cdots}{}$$
$$= -\frac{6b^3n^3x\cos\left(a+b\log\left(cx^n\right)\right)}{1+10b^2n^2+9b^4n^4} + \frac{6b^2n^2x\sin\left(a+b\log\left(cx^n\right)\right)}{1+10b^2n^2+9b^4n^4} - \frac{3bnx\cos\left(a+b\log\cdots\right.}{}$$

Mathematica [A]   time = 0.47, size = 121, normalized size = 0.81

$$-\frac{x\left(-3\left(b^3n^3+bn\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)+3bn\left(9b^2n^2+1\right)\cos\left(a+b\log\left(cx^n\right)\right)+2\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2\cdots\right.\right.\right.}{36b^4n^4+40b^2n^2+4}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^3,x]
```

```
[Out] -((x*(3*b*n*(1 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] - 3*(b*n + b^3*n^3)*Cos[3
*(a + b*Log[c*x^n])] + 2*(-1 - 13*b^2*n^2 + (1 + b^2*n^2)*Cos[2*(a + b*Log[
c*x^n])])*Sin[a + b*Log[c*x^n]]))/(4 + 40*b^2*n^2 + 36*b^4*n^4))
```

fricas [A]   time = 0.52, size = 130, normalized size = 0.87

$$\frac{3\left(b^3n^3+bn\right)x\cos\left(bn\log(x)+b\log(c)+a\right)^3-3\left(3\,b^3n^3+bn\right)x\cos\left(bn\log(x)+b\log(c)+a\right)-\left(\left(b^2n^2+1\right)x\cos\cdots\right.}{9\,b^4n^4+10\,b^2n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*(b^3*n^3 + b*n)*x*cos(b*n*log(x) + b*log(c) + a)^3 - 3*(3*b^3*n^3 + b*n)
*x*cos(b*n*log(x) + b*log(c) + a) - ((b^2*n^2 + 1)*x*cos(b*n*log(x) + b*log
(c) + a)^2 - (7*b^2*n^2 + 1)*x)*sin(b*n*log(x) + b*log(c) + a))/(9*b^4*n^4
+ 10*b^2*n^2 + 1)
```

giac [F(-1)]   time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \sin^3(a + b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^3,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.39, size = 990, normalized size = 6.64

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*
log(c)) + b^3*cos(3*b*log(c)))*n^3 - (b^2*cos(3*b*log(c))*sin(6*b*log(c)) -
 b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 3*(b*cos(
6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3*b
*log(c)))*n - cos(3*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(3*b*log
(c)) - sin(3*b*log(c)))*x*cos(3*b*log(x^n) + 3*a) - 3*(9*(b^3*cos(4*b*log(c
))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(
c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 - 9*(b^2*cos
(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c)) + b^2*co
s(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(c)))*n^2 +
(b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log(c)) + b*
sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n - co
s(3*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(3*b*log(c)) - cos(2*b*l
og(c))*sin(3*b*log(c)) + cos(3*b*log(c))*sin(2*b*log(c)))*x*cos(b*log(x^n)
+ a) - (3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(3*
b*log(c)) + b^3*sin(3*b*log(c)))*n^3 + (b^2*cos(6*b*log(c))*cos(3*b*log(c))
 + b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*n^2 + 3*(b*co
s(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*sin(3
*b*log(c)))*n + cos(6*b*log(c))*cos(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*l
og(c)) + cos(3*b*log(c)))*x*sin(3*b*log(x^n) + 3*a) + 3*(9*(b^3*cos(3*b*log
(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c)) + b^3*cos(2*b*lo
g(c))*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(c)))*n^3 + 9*(b^2*c
os(4*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos(2*b*log(c)) + b^2*
sin(4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*sin(2*b*log(c)))*n^2
+ (b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)) +
b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n +
cos(4*b*log(c))*cos(3*b*log(c)) + cos(3*b*log(c))*cos(2*b*log(c)) + sin(4*b
```

```
*log(c))*sin(3*b*log(c)) + sin(3*b*log(c))*sin(2*b*log(c)))*x*sin(b*log(x^n
) + a))/(9*(b^4*cos(3*b*log(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 10*(b^2*co
s(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2)*n^2 + cos(3*b*log(c))^2 + sin(3*b*
log(c))^2)
```

mupad [B] time = 2.89, size = 114, normalized size = 0.77

$$-\frac{x\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}\,3\mathrm{i}}{-8+b\,n\,8\mathrm{i}}-\frac{3\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{8\,b\,n-8\mathrm{i}}+\frac{x\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}\,1\mathrm{i}}{-8+b\,n\,24\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}{24\,b\,n-8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(b*n*24i - 8) - (3*x*exp(a*1i)*(c*x^n)^(b*
1i))/(8*b*n - 8i) - (x*exp(-a*1i)/(c*x^n)^(b*1i)*3i)/(b*n*8i - 8) + (x*exp(
a*3i)*(c*x^n)^(b*3i))/(24*b*n - 8i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \sin^3\left(a - \frac{i\log\left(cx^n\right)}{n}\right)dx \\ \int \sin^3\left(a - \frac{i\log\left(cx^n\right)}{3n}\right)dx \\ \int \sin^3\left(a + \frac{i\log\left(cx^n\right)}{3n}\right)dx \\ \int \sin^3\left(a + \frac{i\log\left(cx^n\right)}{n}\right)dx \\ -\frac{9b^3n^3x\sin^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)\cos\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{9b^4n^4+10b^2n^2+1} - \frac{6b^3n^3x\cos^3\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{9b^4n^4+10b^2n^2+1} + \frac{7b^2n^2x\sin^3\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{9b^4n^4+10b^2n^2+1} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(sin(a - I*log(c*x**n)/n)**3, x), Eq(b, -I/n)), (Integra
l(sin(a - I*log(c*x**n)/(3*n))**3, x), Eq(b, -I/(3*n))), (Integral(sin(a +
I*log(c*x**n)/(3*n))**3, x), Eq(b, I/(3*n))), (Integral(sin(a + I*log(c*x**
n)/n)**3, x), Eq(b, I/n)), (-9*b**3*n**3*x*sin(a + b*n*log(x) + b*log(c))**
2*cos(a + b*n*log(x) + b*log(c))/(9*b**4*n**4 + 10*b**2*n**2 + 1) - 6*b**3*
n**3*x*cos(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4 + 10*b**2*n**2 + 1) +
 7*b**2*n**2*x*sin(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4 + 10*b**2*n**
2 + 1) + 6*b**2*n**2*x*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) +
b*log(c))**2/(9*b**4*n**4 + 10*b**2*n**2 + 1) - 3*b*n*x*sin(a + b*n*log(x)
```

```
+ b*log(c))**2*cos(a + b*n*log(x) + b*log(c))/(9*b**4*n**4 + 10*b**2*n**2 +
 1) + x*sin(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4 + 10*b**2*n**2 + 1),
 True))
```

3.16 $\int \frac{\sin^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=43

$$\frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] -cos(a+b*ln(c*x^n))/b/n+1/3*cos(a+b*ln(c*x^n))^3/b/n
```

Rubi [A] time = 0.03, antiderivative size = 43, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {2633}

$$\frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] -(Cos[a + b*Log[c*x^n]]/(b*n)) + Cos[a + b*Log[c*x^n]]^3/(3*b*n)
```

Rule 2633

```
Int[sin[(c_.) + (d_.)*(x_)]^(n_), x_Symbol] :> -Dist[d^(-1), Subst[Int[Expa
nd[(1 - x^2)^((n - 1)/2), x], x], x, Cos[c + d*x]], x] /; FreeQ[{c, d}, x]
&& IGtQ[(n - 1)/2, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sin^3(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= -\frac{\text{Subst}\left(\int \left(1-x^2\right)\,dx, x, \cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}\\ &= -\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{bn}+\frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{3bn}\end{aligned}$$

Mathematica [A] time = 0.06, size = 45, normalized size = 1.05

$$\frac{\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)}{12bn}-\frac{3\cos\left(a+b\log\left(cx^n\right)\right)}{4bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] (-3*Cos[a + b*Log[c*x^n]])/(4*b*n) + Cos[3*(a + b*Log[c*x^n])]/(12*b*n)
```

fricas [A] time = 0.62, size = 37, normalized size = 0.86

$$\frac{\cos\left(bn\log(x) + b\log(c) + a\right)^3 - 3\cos\left(bn\log(x) + b\log(c) + a\right)}{3\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*(cos(b*n*log(x) + b*log(c) + a)^3 - 3*cos(b*n*log(x) + b*log(c) + a))/(
b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right) + a\right)^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^3/x, x)
```

maple [A] time = 0.03, size = 35, normalized size = 0.81

$$-\frac{\left(2 + \sin^2\left(a + b\ln\left(c\,x^n\right)\right)\right)\cos\left(a + b\ln\left(c\,x^n\right)\right)}{3nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^3/x,x)
```

```
[Out] -1/3/n/b*(2+sin(a+b*ln(c*x^n))^2)*cos(a+b*ln(c*x^n))
```

maxima [B] time = 0.36, size = 233, normalized size = 5.42

$$\frac{\left(\cos\left(6\,b\log(c)\right)\cos\left(3\,b\log(c)\right) + \sin\left(6\,b\log(c)\right)\sin\left(3\,b\log(c)\right) + \cos\left(3\,b\log(c)\right)\right)\cos\left(3\,b\log\left(x^n\right) + 3\,a\right) - 9}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/24*((cos(6*b*log(c))*cos(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*log(c)) +
cos(3*b*log(c)))*cos(3*b*log(x^n) + 3*a) - 9*(cos(4*b*log(c))*cos(3*b*log(c
)) + cos(3*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)) + si
n(3*b*log(c))*sin(2*b*log(c)))*cos(b*log(x^n) + a) - (cos(3*b*log(c))*sin(6
*b*log(c)) - cos(6*b*log(c))*sin(3*b*log(c)) + sin(3*b*log(c)))*sin(3*b*log
(x^n) + 3*a) + 9*(cos(3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b
*log(c)) + cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)
))*sin(b*log(x^n) + a))/(b*n)
```

mupad [B] time = 2.43, size = 37, normalized size = 0.86

$$-\frac{3\,\cos\left(a+b\,\ln\left(c\,x^n\right)\right)-{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^3}{3\,b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(3*cos(a + b*log(c*x^n)) - cos(a + b*log(c*x^n))^3)/(3*b*n)
```

sympy [A] time = 10.95, size = 83, normalized size = 1.93

$$\begin{cases} \log{\left(x \right)} \sin^{3}{\left(a \right)} & \text{for}\: b = 0 \wedge \left(b = 0 \vee n = 0\right) \\ \log{\left(x \right)} \sin^{3}{\left(a + b \log{\left(c \right)} \right)} & \text{for}\: n = 0 \\ - \frac{\sin^{2}{\left(a + b n \log{\left(x \right)} + b \log{\left(c \right)} \right)} \cos{\left(a + b n \log{\left(x \right)} + b \log{\left(c \right)} \right)}}{b n} - \frac{2 \cos^{3}{\left(a + b n \log{\left(x \right)} + b \log{\left(c \right)} \right)}}{3 b n} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*sin(a)**3, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*sin
(a + b*log(c))**3, Eq(n, 0)), (-sin(a + b*n*log(x) + b*log(c))**2*cos(a + b
*n*log(x) + b*log(c))/(b*n) - 2*cos(a + b*n*log(x) + b*log(c))**3/(3*b*n),
True))
```

3.17 $\int \frac{\sin^3(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=158

$$-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^2n^2+1\right)}-\frac{3bn\sin^2\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^2n^2+1\right)}-\frac{6b^2n^2\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^4n^4+10b^2n^2+1\right)}-\frac{6b^3n^3\cos}{x\left(9b^4n^4\right.}$$

```
[Out] -6*b^3*n^3*cos(a+b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)/x-6*b^2*n^2*sin(a+b*
ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)/x-3*b*n*cos(a+b*ln(c*x^n))*sin(a+b*ln(c
*x^n))^2/(9*b^2*n^2+1)/x-sin(a+b*ln(c*x^n))^3/(9*b^2*n^2+1)/x
```

Rubi [A] time = 0.05, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 4485}

$$-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^2n^2+1\right)}-\frac{6b^2n^2\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^4n^4+10b^2n^2+1\right)}-\frac{6b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^4n^4+10b^2n^2+1\right)}-\frac{3bn\sin^2\left(a+b\log\left(cx^n\right)\right)\cos}{x\left(9b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^3/x^2,x]
```

```
[Out] (-6*b^3*n^3*Cos[a + b*Log[c*x^n]])/((1 + 10*b^2*n^2 + 9*b^4*n^4)*x) - (6*b^
2*n^2*Sin[a + b*Log[c*x^n]])/((1 + 10*b^2*n^2 + 9*b^4*n^4)*x) - (3*b*n*Cos[
a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^2)/((1 + 9*b^2*n^2)*x) - Sin[a + b*
Log[c*x^n]]^3/((1 + 9*b^2*n^2)*x)
```

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
```

```
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{3bn\cos\left(a+b\log\left(cx^n\right)\right)\sin^2\left(a+b\log\left(cx^n\right)\right)}{\left(1+9b^2n^2\right)x} - \frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{\left(1+9b^2n^2\right)x} + \frac{\left(6b^2n^2 \right.}{}$$

$$= -\frac{6b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)}{\left(1+10b^2n^2+9b^4n^4\right)x} - \frac{6b^2n^2\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+10b^2n^2+9b^4n^4\right)x} - \frac{3bn\cos\left(a+b\log\left(cx\right.\right.}{\left(1+\right.}$$

Mathematica [A] time = 0.33, size = 125, normalized size = 0.79

$$\frac{3\left(b^3n^3+bn\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)-3bn\left(9b^2n^2+1\right)\cos\left(a+b\log\left(cx^n\right)\right)+2\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2+1\right.\right.}{4x\left(9b^4n^4+10b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^3/x^2,x]
```

```
[Out] (-3*b*n*(1 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] + 3*(b*n + b^3*n^3)*Cos[3*(a
+ b*Log[c*x^n])] + 2*(-1 - 13*b^2*n^2 + (1 + b^2*n^2)*Cos[2*(a + b*Log[c*x^
n])])*Sin[a + b*Log[c*x^n]])/(4*(1 + 10*b^2*n^2 + 9*b^4*n^4)*x)
```

fricas [A] time = 0.91, size = 127, normalized size = 0.80

$$\frac{3\left(b^3n^3+bn\right)\cos\left(bn\log(x)+b\log(c)+a\right)^3-3\left(3\,b^3n^3+bn\right)\cos\left(bn\log(x)+b\log(c)+a\right)-\left(7\,b^2n^2-\left(b^2n^2+\right.\right.}{\left(9\,b^4n^4+10\,b^2n^2+1\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*(b^3*n^3 + b*n)*cos(b*n*log(x) + b*log(c) + a)^3 - 3*(3*b^3*n^3 + b*n)*c
os(b*n*log(x) + b*log(c) + a) - (7*b^2*n^2 - (b^2*n^2 + 1)*cos(b*n*log(x) +
 b*log(c) + a)^2 + 1)*sin(b*n*log(x) + b*log(c) + a))/((9*b^4*n^4 + 10*b^2*
n^2 + 1)*x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^3/x^2,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^3/x^2, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\sin^3(a + b\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^3/x^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^3/x^2,x)
```

maxima [B] time = 0.40, size = 995, normalized size = 6.30

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*
log(c)) + b^3*cos(3*b*log(c)))*n^3 + (b^2*cos(3*b*log(c))*sin(6*b*log(c)) -
 b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 3*(b*cos(
6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3*b
*log(c)))*n + cos(3*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(3*b*log
(c)) + sin(3*b*log(c)))*cos(3*b*log(x^n) + 3*a) - 3*(9*(b^3*cos(4*b*log(c))
*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c)
)*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 + 9*(b^2*cos(3
*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c)) + b^2*cos(
2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(c)))*n^2 + (b
*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log(c)) + b*si
n(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n + cos(
3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b*log(c)) + cos(2*b*log
(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*cos(b*log(x^n) + a)
 - (3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(3*b*lo
g(c)) + b^3*sin(3*b*log(c)))*n^3 - (b^2*cos(6*b*log(c))*cos(3*b*log(c)) + b
^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*n^2 + 3*(b*cos(3*
b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*l
og(c)))*n - cos(6*b*log(c))*cos(3*b*log(c)) - sin(6*b*log(c))*sin(3*b*log(c
)) - cos(3*b*log(c)))*sin(3*b*log(x^n) + 3*a) + 3*(9*(b^3*cos(3*b*log(c))*s
in(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c)) + b^3*cos(2*b*log(c))*
sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(c)))*n^3 - 9*(b^2*cos(4*b
```

```
*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*
b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*sin(2*b*log(c)))*n^2 + (b*c
os(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)) + b*cos(
2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n - cos(4*
b*log(c))*cos(3*b*log(c)) - cos(3*b*log(c))*cos(2*b*log(c)) - sin(4*b*log(c
))*sin(3*b*log(c)) - sin(3*b*log(c))*sin(2*b*log(c)))*sin(b*log(x^n) + a))/
((9*(b^4*cos(3*b*log(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 10*(b^2*cos(3*b*l
og(c))^2 + b^2*sin(3*b*log(c))^2)*n^2 + cos(3*b*log(c))^2 + sin(3*b*log(c))
^2)*x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+b\ \ln\left(c\,x^n\right)\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^3/x^2,x)
```

```
[Out] int(sin(a + b*log(c*x^n))^3/x^2, x)
```

sympy [B] time = 125.90, size = 1020, normalized size = 6.46

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**3/x**2,x)
```

```
[Out] Piecewise((-3*log(x)*sin(-a + I*log(x) + I*log(c)/n)/(8*x) - 3*I*log(x)*cos
(-a + I*log(x) + I*log(c)/n)/(8*x) + sin(-3*a + 3*I*log(x) + 3*I*log(c)/n)/
(32*x) + 3*sin(-a + I*log(x) + I*log(c)/n)/(8*x) + 3*I*cos(-3*a + 3*I*log(x
) + 3*I*log(c)/n)/(32*x) - 3*log(c)*sin(-a + I*log(x) + I*log(c)/n)/(8*n*x)
 - 3*I*log(c)*cos(-a + I*log(x) + I*log(c)/n)/(8*n*x), Eq(b, -I/n)), (log(x
)*sin(-3*a + I*log(x) + I*log(c)/n)/(8*x) + I*log(x)*cos(-3*a + I*log(x) +
I*log(c)/n)/(8*x) - sin(-3*a + I*log(x) + I*log(c)/n)/(8*x) + 27*sin(-a + I
*log(x)/3 + I*log(c)/(3*n))/(32*x) + 9*I*cos(-a + I*log(x)/3 + I*log(c)/(3*
n))/(32*x) + log(c)*sin(-3*a + I*log(x) + I*log(c)/n)/(8*n*x) + I*log(c)*co
s(-3*a + I*log(x) + I*log(c)/n)/(8*n*x), Eq(b, -I/(3*n))), (-log(x)*sin(3*a
 + I*log(x) + I*log(c)/n)/(8*x) - I*log(x)*cos(3*a + I*log(x) + I*log(c)/n)
/(8*x) - 27*sin(a + I*log(x)/3 + I*log(c)/(3*n))/(32*x) + sin(3*a + I*log(x
) + I*log(c)/n)/(8*x) - 9*I*cos(a + I*log(x)/3 + I*log(c)/(3*n))/(32*x) - l
og(c)*sin(3*a + I*log(x) + I*log(c)/n)/(8*n*x) - I*log(c)*cos(3*a + I*log(x
) + I*log(c)/n)/(8*n*x), Eq(b, I/(3*n))), (3*log(x)*sin(a + I*log(x) + I*lo
g(c)/n)/(8*x) + 3*I*log(x)*cos(a + I*log(x) + I*log(c)/n)/(8*x) - sin(3*a +
 3*I*log(x) + 3*I*log(c)/n)/(32*x) + 3*I*cos(a + I*log(x) + I*log(c)/n)/(8*
```

```
x) - 3*I*cos(3*a + 3*I*log(x) + 3*I*log(c)/n)/(32*x) + 3*log(c)*sin(a + I*l
og(x) + I*log(c)/n)/(8*n*x) + 3*I*log(c)*cos(a + I*log(x) + I*log(c)/n)/(8*
n*x), Eq(b, I/n)), (-9*b**3*n**3*sin(a + b*n*log(x) + b*log(c))**2*cos(a +
b*n*log(x) + b*log(c))/(9*b**4*n**4*x + 10*b**2*n**2*x + x) - 6*b**3*n**3*c
os(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4*x + 10*b**2*n**2*x + x) - 7*b
**2*n**2*sin(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4*x + 10*b**2*n**2*x
+ x) - 6*b**2*n**2*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b*lo
g(c))**2/(9*b**4*n**4*x + 10*b**2*n**2*x + x) - 3*b*n*sin(a + b*n*log(x) +
b*log(c))**2*cos(a + b*n*log(x) + b*log(c))/(9*b**4*n**4*x + 10*b**2*n**2*x
 + x) - sin(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4*x + 10*b**2*n**2*x +
 x), True))
```

3.18 $\int \frac{\sin^3(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=158

$$-\frac{2\sin^3\left(a+b\log\left(cx^n\right)\right)}{x^2\left(9b^2n^2+4\right)}-\frac{3bn\sin^2\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(9b^2n^2+4\right)}-\frac{12b^2n^2\sin\left(a+b\log\left(cx^n\right)\right)}{x^2\left(9b^4n^4+40b^2n^2+16\right)}-\frac{6b^3n^3\cos\ldots}{x^2\left(9b^4n\ldots\right.}$$

```
[Out] -6*b^3*n^3*cos(a+b*ln(c*x^n))/(9*b^4*n^4+40*b^2*n^2+16)/x^2-12*b^2*n^2*sin(
a+b*ln(c*x^n))/(9*b^4*n^4+40*b^2*n^2+16)/x^2-3*b*n*cos(a+b*ln(c*x^n))*sin(a
+b*ln(c*x^n))^2/(9*b^2*n^2+4)/x^2-2*sin(a+b*ln(c*x^n))^3/(9*b^2*n^2+4)/x^2
```

Rubi [A] time = 0.05, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 4485}

$$-\frac{2\sin^3\left(a+b\log\left(cx^n\right)\right)}{x^2\left(9b^2n^2+4\right)}-\frac{12b^2n^2\sin\left(a+b\log\left(cx^n\right)\right)}{x^2\left(9b^4n^4+40b^2n^2+16\right)}-\frac{6b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(9b^4n^4+40b^2n^2+16\right)}-\frac{3bn\sin^2\left(a+b\log\left(cx^n\right)\right)\text{co}\ldots}{x^2\left(9b^2n^2+\ldots\right.}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^3/x^3,x]
```

```
[Out] (-6*b^3*n^3*Cos[a + b*Log[c*x^n]])/((16 + 40*b^2*n^2 + 9*b^4*n^4)*x^2) - (1
2*b^2*n^2*Sin[a + b*Log[c*x^n]])/((16 + 40*b^2*n^2 + 9*b^4*n^4)*x^2) - (3*b
*n*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^2)/((4 + 9*b^2*n^2)*x^2) - (
2*Sin[a + b*Log[c*x^n]]^3)/((4 + 9*b^2*n^2)*x^2)
```

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
```

```
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = -\frac{3bn\cos\left(a+b\log\left(cx^n\right)\right)\sin^2\left(a+b\log\left(cx^n\right)\right)}{\left(4+9b^2n^2\right)x^2} - \frac{2\sin^3\left(a+b\log\left(cx^n\right)\right)}{\left(4+9b^2n^2\right)x^2} + \frac{\left(6b\right.}{}$$
$$= -\frac{6b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)}{\left(16+40b^2n^2+9b^4n^4\right)x^2} - \frac{12b^2n^2\sin\left(a+b\log\left(cx^n\right)\right)}{\left(16+40b^2n^2+9b^4n^4\right)x^2} - \frac{3bn\cos\left(a+b\log\right.}{\left(4\right.}$$

Mathematica [A] time = 0.39, size = 125, normalized size = 0.79

$$\frac{-3bn\left(9b^2n^2+4\right)\cos\left(a+b\log\left(cx^n\right)\right)+3bn\left(b^2n^2+4\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)+4\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n\right.\right.}{4x^2\left(9b^4n^4+40b^2n^2+16\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^3/x^3,x]
```

```
[Out] (-3*b*n*(4 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] + 3*b*n*(4 + b^2*n^2)*Cos[3*(
a + b*Log[c*x^n])] + 4*(-4 - 13*b^2*n^2 + (4 + b^2*n^2)*Cos[2*(a + b*Log[c*
x^n])])*Sin[a + b*Log[c*x^n]])/(4*(16 + 40*b^2*n^2 + 9*b^4*n^4)*x^2)
```

fricas [A] time = 0.70, size = 129, normalized size = 0.82

$$\frac{3\left(b^3n^3+4\,bn\right)\cos\left(bn\log(x)+b\log(c)+a\right)^3-3\left(3\,b^3n^3+4\,bn\right)\cos\left(bn\log(x)+b\log(c)+a\right)-2\left(7\,b^2n^2-\left(\right.\right.}{\left(9\,b^4n^4+40\,b^2n^2+16\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*(b^3*n^3 + 4*b*n)*cos(b*n*log(x) + b*log(c) + a)^3 - 3*(3*b^3*n^3 + 4*b*
n)*cos(b*n*log(x) + b*log(c) + a) - 2*(7*b^2*n^2 - (b^2*n^2 + 4)*cos(b*n*lo
g(x) + b*log(c) + a)^2 + 4)*sin(b*n*log(x) + b*log(c) + a))/((9*b^4*n^4 + 4
0*b^2*n^2 + 16)*x^2)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^3}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^3/x^3, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\sin^3(a + b\ln(c\,x^n))}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^3/x^3,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^3/x^3,x)
```

maxima [B] time = 0.41, size = 1007, normalized size = 6.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*
log(c)) + b^3*cos(3*b*log(c)))*n^3 + 2*(b^2*cos(3*b*log(c))*sin(6*b*log(c))
 - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 12*(b*c
os(6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(
3*b*log(c)))*n + 8*cos(3*b*log(c))*sin(6*b*log(c)) - 8*cos(6*b*log(c))*sin(
3*b*log(c)) + 8*sin(3*b*log(c)))*cos(3*b*log(x^n) + 3*a) - 3*(9*(b^3*cos(4*
b*log(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*sin(4
*b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 + 18*
(b^2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c))
+ b^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(c))
)*n^2 + 4*(b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*lo
g(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c
)))*n + 8*cos(3*b*log(c))*sin(4*b*log(c)) - 8*cos(4*b*log(c))*sin(3*b*log(c
)) + 8*cos(2*b*log(c))*sin(3*b*log(c)) - 8*cos(3*b*log(c))*sin(2*b*log(c)))
*cos(b*log(x^n) + a) - (3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*
b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c)))*n^3 - 2*(b^2*cos(6*b*log(c
))*cos(3*b*log(c)) + b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(
c)))*n^2 + 12*(b*cos(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*
b*log(c)) + b*sin(3*b*log(c)))*n - 8*cos(6*b*log(c))*cos(3*b*log(c)) - 8*si
n(6*b*log(c))*sin(3*b*log(c)) - 8*cos(3*b*log(c)))*sin(3*b*log(x^n) + 3*a)
+ 3*(9*(b^3*cos(3*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*l
og(c)) + b^3*cos(2*b*log(c))*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*
```

```
log(c)))*n^3 - 18*(b^2*cos(4*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c)
)*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c
))*sin(2*b*log(c)))*n^2 + 4*(b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*
log(c))*sin(3*b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log
(c))*sin(2*b*log(c)))*n - 8*cos(4*b*log(c))*cos(3*b*log(c)) - 8*cos(3*b*log
(c))*cos(2*b*log(c)) - 8*sin(4*b*log(c))*sin(3*b*log(c)) - 8*sin(3*b*log(c)
)*sin(2*b*log(c)))*sin(b*log(x^n) + a))/((9*(b^4*cos(3*b*log(c))^2 + b^4*si
n(3*b*log(c))^2)*n^4 + 40*(b^2*cos(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2)*n
^2 + 16*cos(3*b*log(c))^2 + 16*sin(3*b*log(c))^2)*x^2)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin(a+b\,\ln(c\,x^n))^3}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(sin(a + b*log(c*x^n))^3/x^3, x)
```

sympy [B] time = 160.48, size = 1197, normalized size = 7.58

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((-3*log(x)*sin(-a + 2*I*log(x) + 2*I*log(c)/n)/(8*x**2) - 3*I*log
(x)*cos(-a + 2*I*log(x) + 2*I*log(c)/n)/(8*x**2) + sin(-3*a + 6*I*log(x) +
6*I*log(c)/n)/(64*x**2) + 3*sin(-a + 2*I*log(x) + 2*I*log(c)/n)/(16*x**2) +
 3*I*cos(-3*a + 6*I*log(x) + 6*I*log(c)/n)/(64*x**2) - 3*log(c)*sin(-a + 2*
I*log(x) + 2*I*log(c)/n)/(8*n*x**2) - 3*I*log(c)*cos(-a + 2*I*log(x) + 2*I*
log(c)/n)/(8*n*x**2), Eq(b, -2*I/n)), (log(x)*sin(-3*a + 2*I*log(x) + 2*I*l
og(c)/n)/(8*x**2) + I*log(x)*cos(-3*a + 2*I*log(x) + 2*I*log(c)/n)/(8*x**2)
 - sin(-3*a + 2*I*log(x) + 2*I*log(c)/n)/(16*x**2) + 27*sin(-a + 2*I*log(x)
/3 + 2*I*log(c)/(3*n))/(64*x**2) + 9*I*cos(-a + 2*I*log(x)/3 + 2*I*log(c)/(
3*n))/(64*x**2) + log(c)*sin(-3*a + 2*I*log(x) + 2*I*log(c)/n)/(8*n*x**2) +
 I*log(c)*cos(-3*a + 2*I*log(x) + 2*I*log(c)/n)/(8*n*x**2), Eq(b, -2*I/(3*n
))), (-log(x)*sin(3*a + 2*I*log(x) + 2*I*log(c)/n)/(8*x**2) - I*log(x)*cos(
3*a + 2*I*log(x) + 2*I*log(c)/n)/(8*x**2) - 27*sin(a + 2*I*log(x)/3 + 2*I*l
og(c)/(3*n))/(64*x**2) + sin(3*a + 2*I*log(x) + 2*I*log(c)/n)/(16*x**2) - 9
*I*cos(a + 2*I*log(x)/3 + 2*I*log(c)/(3*n))/(64*x**2) - log(c)*sin(3*a + 2*
I*log(x) + 2*I*log(c)/n)/(8*n*x**2) - I*log(c)*cos(3*a + 2*I*log(x) + 2*I*l
og(c)/n)/(8*n*x**2), Eq(b, 2*I/(3*n))), (3*log(x)*sin(a + 2*I*log(x) + 2*I*
```

```
log(c)/n)/(8*x**2) + 3*I*log(x)*cos(a + 2*I*log(x) + 2*I*log(c)/n)/(8*x**2)
 - 3*sin(a + 2*I*log(x) + 2*I*log(c)/n)/(16*x**2) - sin(3*a + 6*I*log(x) +
6*I*log(c)/n)/(64*x**2) - 3*I*cos(3*a + 6*I*log(x) + 6*I*log(c)/n)/(64*x**2
) + 3*log(c)*sin(a + 2*I*log(x) + 2*I*log(c)/n)/(8*n*x**2) + 3*I*log(c)*cos
(a + 2*I*log(x) + 2*I*log(c)/n)/(8*n*x**2), Eq(b, 2*I/n)), (-9*b**3*n**3*si
n(a + b*n*log(x) + b*log(c))**2*cos(a + b*n*log(x) + b*log(c))/(9*b**4*n**4
*x**2 + 40*b**2*n**2*x**2 + 16*x**2) - 6*b**3*n**3*cos(a + b*n*log(x) + b*l
og(c))**3/(9*b**4*n**4*x**2 + 40*b**2*n**2*x**2 + 16*x**2) - 14*b**2*n**2*s
in(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4*x**2 + 40*b**2*n**2*x**2 + 16
*x**2) - 12*b**2*n**2*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b
*log(c))**2/(9*b**4*n**4*x**2 + 40*b**2*n**2*x**2 + 16*x**2) - 12*b*n*sin(a
 + b*n*log(x) + b*log(c))**2*cos(a + b*n*log(x) + b*log(c))/(9*b**4*n**4*x*
*2 + 40*b**2*n**2*x**2 + 16*x**2) - 8*sin(a + b*n*log(x) + b*log(c))**3/(9*
b**4*n**4*x**2 + 40*b**2*n**2*x**2 + 16*x**2), True))
```

3.19 $\int x^2 \sin^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=202

$$\frac{3x^3\sin^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+9}-\frac{4bnx^3\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+9}+\frac{36b^2n^2x^3\sin^2\left(a+b\log\left(cx^n\right)\right)}{64b^4n^4+180b^2n^2+81}-$$

```
[Out] 8*b^4*n^4*x^3/(64*b^4*n^4+180*b^2*n^2+81)-24*b^3*n^3*x^3*cos(a+b*ln(c*x^n))
*sin(a+b*ln(c*x^n))/(64*b^4*n^4+180*b^2*n^2+81)+36*b^2*n^2*x^3*sin(a+b*ln(c
*x^n))^2/(64*b^4*n^4+180*b^2*n^2+81)-4*b*n*x^3*cos(a+b*ln(c*x^n))*sin(a+b*l
n(c*x^n))^3/(16*b^2*n^2+9)+3*x^3*sin(a+b*ln(c*x^n))^4/(16*b^2*n^2+9)
```

Rubi [A] time = 0.08, antiderivative size = 202, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 30}

$$\frac{36b^2n^2x^3\sin^2\left(a+b\log\left(cx^n\right)\right)}{64b^4n^4+180b^2n^2+81}+\frac{3x^3\sin^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+9}-\frac{4bnx^3\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+9}-$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (8*b^4*n^4*x^3)/(81 + 180*b^2*n^2 + 64*b^4*n^4) - (24*b^3*n^3*x^3*Cos[a + b
*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(81 + 180*b^2*n^2 + 64*b^4*n^4) + (36*b
^2*n^2*x^3*Sin[a + b*Log[c*x^n]]^2)/(81 + 180*b^2*n^2 + 64*b^4*n^4) - (4*b*
n*x^3*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^3)/(9 + 16*b^2*n^2) + (3*
x^3*Sin[a + b*Log[c*x^n]]^4)/(9 + 16*b^2*n^2)
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2 \sin^4\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{4bnx^3\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\left(cx^n\right)\right)}{9+16b^2n^2} + \frac{3x^3\sin^4\left(a+b\log\left(cx^n\right)\right)}{9+16b^2n^2}$$
$$= -\frac{24b^3n^3x^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{81+180b^2n^2+64b^4n^4} + \frac{36b^2n^2x^3\sin^2\left(a+b\log\ldots\right)}{81+180b^2n^2+64b^4\ldots}$$
$$= \frac{8b^4n^4x^3}{81+180b^2n^2+64b^4n^4} - \frac{24b^3n^3x^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{81+180b^2n^2+64b^4n^4} + \ldots$$

Mathematica [A] time = 0.50, size = 171, normalized size = 0.85

$$\frac{x^3\left(-128b^3n^3\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+16b^3n^3\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)-12\left(16b^2n^2+9\right)\cos\left(2\left(a+b\log\left(cx^n\right)\right)\ldots\right.}{8\left(\ldots\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sin[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x^3*(81 + 180*b^2*n^2 + 64*b^4*n^4 - 12*(9 + 16*b^2*n^2)*Cos[2*(a + b*Log[
c*x^n])] + 3*(9 + 4*b^2*n^2)*Cos[4*(a + b*Log[c*x^n])] - 72*b*n*Sin[2*(a +
b*Log[c*x^n])] - 128*b^3*n^3*Sin[2*(a + b*Log[c*x^n])] + 36*b*n*Sin[4*(a +
b*Log[c*x^n])] + 16*b^3*n^3*Sin[4*(a + b*Log[c*x^n])]))/(8*(81 + 180*b^2*n^
2 + 64*b^4*n^4))
```

fricas [A] time = 0.50, size = 178, normalized size = 0.88

$$\frac{3\left(4\,b^2n^2+9\right)x^3\cos\left(bn\log(x)+b\log(c)+a\right)^4-6\left(10\,b^2n^2+9\right)x^3\cos\left(bn\log(x)+b\log(c)+a\right)^2+\left(8\,b^4n^4+4\ldots\right.}{\ldots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] (3*(4*b^2*n^2 + 9)*x^3*cos(b*n*log(x) + b*log(c) + a)^4 - 6*(10*b^2*n^2 + 9
)*x^3*cos(b*n*log(x) + b*log(c) + a)^2 + (8*b^4*n^4 + 48*b^2*n^2 + 27)*x^3
+ 4*((4*b^3*n^3 + 9*b*n)*x^3*cos(b*n*log(x) + b*log(c) + a)^3 - (10*b^3*n^3
 + 9*b*n)*x^3*cos(b*n*log(x) + b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a
))/(64*b^4*n^4 + 180*b^2*n^2 + 81)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.09, size = 0, normalized size = 0.00

$$\int x^2 \left(\sin^4\left(a+b\ln\left(c\,x^n\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(x^2*sin(a+b*ln(c*x^n))^4,x)
```

maxima [B] time = 0.41, size = 1107, normalized size = 5.48

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] 1/16*((16*(b^3*cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*
b*log(c)) + b^3*sin(4*b*log(c)))*n^3 + 12*(b^2*cos(8*b*log(c))*cos(4*b*log(
c)) + b^2*sin(8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*n^2 + 36*(
b*cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*s
in(4*b*log(c)))*n + 27*cos(8*b*log(c))*cos(4*b*log(c)) + 27*sin(8*b*log(c))
*sin(4*b*log(c)) + 27*cos(4*b*log(c)))*x^3*cos(4*b*log(x^n) + 4*a) - 4*(32*
(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c))
+ b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c))
)*n^3 + 48*(b^2*cos(6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2
*b*log(c)) + b^2*sin(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(
2*b*log(c)))*n^2 + 18*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c)
)*sin(4*b*log(c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*s
in(2*b*log(c)))*n + 27*cos(6*b*log(c))*cos(4*b*log(c)) + 27*cos(4*b*log(c))
*cos(2*b*log(c)) + 27*sin(6*b*log(c))*sin(4*b*log(c)) + 27*sin(4*b*log(c))*
sin(2*b*log(c)))*x^3*cos(2*b*log(x^n) + 2*a) + (16*(b^3*cos(8*b*log(c))*cos
(4*b*log(c)) + b^3*sin(8*b*log(c))*sin(4*b*log(c)) + b^3*cos(4*b*log(c)))*n
^3 - 12*(b^2*cos(4*b*log(c))*sin(8*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*
log(c)) + b^2*sin(4*b*log(c)))*n^2 + 36*(b*cos(8*b*log(c))*cos(4*b*log(c))
+ b*sin(8*b*log(c))*sin(4*b*log(c)) + b*cos(4*b*log(c)))*n - 27*cos(4*b*log
(c))*sin(8*b*log(c)) + 27*cos(8*b*log(c))*sin(4*b*log(c)) - 27*sin(4*b*log(
c)))*x^3*sin(4*b*log(x^n) + 4*a) - 4*(32*(b^3*cos(6*b*log(c))*cos(4*b*log(c
)) + b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(4*b*log(
c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3 - 48*(b^2*cos(4*b*log(c))*si
n(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(4*b*log(c)) + b^2*cos(2*b*log(c))*s
```

```
in(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*log(c)))*n^2 + 18*(b*cos(6*b*l
og(c))*cos(4*b*log(c)) + b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(
c))*sin(4*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n - 27*cos(4*b*log
(c))*sin(6*b*log(c)) + 27*cos(6*b*log(c))*sin(4*b*log(c)) - 27*cos(2*b*log(
c))*sin(4*b*log(c)) + 27*cos(4*b*log(c))*sin(2*b*log(c)))*x^3*sin(2*b*log(x
^n) + 2*a) + 2*(64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n^4 + 18
0*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + 81*cos(4*b*log(c))^
2 + 81*sin(4*b*log(c))^2)*x^3)/(64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log
(c))^2)*n^4 + 180*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + 81*
cos(4*b*log(c))^2 + 81*sin(4*b*log(c))^2)
```

mupad [B] time = 3.12, size = 127, normalized size = 0.63

$$\frac{x^3}{8}-\frac{x^3\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n+12\mathrm{i}}-\frac{x^3\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}{12+b\,n\,8\mathrm{i}}+\frac{x^3\,\mathrm{e}^{-a\,4\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}\,1\mathrm{i}}{64\,b\,n+48\mathrm{i}}+\frac{x^3\,\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}{48+b\,n\,64\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a + b*log(c*x^n))^4,x)
```

```
[Out] x^3/8 - (x^3*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 12i) - (x^3*exp(a*2i)*(
c*x^n)^(b*2i))/(b*n*8i + 12) + (x^3*exp(-a*4i)/(c*x^n)^(b*4i)*1i)/(64*b*n +
 48i) + (x^3*exp(a*4i)*(c*x^n)^(b*4i))/(b*n*64i + 48)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sin(a+b*ln(c*x**n))**4,x)
```

```
[Out] Timed out
```

3.20 $\int x\sin^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=210

$$\frac{x^2\sin^4\left(a+b\log\left(cx^n\right)\right)}{2\left(4b^2n^2+1\right)}-\frac{bnx^2\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{3b^2n^2x^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(4b^4n^4+5b^2n^2+1\right)}-\frac{3b^3n}{}$$

```
[Out] 3/4*b^4*n^4*x^2/(4*b^4*n^4+5*b^2*n^2+1)-3/2*b^3*n^3*x^2*cos(a+b*ln(c*x^n))*
sin(a+b*ln(c*x^n))/(4*b^4*n^4+5*b^2*n^2+1)+3/2*b^2*n^2*x^2*sin(a+b*ln(c*x^n
))^2/(4*b^4*n^4+5*b^2*n^2+1)-b*n*x^2*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))^
3/(4*b^2*n^2+1)+1/2*x^2*sin(a+b*ln(c*x^n))^4/(4*b^2*n^2+1)
```

Rubi [A] time = 0.06, antiderivative size = 210, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {4487, 30}

$$\frac{3b^2n^2x^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(4b^4n^4+5b^2n^2+1\right)}+\frac{x^2\sin^4\left(a+b\log\left(cx^n\right)\right)}{2\left(4b^2n^2+1\right)}-\frac{bnx^2\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}-\frac{3b^3n}{}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (3*b^4*n^4*x^2)/(4*(1 + 5*b^2*n^2 + 4*b^4*n^4)) - (3*b^3*n^3*x^2*Cos[a + b*
Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(2*(1 + 5*b^2*n^2 + 4*b^4*n^4)) + (3*b^2
*n^2*x^2*Sin[a + b*Log[c*x^n]]^2)/(2*(1 + 5*b^2*n^2 + 4*b^4*n^4)) - (b*n*x^
2*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^3)/(1 + 4*b^2*n^2) + (x^2*Sin
[a + b*Log[c*x^n]]^4)/(2*(1 + 4*b^2*n^2))
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x\sin^4\left(a+b\log\left(cx^n\right)\right)dx = -\frac{bnx^2\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{x^2\sin^4\left(a+b\log\left(cx^n\right)\right)}{2\left(1+4b^2n^2\right)}+$$
$$= -\frac{3b^3n^3x^2\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+5b^2n^2+4b^4n^4\right)}+\frac{3b^2n^2x^2\sin^2\left(a+b\log\left(cx\right.\right.}{2\left(1+5b^2n^2+4b^4n^4\right)}$$
$$= \frac{3b^4n^4x^2}{4\left(1+5b^2n^2+4b^4n^4\right)}-\frac{3b^3n^3x^2\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+5b^2n^2+4b^4n^4\right)}+$$

Mathematica [A] time = 0.44, size = 169, normalized size = 0.80

$$\frac{x^2\left(-16b^3n^3\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+2b^3n^3\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)-4\left(4b^2n^2+1\right)\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\ldots}{16\left(4b^4\ldots\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sin[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x^2*(3 + 15*b^2*n^2 + 12*b^4*n^4 - 4*(1 + 4*b^2*n^2)*Cos[2*(a + b*Log[c*x^
n])] + (1 + b^2*n^2)*Cos[4*(a + b*Log[c*x^n])] - 4*b*n*Sin[2*(a + b*Log[c*x
^n])] - 16*b^3*n^3*Sin[2*(a + b*Log[c*x^n])] + 2*b*n*Sin[4*(a + b*Log[c*x^n
])] + 2*b^3*n^3*Sin[4*(a + b*Log[c*x^n])]))/(16*(1 + 5*b^2*n^2 + 4*b^4*n^4)
)
```

fricas [A] time = 0.56, size = 177, normalized size = 0.84

$$\frac{2\left(b^2n^2+1\right)x^2\cos\left(bn\log(x)+b\log(c)+a\right)^4-2\left(5\,b^2n^2+2\right)x^2\cos\left(bn\log(x)+b\log(c)+a\right)^2+\left(3\,b^4n^4+8\,b^2\ldots\right.}{\ldots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] 1/4*(2*(b^2*n^2 + 1)*x^2*cos(b*n*log(x) + b*log(c) + a)^4 - 2*(5*b^2*n^2 +
2)*x^2*cos(b*n*log(x) + b*log(c) + a)^2 + (3*b^4*n^4 + 8*b^2*n^2 + 2)*x^2 +
 2*(2*(b^3*n^3 + b*n)*x^2*cos(b*n*log(x) + b*log(c) + a)^3 - (5*b^3*n^3 + 2
*b*n)*x^2*cos(b*n*log(x) + b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a))/(
4*b^4*n^4 + 5*b^2*n^2 + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*log(c*x^n))^4,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x \left(\sin^4 \left(a + b \ln \left(c\, x^n\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n))^4,x)
[Out] int(x*sin(a+b*ln(c*x^n))^4,x)
```

maxima [B] time = 0.41, size = 1085, normalized size = 5.17

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*log(c*x^n))^4,x, algorithm="maxima")
[Out] 1/32*((2*(b^3*cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*b
*log(c)) + b^3*sin(4*b*log(c)))*n^3 + (b^2*cos(8*b*log(c))*cos(4*b*log(c))
+ b^2*sin(8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*n^2 + 2*(b*cos
(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*sin(4*
b*log(c)))*n + cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*lo
g(c)) + cos(4*b*log(c)))*x^2*cos(4*b*log(x^n) + 4*a) - 4*(4*(b^3*cos(4*b*lo
g(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b*l
og(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3 + 4*(b^2*
cos(6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2
*sin(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2
 + (b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)) +
 b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n +
 cos(6*b*log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c)) + sin(6*
b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*x^2*cos(2*b*lo
g(x^n) + 2*a) + (2*(b^3*cos(8*b*log(c))*cos(4*b*log(c)) + b^3*sin(8*b*log(c
))*sin(4*b*log(c)) + b^3*cos(4*b*log(c)))*n^3 - (b^2*cos(4*b*log(c))*sin(8*
b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c)))*n^2
+ 2*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c))
```

```
+ b*cos(4*b*log(c)))*n - cos(4*b*log(c))*sin(8*b*log(c)) + cos(8*b*log(c))*
sin(4*b*log(c)) - sin(4*b*log(c)))*x^2*sin(4*b*log(x^n) + 4*a) - 4*(4*(b^3*
cos(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3
*sin(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3
 - 4*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(4*b*log
(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*lo
g(c)))*n^2 + (b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*b*log(c))*cos(2*b
*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*lo
g(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*b*log(c)
) - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*log(c)))*x^2*
sin(2*b*log(x^n) + 2*a) + 6*(4*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))
^2)*n^4 + 5*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + cos(4*b*l
og(c))^2 + sin(4*b*log(c))^2)*x^2)/(4*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*
log(c))^2)*n^4 + 5*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + co
s(4*b*log(c))^2 + sin(4*b*log(c))^2)
```

mupad [B] time = 3.04, size = 127, normalized size = 0.60

$$\frac{3\,x^2}{16}-\frac{x^2\,{\mathrm{e}}^{-a\,2{}\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2{}\mathrm{i}}}\,1{}\mathrm{i}}{8\,b\,n+8{}\mathrm{i}}-\frac{x^2\,{\mathrm{e}}^{a\,2{}\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2{}\mathrm{i}}}{8+b\,n\,8{}\mathrm{i}}+\frac{x^2\,{\mathrm{e}}^{-a\,4{}\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,4{}\mathrm{i}}}\,1{}\mathrm{i}}{64\,b\,n+32{}\mathrm{i}}+\frac{x^2\,{\mathrm{e}}^{a\,4{}\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4{}\mathrm{i}}}{32+b\,n\,64{}\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a + b*log(c*x^n))^4,x)
```

```
[Out] (3*x^2)/16 - (x^2*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 8i) - (x^2*exp(a*2
i)*(c*x^n)^(b*2i))/(b*n*8i + 8) + (x^2*exp(-a*4i)/(c*x^n)^(b*4i)*1i)/(64*b*
n + 32i) + (x^2*exp(a*4i)*(c*x^n)^(b*4i))/(b*n*64i + 32)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*ln(c*x**n))**4,x)
```

```
[Out] Timed out
```

3.21 $\int \sin^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=191

$$\frac{x\sin^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}-\frac{4bnx\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}+\frac{12b^2n^2x\sin^2\left(a+b\log\left(cx^n\right)\right)}{64b^4n^4+20b^2n^2+1}-24b^3$$

```
[Out] 24*b^4*n^4*x/(64*b^4*n^4+20*b^2*n^2+1)-24*b^3*n^3*x*cos(a+b*ln(c*x^n))*sin(
a+b*ln(c*x^n))/(64*b^4*n^4+20*b^2*n^2+1)+12*b^2*n^2*x*sin(a+b*ln(c*x^n))^2/
(64*b^4*n^4+20*b^2*n^2+1)-4*b*n*x*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))^3/(
16*b^2*n^2+1)+x*sin(a+b*ln(c*x^n))^4/(16*b^2*n^2+1)
```

Rubi [A] time = 0.05, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {4477, 8}

$$\frac{12b^2n^2x\sin^2\left(a+b\log\left(cx^n\right)\right)}{64b^4n^4+20b^2n^2+1}+\frac{x\sin^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}-\frac{4bnx\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}-24b^3$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (24*b^4*n^4*x)/(1 + 20*b^2*n^2 + 64*b^4*n^4) - (24*b^3*n^3*x*Cos[a + b*Log[
c*x^n]]*Sin[a + b*Log[c*x^n]])/(1 + 20*b^2*n^2 + 64*b^4*n^4) + (12*b^2*n^2*
x*Sin[a + b*Log[c*x^n]]^2)/(1 + 20*b^2*n^2 + 64*b^4*n^4) - (4*b*n*x*Cos[a +
 b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^3)/(1 + 16*b^2*n^2) + (x*Sin[a + b*Log
[c*x^n]]^4)/(1 + 16*b^2*n^2)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 4477

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

Rubi steps

$$\int \sin^4\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{4bnx\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\left(cx^n\right)\right)}{1+16b^2n^2}+\frac{x\sin^4\left(a+b\log\left(cx^n\right)\right)}{1+16b^2n^2}+\frac{(12b}{}$$
$$= -\frac{24b^3n^3x\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+20b^2n^2+64b^4n^4}+\frac{12b^2n^2x\sin^2\left(a+b\log\left(cx^n\right.\right.}{1+20b^2n^2+64b^4n^4}$$
$$= \frac{24b^4n^4x}{1+20b^2n^2+64b^4n^4}-\frac{24b^3n^3x\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+20b^2n^2+64b^4n^4}+\frac{12b^2n}{1}$$

Mathematica [A] time = 0.39, size = 168, normalized size = 0.88

$$\frac{x\left(-128b^3n^3\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+16b^3n^3\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)-4\left(16b^2n^2+1\right)\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)\right.}{8\left(64b\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x*(3 + 60*b^2*n^2 + 192*b^4*n^4 - 4*(1 + 16*b^2*n^2)*Cos[2*(a + b*Log[c*x^
n])] + (1 + 4*b^2*n^2)*Cos[4*(a + b*Log[c*x^n])] - 8*b*n*Sin[2*(a + b*Log[c
*x^n])] - 128*b^3*n^3*Sin[2*(a + b*Log[c*x^n])] + 4*b*n*Sin[4*(a + b*Log[c*
x^n])] + 16*b^3*n^3*Sin[4*(a + b*Log[c*x^n])]))/(8*(1 + 20*b^2*n^2 + 64*b^4
*n^4))
```

fricas [A] time = 0.46, size = 165, normalized size = 0.86

$$\frac{\left(4\,b^2n^2+1\right)x\cos\left(bn\log(x)+b\log(c)+a\right)^4-2\left(10\,b^2n^2+1\right)x\cos\left(bn\log(x)+b\log(c)+a\right)^2+\left(24\,b^4n^4+16\,b\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] ((4*b^2*n^2 + 1)*x*cos(b*n*log(x) + b*log(c) + a)^4 - 2*(10*b^2*n^2 + 1)*x*
cos(b*n*log(x) + b*log(c) + a)^2 + (24*b^4*n^4 + 16*b^2*n^2 + 1)*x + 4*((4*
b^3*n^3 + b*n)*x*cos(b*n*log(x) + b*log(c) + a)^3 - (10*b^3*n^3 + b*n)*x*co
s(b*n*log(x) + b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a))/(64*b^4*n^4 +
 20*b^2*n^2 + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \sin^4(a + b\ln(c x^n))\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^4,x)
```

maxima [B] time = 0.41, size = 1078, normalized size = 5.64

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] 1/16*((16*(b^3*cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*
b*log(c)) + b^3*sin(4*b*log(c)))*n^3 + 4*(b^2*cos(8*b*log(c))*cos(4*b*log(c
)) + b^2*sin(8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*n^2 + 4*(b*
cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*sin
(4*b*log(c)))*n + cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b
*log(c)) + cos(4*b*log(c)))*x*cos(4*b*log(x^n) + 4*a) - 4*(32*(b^3*cos(4*b*
log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b
*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3 + 16*(b
^2*cos(6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) +
b^2*sin(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*
n^2 + 2*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(
c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c))
)*n + cos(6*b*log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c)) + s
in(6*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*x*cos(2*b
*log(x^n) + 2*a) + (16*(b^3*cos(8*b*log(c))*cos(4*b*log(c)) + b^3*sin(8*b*l
og(c))*sin(4*b*log(c)) + b^3*cos(4*b*log(c)))*n^3 - 4*(b^2*cos(4*b*log(c))*
sin(8*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))
)*n^2 + 4*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*lo
g(c)) + b*cos(4*b*log(c)))*n - cos(4*b*log(c))*sin(8*b*log(c)) + cos(8*b*lo
g(c))*sin(4*b*log(c)) - sin(4*b*log(c)))*x*sin(4*b*log(x^n) + 4*a) - 4*(32*
(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log(c))
+ b^3*sin(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c))
)*n^3 - 16*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(4
*b*log(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(
```

```
2*b*log(c)))*n^2 + 2*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*b*log(c))
*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c))*si
n(2*b*log(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*
b*log(c)) - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*log(c
)))*x*sin(2*b*log(x^n) + 2*a) + 6*(64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*
log(c))^2)*n^4 + 20*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + c
os(4*b*log(c))^2 + sin(4*b*log(c))^2)*x)/(64*(b^4*cos(4*b*log(c))^2 + b^4*s
in(4*b*log(c))^2)*n^4 + 20*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*
n^2 + cos(4*b*log(c))^2 + sin(4*b*log(c))^2)
```

mupad [**B**] time = 2.86, size = 117, normalized size = 0.61

$$\frac{3\,x}{8}-\frac{x\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n+4\mathrm{i}}-\frac{x\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}{4+b\,n\,8\mathrm{i}}+\frac{x\,\mathrm{e}^{-a\,4\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}\,1\mathrm{i}}{64\,b\,n+16\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}{16+b\,n\,64\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^4,x)
```

```
[Out] (3*x)/8 - (x*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 4i) - (x*exp(a*2i)*(c*x
^n)^(b*2i))/(b*n*8i + 4) + (x*exp(-a*4i)/(c*x^n)^(b*4i)*1i)/(64*b*n + 16i)
+ (x*exp(a*4i)*(c*x^n)^(b*4i))/(b*n*64i + 16)
```

sympy [**F(-1)**] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**4,x)
```

```
[Out] Timed out
```

3.22 $\int \frac{\sin^4(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=73

$$-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4bn}-\frac{3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{8bn}+\frac{3\log(x)}{8}$$

```
[Out] 3/8*ln(x)-3/8*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/b/n-1/4*cos(a+b*ln(c*x^
n))*sin(a+b*ln(c*x^n))^3/b/n
```

Rubi [A] time = 0.05, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2635, 8}

$$-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4bn}-\frac{3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{8bn}+\frac{3\log(x)}{8}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] (3*Log[x])/8 - (3*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(8*b*n) - (C
os[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^3)/(4*b*n)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rubi steps

$$\int \frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \sin^4(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\left(cx^n\right)\right)}{4bn} + \frac{3\,\text{Subst}\left(\int \sin^2(a+bx)\,dx, x, \log\left(c\right.\right.}{4n}$$
$$= -\frac{3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{8bn} - \frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\right.}{4bn}$$
$$= \frac{3\log(x)}{8} - \frac{3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{8bn} - \frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin^3}{4bn}$$

Mathematica [A] time = 0.09, size = 51, normalized size = 0.70

$$\frac{12\left(a+b\log\left(cx^n\right)\right) - 8\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right) + \sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)}{32bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] (12*(a + b*Log[c*x^n]) - 8*Sin[2*(a + b*Log[c*x^n])] + Sin[4*(a + b*Log[c*x
^n])])/(32*b*n)
```

fricas [A] time = 0.51, size = 59, normalized size = 0.81

$$\frac{3\,bn\log(x) + \left(2\,\cos\left(bn\log(x)+b\log(c)+a\right)^3 - 5\,\cos\left(bn\log(x)+b\log(c)+a\right)\right)\sin\left(bn\log(x)+b\log(c)+a\right.}{8\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x,x, algorithm="fricas")
```

```
[Out] 1/8*(3*b*n*log(x) + (2*cos(b*n*log(x) + b*log(c) + a)^3 - 5*cos(b*n*log(x)
+ b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a))/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^4}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^4/x, x)
```

maple [A] time = 0.03, size = 84, normalized size = 1.15

$$-\frac{\cos\left(a+b\ln\left(c\,x^{n}\right)\right)\left(\sin^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{4bn}-\frac{3\cos\left(a+b\ln\left(c\,x^{n}\right)\right)\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}{8bn}+\frac{3\ln\left(c\,x^{n}\right)}{8n}+\frac{3a}{8bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^4/x,x)
```

```
[Out] -1/4*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))^3/b/n-3/8*cos(a+b*ln(c*x^n))*sin
(a+b*ln(c*x^n))/b/n+3/8/n*ln(c*x^n)+3/8/b/n*a
```

maxima [A] time = 0.36, size = 93, normalized size = 1.27

$$\frac{12\,bn\log(x)+\cos\left(4\,b\log\left(x^{n}\right)+4\,a\right)\sin\left(4\,b\log(c)\right)-8\,\cos\left(2\,b\log\left(x^{n}\right)+2\,a\right)\sin\left(2\,b\log(c)\right)+\cos\left(4\,b\log(\right.}{32\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x,x, algorithm="maxima")
```

```
[Out] 1/32*(12*b*n*log(x) + cos(4*b*log(x^n) + 4*a)*sin(4*b*log(c)) - 8*cos(2*b*l
og(x^n) + 2*a)*sin(2*b*log(c)) + cos(4*b*log(c))*sin(4*b*log(x^n) + 4*a) -
8*cos(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/(b*n)
```

mupad [B] time = 2.58, size = 51, normalized size = 0.70

$$\frac{3\,\ln\left(x^n\right)}{8\,n}-\frac{\frac{\sin\left(2\,a+2\,b\,\ln\left(c\,x^n\right)\right)}{4}-\frac{\sin\left(4\,a+4\,b\,\ln\left(c\,x^n\right)\right)}{32}}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^4/x,x)
```

```
[Out] (3*log(x^n))/(8*n) - (sin(2*a + 2*b*log(c*x^n))/4 - sin(4*a + 4*b*log(c*x^n
))/32)/(b*n)
```

sympy [A] time = 22.74, size = 110, normalized size = 1.51

$$-\frac{\begin{cases}\log\left(x\right)\cos\left(2a\right) & \text{for}\: b=0\wedge\left(b=0\vee n=0\right)\\\log\left(x\right)\cos\left(2a+2b\log\left(c\right)\right) & \text{for}\: n=0\\\frac{\sin\left(2a+2bn\log\left(x\right)+2b\log\left(c\right)\right)}{2bn} & \text{otherwise}\end{cases}}{2}+\frac{\begin{cases}\log\left(x\right)\cos\left(4a\right) & \text{for}\: b=0\wedge\left(b=\right.\\\log\left(x\right)\cos\left(4a+4b\log\left(c\right)\right) & \text{for}\: n=0\\\frac{\sin\left(4a+4bn\log\left(x\right)+4b\log\left(c\right)\right)}{4bn} & \text{otherwise}\end{cases}}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**4/x,x)
```

```
[Out] -Piecewise((log(x)*cos(2*a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cos
(2*a + 2*b*log(c)), Eq(n, 0)), (sin(2*a + 2*b*n*log(x) + 2*b*log(c))/(2*b*n
), True))/2 + Piecewise((log(x)*cos(4*a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0)))
, (log(x)*cos(4*a + 4*b*log(c)), Eq(n, 0)), (sin(4*a + 4*b*n*log(x) + 4*b*l
og(c))/(4*b*n), True))/8 + 3*log(x)/8
```

3.23 $\int \frac{\sin^4(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=202

$$-\frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{x\left(16b^2n^2+1\right)}-\frac{4bn\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(16b^2n^2+1\right)}-\frac{12b^2n^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{x\left(64b^4n^4+20b^2n^2+1\right)}-\frac{24b^3n^3 s}{}$$

```
[Out] -24*b^4*n^4/(64*b^4*n^4+20*b^2*n^2+1)/x-24*b^3*n^3*cos(a+b*ln(c*x^n))*sin(a
+b*ln(c*x^n))/(64*b^4*n^4+20*b^2*n^2+1)/x-12*b^2*n^2*sin(a+b*ln(c*x^n))^2/(
64*b^4*n^4+20*b^2*n^2+1)/x-4*b*n*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))^3/(1
6*b^2*n^2+1)/x-sin(a+b*ln(c*x^n))^4/(16*b^2*n^2+1)/x
```

Rubi [A] time = 0.07, antiderivative size = 202, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 30}

$$-\frac{12b^2n^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{x\left(64b^4n^4+20b^2n^2+1\right)}-\frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{x\left(16b^2n^2+1\right)}-\frac{4bn\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(16b^2n^2+1\right)}-\frac{24b^3n^3 s}{}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^4/x^2,x]
```

```
[Out] (-24*b^4*n^4)/((1 + 20*b^2*n^2 + 64*b^4*n^4)*x) - (24*b^3*n^3*Cos[a + b*Log
[c*x^n]]*Sin[a + b*Log[c*x^n]])/((1 + 20*b^2*n^2 + 64*b^4*n^4)*x) - (12*b^2
*n^2*Sin[a + b*Log[c*x^n]]^2)/((1 + 20*b^2*n^2 + 64*b^4*n^4)*x) - (4*b*n*Co
s[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^3)/((1 + 16*b^2*n^2)*x) - Sin[a +
 b*Log[c*x^n]]^4/((1 + 16*b^2*n^2)*x)
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{4bn\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\left(cx^n\right)\right)}{\left(1+16b^2n^2\right)x} - \frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{\left(1+16b^2n^2\right)x} + \frac{(12b^2n}{}$$

$$= -\frac{24b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+20b^2n^2+64b^4n^4\right)x} - \frac{12b^2n^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{\left(1+20b^2n^2+64b^4n^4\right)x}$$

$$= -\frac{24b^4n^4}{\left(1+20b^2n^2+64b^4n^4\right)x} - \frac{24b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+20b^2n^2+64b^4n^4\right)x} - \frac{12}{}$$

Mathematica [A] time = 0.51, size = 170, normalized size = 0.84

$$-\frac{128b^3n^3\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)-16b^3n^3\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)-4\left(16b^2n^2+1\right)\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+(}{8x\left(64b\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^4/x^2,x]
```

```
[Out] -1/8*(3 + 60*b^2*n^2 + 192*b^4*n^4 - 4*(1 + 16*b^2*n^2)*Cos[2*(a + b*Log[c*
x^n])] + (1 + 4*b^2*n^2)*Cos[4*(a + b*Log[c*x^n])] + 8*b*n*Sin[2*(a + b*Log
[c*x^n])] + 128*b^3*n^3*Sin[2*(a + b*Log[c*x^n])] - 4*b*n*Sin[4*(a + b*Log[
c*x^n])] - 16*b^3*n^3*Sin[4*(a + b*Log[c*x^n])])/((1 + 20*b^2*n^2 + 64*b^4*
n^4)*x)
```

fricas [A] time = 0.57, size = 162, normalized size = 0.80

$$-\frac{24\,b^4n^4+\left(4\,b^2n^2+1\right)\cos\left(bn\log(x)+b\log(c)+a\right)^4+16\,b^2n^2-2\left(10\,b^2n^2+1\right)\cos\left(bn\log(x)+b\log(c)+a\right)}{(}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x^2,x, algorithm="fricas")
```

```
[Out] -(24*b^4*n^4 + (4*b^2*n^2 + 1)*cos(b*n*log(x) + b*log(c) + a)^4 + 16*b^2*n^
2 - 2*(10*b^2*n^2 + 1)*cos(b*n*log(x) + b*log(c) + a)^2 - 4*((4*b^3*n^3 + b
*n)*cos(b*n*log(x) + b*log(c) + a)^3 - (10*b^3*n^3 + b*n)*cos(b*n*log(x) +
b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a) + 1)/((64*b^4*n^4 + 20*b^2*n^
2 + 1)*x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^4}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x^2,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^4/x^2, x)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \frac{\sin^4\left(a+b\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^4/x^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^4/x^2,x)
```

maxima [B] time = 0.41, size = 1085, normalized size = 5.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x^2,x, algorithm="maxima")
```

```
[Out] -1/16*(384*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n^4 + 120*(b^2*c
os(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + 6*cos(4*b*log(c))^2 - (16*(
b^3*cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*b*log(c)) +
 b^3*sin(4*b*log(c)))*n^3 - 4*(b^2*cos(8*b*log(c))*cos(4*b*log(c)) + b^2*si
n(8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*n^2 + 4*(b*cos(4*b*log
(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c)
))*n - cos(8*b*log(c))*cos(4*b*log(c)) - sin(8*b*log(c))*sin(4*b*log(c)) -
cos(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 4*(32*(b^3*cos(4*b*log(c))*sin(6
*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b*log(c))*sin(
4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3 - 16*(b^2*cos(6*b*lo
g(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(6*b*l
og(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 + 2*(b*co
s(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)) + b*cos(2
*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n - cos(6*b
*log(c))*cos(4*b*log(c)) - cos(4*b*log(c))*cos(2*b*log(c)) - sin(6*b*log(c)
)*sin(4*b*log(c)) - sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a
```

```
) + 6*sin(4*b*log(c))^2 - (16*(b^3*cos(8*b*log(c))*cos(4*b*log(c)) + b^3*si
n(8*b*log(c))*sin(4*b*log(c)) + b^3*cos(4*b*log(c)))*n^3 + 4*(b^2*cos(4*b*l
og(c))*sin(8*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*
log(c)))*n^2 + 4*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin
(4*b*log(c)) + b*cos(4*b*log(c)))*n + cos(4*b*log(c))*sin(8*b*log(c)) - cos
(8*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4
*(32*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log
(c)) + b^3*sin(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*lo
g(c)))*n^3 + 16*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*
sin(4*b*log(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))
*sin(2*b*log(c)))*n^2 + 2*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*b*lo
g(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c
))*sin(2*b*log(c)))*n + cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*s
in(4*b*log(c)) + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*
log(c)))*sin(2*b*log(x^n) + 2*a))/((64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b
*log(c))^2)*n^4 + 20*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 +
cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^4}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^4/x^2,x)
```

```
[Out] int(sin(a + b*log(c*x^n))^4/x^2, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**4/x**2,x)
```

```
[Out] Timed out
```

3.24 $\int \frac{\sin^4(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=210

$$-\frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(4b^2n^2+1\right)}-\frac{bn\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(4b^2n^2+1\right)}-\frac{3b^2n^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(4b^4n^4+5b^2n^2+1\right)}-\frac{3b^3n^3\sin\left(\right.}{}$$

```
[Out] -3/4*b^4*n^4/(4*b^4*n^4+5*b^2*n^2+1)/x^2-3/2*b^3*n^3*cos(a+b*ln(c*x^n))*sin
(a+b*ln(c*x^n))/(4*b^4*n^4+5*b^2*n^2+1)/x^2-3/2*b^2*n^2*sin(a+b*ln(c*x^n))^
2/(4*b^4*n^4+5*b^2*n^2+1)/x^2-b*n*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))^3/(
4*b^2*n^2+1)/x^2-1/2*sin(a+b*ln(c*x^n))^4/(4*b^2*n^2+1)/x^2
```

Rubi [A] time = 0.06, antiderivative size = 210, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4487, 30}

$$-\frac{3b^2n^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(4b^4n^4+5b^2n^2+1\right)}-\frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{2x^2\left(4b^2n^2+1\right)}-\frac{bn\sin^3\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x^2\left(4b^2n^2+1\right)}-\frac{3b^3n^3\sin\left(\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^4/x^3,x]
```

```
[Out] (-3*b^4*n^4)/(4*(1 + 5*b^2*n^2 + 4*b^4*n^4)*x^2) - (3*b^3*n^3*Cos[a + b*Log
[c*x^n]]*Sin[a + b*Log[c*x^n]])/(2*(1 + 5*b^2*n^2 + 4*b^4*n^4)*x^2) - (3*b^
2*n^2*Sin[a + b*Log[c*x^n]]^2)/(2*(1 + 5*b^2*n^2 + 4*b^4*n^4)*x^2) - (b*n*C
os[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^3)/((1 + 4*b^2*n^2)*x^2) - Sin[a
 + b*Log[c*x^n]]^4/(2*(1 + 4*b^2*n^2)*x^2)
```

Rule 30

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = -\frac{bn\cos\left(a+b\log\left(cx^n\right)\right)\sin^3\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x^2} - \frac{\sin^4\left(a+b\log\left(cx^n\right)\right)}{2\left(1+4b^2n^2\right)x^2} + \frac{\left(3b^2n^2\right)}{}$$

$$= -\frac{3b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+5b^2n^2+4b^4n^4\right)x^2} - \frac{3b^2n^2\sin^2\left(a+b\log\left(cx^n\right)\right)}{2\left(1+5b^2n^2+4b^4n^4\right)x^2} -$$

$$= -\frac{3b^4n^4}{4\left(1+5b^2n^2+4b^4n^4\right)x^2} - \frac{3b^3n^3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+5b^2n^2+4b^4n^4\right)x^2} - \frac{3b}{2}$$

Mathematica [A] time = 0.45, size = 169, normalized size = 0.80

$$-\frac{16b^3n^3\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)-2b^3n^3\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)-4\left(4b^2n^2+1\right)\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\left(b^2n\right.}{16x^2\left(4b^4n\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^4/x^3,x]
```

```
[Out] -1/16*(3 + 15*b^2*n^2 + 12*b^4*n^4 - 4*(1 + 4*b^2*n^2)*Cos[2*(a + b*Log[c*x
^n])] + (1 + b^2*n^2)*Cos[4*(a + b*Log[c*x^n])] + 4*b*n*Sin[2*(a + b*Log[c*
x^n])] + 16*b^3*n^3*Sin[2*(a + b*Log[c*x^n])] - 2*b*n*Sin[4*(a + b*Log[c*x^
n])] - 2*b^3*n^3*Sin[4*(a + b*Log[c*x^n])])/((1 + 5*b^2*n^2 + 4*b^4*n^4)*x^
2)
```

fricas [A] time = 0.63, size = 163, normalized size = 0.78

$$-\frac{3\,b^4n^4+2\left(b^2n^2+1\right)\cos\left(bn\log(x)+b\log(c)+a\right)^4+8\,b^2n^2-2\left(5\,b^2n^2+2\right)\cos\left(bn\log(x)+b\log(c)+a\right)^2-}{4\left(\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x^3,x, algorithm="fricas")
```

```
[Out] -1/4*(3*b^4*n^4 + 2*(b^2*n^2 + 1)*cos(b*n*log(x) + b*log(c) + a)^4 + 8*b^2*
n^2 - 2*(5*b^2*n^2 + 2)*cos(b*n*log(x) + b*log(c) + a)^2 - 2*(2*(b^3*n^3 +
b*n)*cos(b*n*log(x) + b*log(c) + a)^3 - (5*b^3*n^3 + 2*b*n)*cos(b*n*log(x)
+ b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a) + 2)/((4*b^4*n^4 + 5*b^2*n^
2 + 1)*x^2)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^4}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x^3,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^4/x^3, x)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \frac{\sin^4\left(a+b\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^4/x^3,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^4/x^3,x)
```

maxima [B] time = 0.41, size = 1082, normalized size = 5.15

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^4/x^3,x, algorithm="maxima")
```

```
[Out] -1/32*(24*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n^4 + 30*(b^2*cos
(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + 6*cos(4*b*log(c))^2 - (2*(b^3
*cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*b*log(c)) + b^
3*sin(4*b*log(c)))*n^3 - (b^2*cos(8*b*log(c))*cos(4*b*log(c)) + b^2*sin(8*b
*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*n^2 + 2*(b*cos(4*b*log(c))*
sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c)))*n
- cos(8*b*log(c))*cos(4*b*log(c)) - sin(8*b*log(c))*sin(4*b*log(c)) - cos(4
*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 4*(4*(b^3*cos(4*b*log(c))*sin(6*b*log
(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b*log(c))*sin(4*b*lo
g(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3 - 4*(b^2*cos(6*b*log(c))*c
os(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(6*b*log(c))*
sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 + (b*cos(4*b*log
(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)) + b*cos(2*b*log(c)
)*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n - cos(6*b*log(c))*
cos(4*b*log(c)) - cos(4*b*log(c))*cos(2*b*log(c)) - sin(6*b*log(c))*sin(4*b
*log(c)) - sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 6*sin
```

```
(4*b*log(c))^2 - (2*(b^3*cos(8*b*log(c))*cos(4*b*log(c)) + b^3*sin(8*b*log(
c))*sin(4*b*log(c)) + b^3*cos(4*b*log(c)))*n^3 + (b^2*cos(4*b*log(c))*sin(8
*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c)))*n^2
 + 2*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c))
 + b*cos(4*b*log(c)))*n + cos(4*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))
*sin(4*b*log(c)) + sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4*(4*(b^3*cos
(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3*si
n(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3 +
4*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(4*b*log(c)
) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*log(c
)))*n^2 + (b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*b*log(c))*cos(2*b*lo
g(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c
)))*n + cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c)) +
 cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b
*log(x^n) + 2*a))/((4*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n^4 +
 5*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + cos(4*b*log(c))^2
+ sin(4*b*log(c))^2)*x^2)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^4}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^4/x^3,x)
```

```
[Out] int(sin(a + b*log(c*x^n))^4/x^3, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**4/x**3,x)
```

```
[Out] Timed out
```

3.25 $\int \sin(\log(a+bx))\,dx$

Optimal. Leaf size=39

$$\frac{(a+bx)\sin(\log(a+bx))}{2b}-\frac{(a+bx)\cos(\log(a+bx))}{2b}$$

```
[Out] -1/2*(b*x+a)*cos(ln(b*x+a))/b+1/2*(b*x+a)*sin(ln(b*x+a))/b
```

Rubi [A] time = 0.01, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4475}

$$\frac{(a+bx)\sin(\log(a+bx))}{2b}-\frac{(a+bx)\cos(\log(a+bx))}{2b}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[Log[a + b*x]],x]
```

```
[Out] -((a + b*x)*Cos[Log[a + b*x]])/(2*b) + ((a + b*x)*Sin[Log[a + b*x]])/(2*b)
```

Rule 4475

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Simp[(x*
Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] - Simp[(b*d*n*x*Cos[d*(a +
 b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[
b^2*d^2*n^2 + 1, 0]
```

Rubi steps

$$\begin{aligned}\int \sin(\log(a+bx))\,dx &= \frac{\text{Subst}\left(\int \sin(\log(x))\,dx, x, a+bx\right)}{b}\\ &= -\frac{(a+bx)\cos(\log(a+bx))}{2b}+\frac{(a+bx)\sin(\log(a+bx))}{2b}\end{aligned}$$

Mathematica [A] time = 0.01, size = 29, normalized size = 0.74

$$-\frac{(a+bx)(\cos(\log(a+bx))-\sin(\log(a+bx)))}{2b}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[Log[a + b*x]],x]
```

```
[Out] -1/2*((a + b*x)*(Cos[Log[a + b*x]] - Sin[Log[a + b*x]]))/b
```

fricas [A] time = 0.79, size = 33, normalized size = 0.85

$$-\frac{(bx+a)\cos\left(\log\left(bx+a\right)\right)-(bx+a)\sin\left(\log\left(bx+a\right)\right)}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(log(b*x+a)),x, algorithm="fricas")
```

```
[Out] -1/2*((b*x + a)*cos(log(b*x + a)) - (b*x + a)*sin(log(b*x + a)))/b
```

giac [A] time = 0.16, size = 35, normalized size = 0.90

$$-\frac{(bx+a)\cos\left(\log\left(bx+a\right)\right)}{2\,b}+\frac{(bx+a)\sin\left(\log\left(bx+a\right)\right)}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(log(b*x+a)),x, algorithm="giac")
```

```
[Out] -1/2*(b*x + a)*cos(log(b*x + a))/b + 1/2*(b*x + a)*sin(log(b*x + a))/b
```

maple [B] time = 0.02, size = 76, normalized size = 1.95

$$\frac{x\tan\left(\frac{\ln(bx+a)}{2}\right)+\frac{a\tan\left(\frac{\ln(bx+a)}{2}\right)}{b}+\frac{a\left(\tan^{2}\left(\frac{\ln(bx+a)}{2}\right)\right)}{b}-\frac{x}{2}+\frac{x\left(\tan^{2}\left(\frac{\ln(bx+a)}{2}\right)\right)}{2}}{1+\tan^{2}\left(\frac{\ln(bx+a)}{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(ln(b*x+a)),x)
```

```
[Out] (x*tan(1/2*ln(b*x+a))+a/b*tan(1/2*ln(b*x+a))+a/b*tan(1/2*ln(b*x+a))^2-1/2*x
+1/2*x*tan(1/2*ln(b*x+a))^2)/(1+tan(1/2*ln(b*x+a))^2)
```

maxima [A] time = 0.32, size = 27, normalized size = 0.69

$$-\frac{(bx+a)\left(\cos\left(\log\left(bx+a\right)\right)-\sin\left(\log\left(bx+a\right)\right)\right)}{2\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(log(b*x+a)),x, algorithm="maxima")
```

```
[Out] -1/2*(b*x + a)*(cos(log(b*x + a)) - sin(log(b*x + a)))/b
```

mupad [B] time = 2.16, size = 36, normalized size = 0.92

$$\begin{cases} x\sin(\ln(a)) & \text{if } b = 0 \\ -\frac{\sqrt{2}\cos\left(\frac{\pi}{4}+\ln(a+b\,x)\right)(a+b\,x)}{2\,b} & \text{if } b \neq 0 \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(log(a + b*x)),x)
```

```
[Out] piecewise(b == 0, x*sin(log(a)), b ~= 0, -(2^(1/2)*cos(pi/4 + log(a + b*x))
*(a + b*x))/(2*b))
```

sympy [A] time = 0.70, size = 56, normalized size = 1.44

$$\begin{cases} \frac{a\sin\left(\log(a+bx)\right)}{2b} - \frac{a\cos\left(\log(a+bx)\right)}{2b} + \frac{x\sin\left(\log(a+bx)\right)}{2} - \frac{x\cos\left(\log(a+bx)\right)}{2} & \text{for } b \neq 0 \\ x\sin\left(\log(a)\right) & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(ln(b*x+a)),x)
```

```
[Out] Piecewise((a*sin(log(a + b*x))/(2*b) - a*cos(log(a + b*x))/(2*b) + x*sin(lo
g(a + b*x))/2 - x*cos(log(a + b*x))/2, Ne(b, 0)), (x*sin(log(a)), True))
```

3.26 $\int x^m \sin\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=133

$$\frac{(m+1)x^{m+1}\log(x)e^{\frac{an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}\left(cx^n\right)^{-\frac{m+1}{n}}}{2n\sqrt{-\frac{(m+1)^2}{n^2}}}-\frac{x^{m+1}e^{\frac{a(m+1)}{n\sqrt{-\frac{(m+1)^2}{n^2}}}}\left(cx^n\right)^{\frac{m+1}{n}}}{4n\sqrt{-\frac{(m+1)^2}{n^2}}}$$

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

Rubi [A] time = 0.28, antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4493, 4489}

$$\frac{(m+1)x^{m+1}\log(x)e^{\frac{an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}\left(cx^n\right)^{-\frac{m+1}{n}}}{2n\sqrt{-\frac{(m+1)^2}{n^2}}}-\frac{x^{m+1}e^{\frac{a(m+1)}{n\sqrt{-\frac{(m+1)^2}{n^2}}}}\left(cx^n\right)^{\frac{m+1}{n}}}{4n\sqrt{-\frac{(m+1)^2}{n^2}}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sin[a + Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n]],x]
```

```
[Out] -(E^((a*(1 + m))/(Sqrt[-((1 + m)^2/n^2)]*n))*x^(1 + m)*(c*x^n)^((1 + m)/n))
/(4*Sqrt[-((1 + m)^2/n^2)]*n) + (E^((a*Sqrt[-((1 + m)^2/n^2)]*n)/(1 + m))*(
1 + m)*x^(1 + m)*Log[x])/(2*Sqrt[-((1 + m)^2/n^2)]*n*(c*x^n)^((1 + m)/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sin\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sin\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log(x)\right)dx,\right.}{n}$$

$$= \frac{\left((1+m)x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int\left(\frac{e^{\frac{a\sqrt{-\frac{(1+m)^2}{n^2}}\,n}{1+m}}}{x}-e^{\frac{a(1+m)}{\sqrt{-\frac{(1+m)^2}{n^2}}\,n}}x^{-1+\frac{2(}{}}\right.\right.}{2\sqrt{-\frac{(1+m)^2}{n^2}}\,n^2}$$

$$= -\frac{e^{\frac{a(1+m)}{\sqrt{-\frac{(1+m)^2}{n^2}}\,n}}x^{1+m}\left(cx^n\right)^{\frac{1+m}{n}}}{4\sqrt{-\frac{(1+m)^2}{n^2}}\,n}+\frac{e^{\frac{a\sqrt{-\frac{(1+m)^2}{n^2}}\,n}{1+m}}(1+m)x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\log}{2\sqrt{-\frac{(1+m)^2}{n^2}}\,n}$$

Mathematica [F] time = 0.36, size = 0, normalized size = 0.00

$$\int x^m \sin\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Sin[a + Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n]],x]
[Out] Integrate[x^m*Sin[a + Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n]], x]
```

fricas [C] time = 0.76, size = 62, normalized size = 0.47

$$\frac{\left(i\,x^2x^{2\,m}+(-2i\,m-2i)e^{\left(\frac{2\left(i\,an-(m+1)\log(c)\right)}{n}\right)}\log(x)\right)e^{\left(-\frac{i\,an-(m+1)\log(c)}{n}\right)}}{4\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+log(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x, algorithm="fricas")
```

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

giac [C] time = 2.08, size = 272, normalized size = 2.05

$$\frac{-i\,mn^2xx^m e^{\left(i\,a-\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+i\,mn^2xx^m e^{\left(-i\,a+\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}-i\,n^2xx^m e^{\left(i\,a-\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}-i\ldots}{2\left(m^2n^2+2\,mn\ldots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+log(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x, algorithm="giac")
```

```
[Out] 1/2*(-I*m*n^2*x*x^m*e^(I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/
n^2) + I*m*n^2*x*x^m*e^(-I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c)
)/n^2) - I*n^2*x*x^m*e^(I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))
/n^2) - I*n*x*x^m*abs(m*n + n)*e^(I*a - (n*abs(m*n + n)*log(x) + abs(m*n +
n)*log(c))/n^2) + I*n^2*x*x^m*e^(-I*a + (n*abs(m*n + n)*log(x) + abs(m*n +
n)*log(c))/n^2) - I*n*x*x^m*abs(m*n + n)*e^(-I*a + (n*abs(m*n + n)*log(x) +
 abs(m*n + n)*log(c))/n^2))/(m^2*n^2 + 2*m*n^2 - (m*n + n)^2 + n^2)
```

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int x^m \sin\left(a+\ln\left(c\,x^n\right)\sqrt{-\frac{(1+m)^2}{n^2}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a+ln(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x)
```

```
[Out] int(x^m*sin(a+ln(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x)
```

maxima [A] time = 0.39, size = 82, normalized size = 0.62

$$\frac{c^{\frac{2m}{n}+\frac{2}{n}}xe^{\left(m\log(x)+\frac{m\log\left(x^n\right)}{n}+\frac{\log\left(x^n\right)}{n}\right)}\sin(a)+2\left(m\sin(a)+\sin(a)\right)\log(x)}{4\left(c^{\frac{m}{n}+\frac{1}{n}}m+c^{\frac{m}{n}+\frac{1}{n}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*(c^(2*m/n + 2/n)*x*e^(m*log(x) + m*log(x^n)/n + log(x^n)/n)*sin(a) + 2*
(m*sin(a) + sin(a))*log(x))/(c^(m/n + 1/n)*m + c^(m/n + 1/n))
```

mupad [B] time = 3.94, size = 135, normalized size = 1.02

$$\frac{x\,x^m\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{(c\,x^n)^{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}}\,1\mathrm{i}}{2\,m+2-n\,\sqrt{-\frac{(m+1)^2}{n^2}}\,2\mathrm{i}}-\frac{x\,x^m\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^n)^{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}\,1\mathrm{i}}{2\,m+2+n\,\sqrt{-\frac{(m+1)^2}{n^2}}\,2\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a + log(c*x^n)*(-(m + 1)^2/n^2)^(1/2)),x)
```

```
[Out] (x*x^m*exp(-a*1i)/(c*x^n)^((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i)*1i)/(2
*m - n*(-(m + 1)^2/n^2)^(1/2)*2i + 2) - (x*x^m*exp(a*1i)*(c*x^n)^((- (2*m)/
n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i)*1i)/(2*m + n*(-(m + 1)^2/n^2)^(1/2)*2i + 2
)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sin\left(a+\sqrt{-\frac{m^2}{n^2}-\frac{2m}{n^2}-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sin(a+ln(c*x**n)*(-(1+m)**2/n**2)**(1/2)),x)
```

```
[Out] Integral(x**m*sin(a + sqrt(-m**2/n**2 - 2*m/n**2 - 1/n**2)*log(c*x**n)), x)
```

3.27 $\int x^2 \sin\left(a+3\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)dx$

Optimal. Leaf size=88

$$\frac{1}{12}\sqrt{-\frac{1}{n^2}}\,nx^3e^{-a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{3/n}-\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,nx^3e^{a\sqrt{-\frac{1}{n^2}}\,n}\log(x)(cx^n)^{-3/n}$$

```
[Out] 1/12*n*x^3*(c*x^n)^(3/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))-1/2*exp(a*n
*(-1/n^2)^(1/2))*n*x^3*ln(x)*(-1/n^2)^(1/2)/((c*x^n)^(3/n))
```

Rubi [A] time = 0.10, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {4493, 4489}

$$\frac{1}{12}\sqrt{-\frac{1}{n^2}}\,nx^3e^{-a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{3/n}-\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,nx^3e^{a\sqrt{-\frac{1}{n^2}}\,n}\log(x)(cx^n)^{-3/n}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + 3*Sqrt[-n^(-2)]*Log[c*x^n]],x]
```

```
[Out] (Sqrt[-n^(-2)]*n*x^3*(c*x^n)^(3/n))/(12*E^(a*Sqrt[-n^(-2)]*n)) - (E^(a*Sqrt
[-n^(-2)]*n)*Sqrt[-n^(-2)]*n*x^3*Log[x])/(2*(c*x^n)^(3/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \sin\left(a + 3\sqrt{-\frac{1}{n^2}} \log(cx^n)\right) dx = \frac{\left(x^3 (cx^n)^{-3/n}\right) \text{Subst}\left(\int x^{-1+\frac{3}{n}} \sin\left(a + 3\sqrt{-\frac{1}{n^2}} \log(x)\right) dx, x, cx^n\right)}{n}$$

$$= -\left(\frac{1}{2}\left(\sqrt{-\frac{1}{n^2}} x^3 (cx^n)^{-3/n}\right) \text{Subst}\left(\int \left(\frac{e^{a\sqrt{-\frac{1}{n^2}}n}}{x} - e^{-a\sqrt{-\frac{1}{n^2}}n} x^{-1+\frac{6}{n}}\right) dx, x,\right.\right.$$

$$= \frac{1}{12} e^{-a\sqrt{-\frac{1}{n^2}}n} \sqrt{-\frac{1}{n^2}} nx^3 (cx^n)^{3/n} - \frac{1}{2} e^{a\sqrt{-\frac{1}{n^2}}n} \sqrt{-\frac{1}{n^2}} nx^3 (cx^n)^{-3/n} \log(x)$$

Mathematica [F] time = 0.19, size = 0, normalized size = 0.00

$$\int x^2 \sin\left(a + 3\sqrt{-\frac{1}{n^2}} \log(cx^n)\right) dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^2*Sin[a + 3*Sqrt[-n^(-2)]*Log[c*x^n]],x]
[Out] Integrate[x^2*Sin[a + 3*Sqrt[-n^(-2)]*Log[c*x^n]], x]
```

fricas [C] time = 0.53, size = 42, normalized size = 0.48

$$\frac{1}{12}\left(i x^6 - 6i e^{\left(\frac{2(i an-3 \log(c))}{n}\right)} \log(x)\right) e^{\left(-\frac{i an-3 \log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+3*log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="fricas")
[Out] 1/12*(I*x^6 - 6*I*e^(2*(I*a*n - 3*log(c))/n)*log(x))*e^(-(I*a*n - 3*log(c))
/n)
```

giac [A] time = 0.57, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+3*log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="giac")
[Out] +Infinity
```

maple [F] time = 0.03, size = 0, normalized size = 0.00

$$\int x^{2} \sin\left(a + 3 \ln\left(c\,x^{n}\right) \sqrt{-\frac{1}{n^{2}}}\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+3*ln(c*x^n)*(-1/n^2)^(1/2)),x)
[Out] int(x^2*sin(a+3*ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

maxima [A] time = 0.36, size = 31, normalized size = 0.35

$$\frac{c^{\frac{6}{n}} x^{6} \sin(a) + 6 \log(x) \sin(a)}{12\, c^{\frac{3}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+3*log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="maxima")
[Out] 1/12*(c^(6/n)*x^6*sin(a) + 6*log(x)*sin(a))/c^(3/n)
```

mupad [B] time = 3.02, size = 85, normalized size = 0.97

$$-\frac{x^{3}\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{\left(c\,x^{n}\right)^{\sqrt{-\frac{1}{n^{2}}}\,3\mathrm{i}}}}{6\,n\,\sqrt{-\frac{1}{n^{2}}}+6\mathrm{i}}-\frac{x^{3}\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(c\,x^{n}\right)^{\sqrt{-\frac{1}{n^{2}}}\,3\mathrm{i}}}{6\,n\,\sqrt{-\frac{1}{n^{2}}}-6\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a + 3*log(c*x^n)*(-1/n^2)^(1/2)),x)
[Out] - (x^3*exp(-a*1i)/(c*x^n)^((-1/n^2)^(1/2)*3i))/(6*n*(-1/n^2)^(1/2) + 6i) -
(x^3*exp(a*1i)*(c*x^n)^((-1/n^2)^(1/2)*3i))/(6*n*(-1/n^2)^(1/2) - 6i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \sin\left(a + 3\sqrt{-\frac{1}{n^{2}}} \log\left(cx^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sin(a+3*ln(c*x**n)*(-1/n**2)**(1/2)),x)
[Out] Integral(x**2*sin(a + 3*sqrt(-1/n**2)*log(c*x**n)), x)
```

3.28 $\int x \sin\left(a + 2\sqrt{-\frac{1}{n^2}} \log(cx^n)\right) dx$

Optimal. Leaf size=88

$$\frac{1}{8}\sqrt{-\frac{1}{n^2}}\, nx^2 e^{-a\sqrt{-\frac{1}{n^2}}\, n} (cx^n)^{2/n} - \frac{1}{2}\sqrt{-\frac{1}{n^2}}\, nx^2 e^{a\sqrt{-\frac{1}{n^2}}\, n} \log(x) (cx^n)^{-2/n}$$

```
[Out] 1/8*n*x^2*(c*x^n)^(2/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))-1/2*exp(a*n*
(-1/n^2)^(1/2))*n*x^2*ln(x)*(-1/n^2)^(1/2)/((c*x^n)^(2/n))
```

Rubi [A] time = 0.05, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {4493, 4489}

$$\frac{1}{8}\sqrt{-\frac{1}{n^2}}\, nx^2 e^{-a\sqrt{-\frac{1}{n^2}}\, n} (cx^n)^{2/n} - \frac{1}{2}\sqrt{-\frac{1}{n^2}}\, nx^2 e^{a\sqrt{-\frac{1}{n^2}}\, n} \log(x) (cx^n)^{-2/n}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + 2*Sqrt[-n^(-2)]*Log[c*x^n]],x]
```

```
[Out] (Sqrt[-n^(-2)]*n*x^2*(c*x^n)^(2/n))/(8*E^(a*Sqrt[-n^(-2)]*n)) - (E^(a*Sqrt[
-n^(-2)]*n)*Sqrt[-n^(-2)]*n*x^2*Log[x])/(2*(c*x^n)^(2/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log(x)\right)dx,x,cx^n\right)}{n}$$

$$=-\left(\frac{1}{2}\left(\sqrt{-\frac{1}{n^2}}x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int\left(\frac{e^{a\sqrt{-\frac{1}{n^2}}n}}{x}-e^{-a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{4}{n}}\right)dx,x,cx\right.\right.$$

$$=\frac{1}{8}e^{-a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx^2\left(cx^n\right)^{2/n}-\frac{1}{2}e^{a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx^2\left(cx^n\right)^{-2/n}\log(x)$$

Mathematica [F] time = 0.16, size = 0, normalized size = 0.00

$$\int x\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x*Sin[a + 2*Sqrt[-n^(-2)]*Log[c*x^n]],x]
[Out] Integrate[x*Sin[a + 2*Sqrt[-n^(-2)]*Log[c*x^n]], x]
```

fricas [C] time = 0.51, size = 42, normalized size = 0.48

$$\frac{1}{8}\left(ix^4-4ie^{\left(\frac{2(ian-2\log(c))}{n}\right)}\log(x)\right)e^{\left(-\frac{ian-2\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2*log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="fricas")
[Out] 1/8*(I*x^4 - 4*I*e^(2*(I*a*n - 2*log(c))/n)*log(x))*e^(-(I*a*n - 2*log(c))/
n)
```

giac [A] time = 0.50, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2*log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="giac")
[Out] +Infinity
```

maple [F] time = 0.03, size = 0, normalized size = 0.00

$$\int x \sin\left(a + 2\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+2*ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

```
[Out] int(x*sin(a+2*ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

maxima [A] time = 0.36, size = 31, normalized size = 0.35

$$\frac{c^{\frac{4}{n}}x^{4}\sin(a) + 4\,\log(x)\sin(a)}{8\,c^{\frac{2}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*(c^(4/n)*x^4*sin(a) + 4*log(x)*sin(a))/c^(2/n)
```

mupad [B] time = 2.80, size = 85, normalized size = 0.97

$$-\frac{x^{2}\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{\left(c\,x^{n}\right)^{\sqrt{-\frac{1}{n^{2}}}\,2\mathrm{i}}}}{4\,n\,\sqrt{-\frac{1}{n^{2}}}+4\mathrm{i}}-\frac{x^{2}\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(c\,x^{n}\right)^{\sqrt{-\frac{1}{n^{2}}}\,2\mathrm{i}}}{4\,n\,\sqrt{-\frac{1}{n^{2}}}-4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a + 2*log(c*x^n)*(-1/n^2)^(1/2)),x)
```

```
[Out] - (x^2*exp(-a*1i)/(c*x^n)^((-1/n^2)^(1/2)*2i))/(4*n*(-1/n^2)^(1/2) + 4i) -
(x^2*exp(a*1i)*(c*x^n)^((-1/n^2)^(1/2)*2i))/(4*n*(-1/n^2)^(1/2) - 4i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \sin\left(a + 2\sqrt{-\frac{1}{n^{2}}}\,\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2*ln(c*x**n)*(-1/n**2)**(1/2)),x)
```

```
[Out] Integral(x*sin(a + 2*sqrt(-1/n**2)*log(c*x**n)), x)
```

3.29 $\int \sin\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=82

$$\frac{1}{4}\sqrt{-\frac{1}{n^2}}\,nxe^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{n}}-\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,nxe^{a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\left(cx^n\right)^{-1/n}$$

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

Rubi [A] time = 0.05, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {4483, 4489}

$$\frac{1}{4}\sqrt{-\frac{1}{n^2}}\,nxe^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{n}}-\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,nxe^{a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\left(cx^n\right)^{-1/n}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]],x]
```

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

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rubi steps

$$\int \sin\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sin\left(a+\sqrt{-\frac{1}{n^2}}\log(x)\right)dx,x,cx^n\right)}{n}$$

$$= -\left(\frac{1}{2}\left(\sqrt{-\frac{1}{n^2}}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\left(\frac{e^{a\sqrt{-\frac{1}{n^2}}n}}{x}-e^{-a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{2}{n}}\right)dx,x,cx^n\right)\right)$$

$$= \frac{1}{4}e^{-a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx\left(cx^n\right)^{\frac{1}{n}} - \frac{1}{2}e^{a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx\left(cx^n\right)^{-1/n}\log(x)$$

Mathematica [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \sin\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]],x]
[Out] Integrate[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]], x]
```

fricas [C] time = 0.57, size = 42, normalized size = 0.51

$$\frac{1}{4}\left(ix^2-2ie^{\left(\frac{2\left(ian-\log(c)\right)}{n}\right)}\log(x)\right)e^{\left(-\frac{ian-\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="fricas")
[Out] 1/4*(I*x^2 - 2*I*e^(2*(I*a*n - log(c))/n)*log(x))*e^(-(I*a*n - log(c))/n)
```

giac [A] time = 0.43, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="giac")
[Out] +Infinity
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int \sin\left(a+\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

```
[Out] int(sin(a+ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

maxima [A] time = 0.36, size = 29, normalized size = 0.35

$$\frac{c^{\frac{2}{n}}x^{2}\sin(a)+2\,\log(x)\sin(a)}{4\,c^{\left(\frac{1}{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 2.73, size = 81, normalized size = 0.99

$$-\frac{x\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{(c\,x^{n})^{\sqrt{-\frac{1}{n^{2}}}\,1\mathrm{i}}}}{2\,n\,\sqrt{-\frac{1}{n^{2}}}+2\mathrm{i}}-\frac{x\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^{n})^{\sqrt{-\frac{1}{n^{2}}}\,1\mathrm{i}}}{2\,n\,\sqrt{-\frac{1}{n^{2}}}-2\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + log(c*x^n)*(-1/n^2)^(1/2)),x)
```

```
[Out] - (x*exp(-a*1i)/(c*x^n)^((-1/n^2)^(1/2)*1i))/(2*n*(-1/n^2)^(1/2) + 2i) - (x
*exp(a*1i)*(c*x^n)^((-1/n^2)^(1/2)*1i))/(2*n*(-1/n^2)^(1/2) - 2i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(a+\sqrt{-\frac{1}{n^{2}}}\,\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+ln(c*x**n)*(-1/n**2)**(1/2)),x)
```

```
[Out] Integral(sin(a + sqrt(-1/n**2)*log(c*x**n)), x)
```

3.30 $\int \frac{\sin(a)}{x} \, dx$

Optimal. Leaf size=5

$$\sin(a)\log(x)$$

```
[Out] ln(x)*sin(a)
```

Rubi [A] time = 0.00, antiderivative size = 5, 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 = {12, 29}

$$\sin(a)\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a]/x,x]
```

```
[Out] Log[x]*Sin[a]
```

Rule 12

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

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin(a)}{x} \, dx &= \sin(a) \int \frac{1}{x} \, dx\\ &= \log(x)\sin(a)\end{aligned}$$

Mathematica [A] time = 0.00, size = 5, normalized size = 1.00

$$\sin(a)\log(x)$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a]/x,x]
```

```
[Out] Log[x]*Sin[a]
```

fricas [A] time = 0.40, size = 5, normalized size = 1.00

$$\log(x)\sin(a)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [A] time = 0.26, size = 6, normalized size = 1.20

$$\log(|x|)\sin(a)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)/x,x, algorithm="giac")
[Out] log(abs(x))*sin(a)
```

maple [A] time = 0.00, size = 6, normalized size = 1.20

$$\ln(x)\sin(a)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a)/x,x)
[Out] ln(x)*sin(a)
```

maxima [A] time = 0.31, size = 5, normalized size = 1.00

$$\log(x)\sin(a)$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [B] time = 0.03, size = 5, normalized size = 1.00

$$\sin(a)\ \ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a)/x,x)
[Out] sin(a)*log(x)
```

sympy [A] time = 0.05, size = 5, normalized size = 1.00

$$\log(x)\sin(a)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)/x,x)
```

```
[Out] log(x)*sin(a)
```

3.31 $\int \frac{\sin\left(a+\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)}{x^2}\,dx$

Optimal. Leaf size=86

$$\frac{\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}}{4x}+\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\,(cx^n)^{\frac{1}{n}}}{2x}$$

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

Rubi [A] time = 0.06, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {4493, 4489}

$$\frac{\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}}{4x}+\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\,(cx^n)^{\frac{1}{n}}}{2x}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]/x^2,x]
```

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

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin\left(a+\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sin\left(a+\sqrt{-\frac{1}{n^2}}\,\log(x)\right)dx,x,cx^n\right)}{nx}$$
$$= \frac{\left(\sqrt{-\frac{1}{n^2}}\,\left(cx^n\right)^{\frac{1}{n}}\right)\text{Subst}\left(\int\left(\frac{e^{-a\sqrt{-\frac{1}{n^2}}\,n}}{x}-e^{a\sqrt{-\frac{1}{n^2}}\,n}x^{-\frac{2+n}{n}}\right)dx,x,cx^n\right)}{2x}$$
$$= \frac{e^{a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,n\left(cx^n\right)^{-1/n}}{4x}+\frac{e^{-a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,n\left(cx^n\right)^{\frac{1}{n}}\log(x)}{2x}$$

Mathematica [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(a+\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification is Not applicable to the result.

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

fricas [C] time = 0.43, size = 45, normalized size = 0.52

$$\frac{\left(2i\,x^2\log(x)+i\,e^{\left(\frac{2\left(i\,an-\log(c)\right)}{n}\right)}\right)e^{\left(-\frac{i\,an-\log(c)}{n}\right)}}{4\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2))/x^2,x, algorithm="fricas")
[Out] 1/4*(2*I*x^2*log(x) + I*e^(2*(I*a*n - log(c))/n))*e^(-(I*a*n - log(c))/n)/x
^2
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)+a\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2))/x^2,x, algorithm="giac")
```

```
[Out] integrate(sin(sqrt(-1/n^2)*log(c*x^n) + a)/x^2, x)
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(a+\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+ln(c*x^n)*(-1/n^2)^(1/2))/x^2,x)
```

```
[Out] int(sin(a+ln(c*x^n)*(-1/n^2)^(1/2))/x^2,x)
```

maxima [A] time = 0.35, size = 33, normalized size = 0.38

$$\frac{2\,c^{\frac{2}{n}}x^{2}\log(x)\sin(a)-\sin(a)}{4\,c^{\left(\frac{1}{n}\right)}x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+\ln\left(c\,x^{n}\right)\,\sqrt{-\frac{1}{n^{2}}}\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + log(c*x^n)*(-1/n^2)^(1/2))/x^2,x)
```

```
[Out] int(sin(a + log(c*x^n)*(-1/n^2)^(1/2))/x^2, x)
```

sympy [C] time = 4.89, size = 226, normalized size = 2.63

$$\frac{in\sqrt{\frac{1}{n^{2}}}\log\left(x\right)\cos\left(a+in\sqrt{\frac{1}{n^{2}}}\log\left(x\right)+i\sqrt{\frac{1}{n^{2}}}\log\left(c\right)\right)}{2x}+\frac{in\sqrt{\frac{1}{n^{2}}}\cos\left(a+in\sqrt{\frac{1}{n^{2}}}\log\left(x\right)+i\sqrt{\frac{1}{n^{2}}}\log\left(c\right)\right)}{2x}+\frac{i\sqrt{\frac{1}{n^{2}}}\,\mathrm{l}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+ln(c*x**n)*(-1/n**2)**(1/2))/x**2,x)
```

```
[Out] I*n*sqrt(n**(-2))*log(x)*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))
*log(c))/(2*x) + I*n*sqrt(n**(-2))*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqr
t(n**(-2))*log(c))/(2*x) + I*sqrt(n**(-2))*log(c)*cos(a + I*n*sqrt(n**(-2))
*log(x) + I*sqrt(n**(-2))*log(c))/(2*x) + log(x)*sin(a + I*n*sqrt(n**(-2))*
log(x) + I*sqrt(n**(-2))*log(c))/(2*x) + log(c)*sin(a + I*n*sqrt(n**(-2))*l
og(x) + I*sqrt(n**(-2))*log(c))/(2*n*x)
```

3.32 $\int \frac{\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)}{x^3}\,dx$

Optimal. Leaf size=88

$$\frac{\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-2/n}}{8x^2}+\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\,(cx^n)^{2/n}}{2x^2}$$

```
[Out] 1/8*exp(a*n*(-1/n^2)^(1/2))*n*(-1/n^2)^(1/2)/x^2/((c*x^n)^(2/n))+1/2*n*(c*x
^n)^(2/n)*ln(x)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))/x^2
```

Rubi [A] time = 0.05, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {4493, 4489}

$$\frac{\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-2/n}}{8x^2}+\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\,(cx^n)^{2/n}}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + 2*Sqrt[-n^(-2)]*Log[c*x^n]]/x^3,x]
```

```
[Out] (E^(a*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n)/(8*x^2*(c*x^n)^(2/n)) + (Sqrt[-n^(-
2)]*n*(c*x^n)^(2/n)*Log[x])/(2*E^(a*Sqrt[-n^(-2)]*n)*x^2)
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{(cx^n)^{2/n}\,\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log(x)\right)dx,x,cx^n\right)}{nx^2}$$

$$= \frac{\left(\sqrt{-\frac{1}{n^2}}\,(cx^n)^{2/n}\right)\text{Subst}\left(\int\left(\frac{e^{-a\sqrt{-\frac{1}{n^2}}\,n}}{x}-e^{a\sqrt{-\frac{1}{n^2}}\,n}x^{-\frac{4+n}{n}}\right)dx,x,cx^n\right)}{2x^2}$$

$$= \frac{e^{a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,n\,(cx^n)^{-2/n}}{8x^2}+\frac{e^{-a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,n\,(cx^n)^{2/n}\log(x)}{2x^2}$$

Mathematica [F] time = 0.12, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(a+2\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + 2*Sqrt[-n^(-2)]*Log[c*x^n]]/x^3,x]
```

```
[Out] Integrate[Sin[a + 2*Sqrt[-n^(-2)]*Log[c*x^n]]/x^3, x]
```

fricas [C] time = 0.47, size = 45, normalized size = 0.51

$$\frac{\left(4i\,x^4\log(x)+i\,e^{\left(\frac{2\left(ian-2\log(c)\right)}{n}\right)}\right)e^{\left(-\frac{ian-2\log(c)}{n}\right)}}{8\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2*log(c*x^n)*(-1/n^2)^(1/2))/x^3,x, algorithm="fricas")
```

```
[Out] 1/8*(4*I*x^4*log(x) + I*e^(2*(I*a*n - 2*log(c))/n))*e^(-(I*a*n - 2*log(c))/
n)/x^4
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(2\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)+a\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2*log(c*x^n)*(-1/n^2)^(1/2))/x^3,x, algorithm="giac")
```

```
[Out] integrate(sin(2*sqrt(-1/n^2)*log(c*x^n) + a)/x^3, x)
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(a + 2\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+2*ln(c*x^n)*(-1/n^2)^(1/2))/x^3,x)
```

```
[Out] int(sin(a+2*ln(c*x^n)*(-1/n^2)^(1/2))/x^3,x)
```

maxima [A] time = 0.36, size = 35, normalized size = 0.40

$$\frac{4\,c^{\frac{4}{n}}x^{4}\log(x)\sin(a) - \sin(a)}{8\,c^{\frac{2}{n}}x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2*log(c*x^n)*(-1/n^2)^(1/2))/x^3,x, algorithm="maxima")
```

```
[Out] 1/8*(4*c^(4/n)*x^4*log(x)*sin(a) - sin(a))/(c^(2/n)*x^4)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a + 2\,\ln\left(c\,x^{n}\right)\,\sqrt{-\frac{1}{n^{2}}}\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [C] time = 16.18, size = 252, normalized size = 2.86

$$\frac{in\sqrt{\frac{1}{n^{2}}}\log(x)\cos\left(a + 2in\sqrt{\frac{1}{n^{2}}}\log(x) + 2i\sqrt{\frac{1}{n^{2}}}\log(c)\right)}{2x^{2}} + \frac{in\sqrt{\frac{1}{n^{2}}}\cos\left(a + 2in\sqrt{\frac{1}{n^{2}}}\log(x) + 2i\sqrt{\frac{1}{n^{2}}}\log(c)\right)}{4x^{2}} + \frac{i\sqrt{}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2*ln(c*x**n)*(-1/n**2)**(1/2))/x**3,x)
```

```
[Out] I*n*sqrt(n**(-2))*log(x)*cos(a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(
-2))*log(c))/(2*x**2) + I*n*sqrt(n**(-2))*cos(a + 2*I*n*sqrt(n**(-2))*log(x
) + 2*I*sqrt(n**(-2))*log(c))/(4*x**2) + I*sqrt(n**(-2))*log(c)*cos(a + 2*I
*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(-2))*log(c))/(2*x**2) + log(x)*sin(a
 + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(-2))*log(c))/(2*x**2) + log(c)
*sin(a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(-2))*log(c))/(2*n*x**2)
```

3.33 $\int x^m \sin^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=117

$$-\frac{x^{m+1}e^{-\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{\frac{m+1}{n}}}{8(m+1)}-\frac{1}{4}x^{m+1}\log(x)e^{\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{-\frac{m+1}{n}}+\frac{x^{m+1}}{2(m+1)}$$

```
[Out] 1/2*x^(1+m)/(1+m)-1/8*x^(1+m)*(c*x^n)^((1+m)/n)/exp(2*a*n*(-(1+m)^2/n^2)^(1
/2)/(1+m))/(1+m)-1/4*exp(2*a*n*(-(1+m)^2/n^2)^(1/2)/(1+m))*x^(1+m)*ln(x)/((
c*x^n)^((1+m)/n))
```

Rubi [A] time = 0.16, antiderivative size = 117, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {4493, 4489}

$$-\frac{x^{m+1}e^{-\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{\frac{m+1}{n}}}{8(m+1)}-\frac{1}{4}x^{m+1}\log(x)e^{\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{-\frac{m+1}{n}}+\frac{x^{m+1}}{2(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] x^(1 + m)/(2*(1 + m)) - (x^(1 + m)*(c*x^n)^((1 + m)/n))/(8*E^((2*a*Sqrt[-((
1 + m)^2/n^2)]*n)/(1 + m))*(1 + m)) - (E^((2*a*Sqrt[-((1 + m)^2/n^2)]*n)/(1
 + m))*x^(1 + m)*Log[x])/(4*(c*x^n)^((1 + m)/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sin^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sin^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log(x\right.\right.}{n}$$

$$= -\frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int\left(\frac{e^{\frac{2a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}}{x}-2x^{-1+\frac{1+m}{n}}+e^{-\frac{2a\sqrt{-\frac{(}{}}}{1}}\right.\right.}{4n}$$

$$= \frac{x^{1+m}}{2(1+m)}-\frac{e^{-\frac{2a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}x^{1+m}\left(cx^n\right)^{\frac{1+m}{n}}}{8(1+m)}-\frac{1}{4}e^{\frac{2a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}x^{1+m}\left(cx\right.$$

Mathematica [F] time = 0.48, size = 0, normalized size = 0.00

$$\int x^m \sin^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] Integrate[x^m*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2, x]
```

fricas [C] time = 0.43, size = 107, normalized size = 0.91

$$-\frac{\left(2\,(m+1)e^{\left(-\frac{2\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}\right)}\log(x)-4\,e^{\left(-\frac{(m+1)n\log(x)-2i\,an+(m+1)\log(c)}{n}\right)}+1\right)e^{\left(\frac{2\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}+\frac{2i\,a}{}\right.}}{8\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x, algorithm="fr
icas")
```

```
[Out] -1/8*(2*(m + 1)*e^(-2*((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n)*log(
x) - 4*e^(-((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n) + 1)*e^(2*((m +
 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n + (2*I*a*n - (m + 1)*log(c))/n)/
(m + 1)
```

giac [C] time = 4.96, size = 498, normalized size = 4.26

$$-\frac{m^2n^2xx^me^{\left(2ia-\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+m^2n^2xx^me^{\left(-2ia+\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}-2m^2n^2xx^m+2mn^2xx^me^{\left(2ia-\frac{n|mn+n}{}\right.}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x, algorithm="gi
ac")
```

```
[Out] -1/4*(m^2*n^2*x*x^m*e^(2*I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c)
)/n^2) + m^2*n^2*x*x^m*e^(-2*I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*lo
g(c))/n^2) - 2*m^2*n^2*x*x^m + 2*m*n^2*x*x^m*e^(2*I*a - (n*abs(m*n + n)*log
(x) + abs(m*n + n)*log(c))/n^2) + m*n*x*x^m*abs(m*n + n)*e^(2*I*a - (n*abs(
m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 2*m*n^2*x*x^m*e^(-2*I*a + (n*
abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - m*n*x*x^m*abs(m*n + n)*e^
(-2*I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 4*m*n^2*x*x^
m + n^2*x*x^m*e^(2*I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2)
 + n*x*x^m*abs(m*n + n)*e^(2*I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*lo
g(c))/n^2) + n^2*x*x^m*e^(-2*I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*lo
g(c))/n^2) - n*x*x^m*abs(m*n + n)*e^(-2*I*a + (n*abs(m*n + n)*log(x) + abs(
m*n + n)*log(c))/n^2) + 2*(m*n + n)^2*x*x^m - 2*n^2*x*x^m)/(m^3*n^2 + 3*m^2
*n^2 - (m*n + n)^2*m + 3*m*n^2 - (m*n + n)^2 + n^2)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int x^m \left(\sin^2\left(a+\frac{\ln\left(c\,x^n\right)\sqrt{-\frac{(1+m)^2}{n^2}}}{2}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x)
```

```
[Out] int(x^m*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x)
```

maxima [A] time = 0.40, size = 173, normalized size = 1.48

$$\frac{4\left(\cos(2a)^2+\sin(2a)^2\right)c^{\frac{m}{n}+\frac{1}{n}}xx^m-c^{\frac{2m}{n}+\frac{2}{n}}x\cos(2a)e^{\left(m\log(x)+\frac{m\log(x^n)}{n}+\frac{\log(x^n)}{n}\right)}-2\left(\cos(2a)^3+\cos(2a)\sin(2a)^2\right.}{8\left(\left(\cos(2a)^2+\sin(2a)^2\right)c^{\frac{m}{n}+\frac{1}{n}}m+\left(\cos(2a)^2+\sin(2a)^2\right)c^{\frac{m}{n}+\frac{1}{n}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x, algorithm="ma
xima")
```

```
[Out] 1/8*(4*(cos(2*a)^2 + sin(2*a)^2)*c^(m/n + 1/n)*x*x^m - c^(2*m/n + 2/n)*x*co
s(2*a)*e^(m*log(x) + m*log(x^n)/n + log(x^n)/n) - 2*(cos(2*a)^3 + cos(2*a)*
sin(2*a)^2 + (cos(2*a)^3 + cos(2*a)*sin(2*a)^2)*m)*log(x))/((cos(2*a)^2 + s
in(2*a)^2)*c^(m/n + 1/n)*m + (cos(2*a)^2 + sin(2*a)^2)*c^(m/n + 1/n))
```

mupad [B] time = 3.85, size = 145, normalized size = 1.24

$$\frac{x\,x^m}{2\,m+2}-\frac{x\,x^m\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}}}{4\,m+4-n\,\sqrt{-\frac{{\left(m+1\right)}^2}{n^2}}\,4\mathrm{i}}-\frac{x\,x^m\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}}{4\,m+4+n\,\sqrt{-\frac{{\left(m+1\right)}^2}{n^2}}\,4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a + (log(c*x^n)*(-(m + 1)^2/n^2)^(1/2))/2)^2,x)
```

```
[Out] (x*x^m)/(2*m + 2) - (x*x^m*exp(-a*2i)/(c*x^n)^((- (2*m)/n^2 - 1/n^2 - m^2/n
^2)^(1/2)*1i))/(4*m - n*(-(m + 1)^2/n^2)^(1/2)*4i + 4) - (x*x^m*exp(a*2i)*(
c*x^n)^((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i))/(4*m + n*(-(m + 1)^2/n^2
)^(1/2)*4i + 4)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sin^2\left(a + \frac{\sqrt{-\frac{m^2}{n^2} - \frac{2m}{n^2} - \frac{1}{n^2}}\log\left(cx^n\right)}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sin(a+1/2*ln(c*x**n)*(-(1+m)**2/n**2)**(1/2))**2,x)
```

```
[Out] Integral(x**m*sin(a + sqrt(-m**2/n**2 - 2*m/n**2 - 1/n**2)*log(c*x**n)/2)**
2, x)
```

3.34 $\int x^2 \sin^2\left(a+\frac{3}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=76

$$-\frac{1}{24}x^3e^{-2a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{3/n}-\frac{1}{4}x^3e^{2a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\left(cx^n\right)^{-3/n}+\frac{x^3}{6}$$

```
[Out] 1/6*x^3-1/24*x^3*(c*x^n)^(3/n)/exp(2*a*n*(-1/n^2)^(1/2))-1/4*exp(2*a*n*(-1/
n^2)^(1/2))*x^3*ln(x)/((c*x^n)^(3/n))
```

Rubi [A] time = 0.08, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4493, 4489}

$$-\frac{1}{24}x^3e^{-2a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{3/n}-\frac{1}{4}x^3e^{2a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\left(cx^n\right)^{-3/n}+\frac{x^3}{6}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + (3*Sqrt[-n^(-2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] x^3/6 - (x^3*(c*x^n)^(3/n))/(24*E^(2*a*Sqrt[-n^(-2)]*n)) - (E^(2*a*Sqrt[-n^
(-2)]*n)*x^3*Log[x])/(4*(c*x^n)^(3/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \sin^2\left(a+\frac{3}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}}\sin^2\left(a+\frac{3}{2}\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{n}$$

$$= -\frac{\left(x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int\left(\frac{e^{2a\sqrt{-\frac{1}{n^2}}n}}{x}-2x^{-1+\frac{3}{n}}+e^{-2a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{6}{n}}\right)dx, x}{4n}$$

$$= \frac{x^3}{6}-\frac{1}{24}e^{-2a\sqrt{-\frac{1}{n^2}}n}x^3\left(cx^n\right)^{3/n}-\frac{1}{4}e^{2a\sqrt{-\frac{1}{n^2}}n}x^3\left(cx^n\right)^{-3/n}\log(x)$$

Mathematica [F] time = 0.29, size = 0, normalized size = 0.00

$$\int x^2 \sin^2\left(a+\frac{3}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^2*Sin[a + (3*Sqrt[-n^(-2)]*Log[c*x^n])/2]^2,x]
[Out] Integrate[x^2*Sin[a + (3*Sqrt[-n^(-2)]*Log[c*x^n])/2]^2, x]
```

fricas [C] time = 0.48, size = 59, normalized size = 0.78

$$-\frac{1}{24}\left(x^6-4x^3e^{\left(\frac{2ian-3\log(c)}{n}\right)}+6e^{\left(\frac{2\left(2ian-3\log(c)\right)}{n}\right)}\log(x)\right)e^{\left(-\frac{2ian-3\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+3/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="fricas")
[Out] -1/24*(x^6 - 4*x^3*e^((2*I*a*n - 3*log(c))/n) + 6*e^(2*(2*I*a*n - 3*log(c))
/n)*log(x))*e^(-(2*I*a*n - 3*log(c))/n)
```

giac [A] time = 5.00, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+3/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="giac")
[Out] +Infinity
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int x^{2} \left(\sin^{2}\left(a +\frac{3 \ln \left(c \,x^{n}\right) \sqrt{-\frac{1}{n^{2}}}}{2}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+3/2*ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
[Out] int(x^2*sin(a+3/2*ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

maxima [A] time = 0.37, size = 47, normalized size = 0.62

$$-\frac{c^{\frac{6}{n}} x^{6} \cos\left(2\,a\right) - 4\,c^{\frac{3}{n}} x^{3} + 6\,\cos\left(2\,a\right) \log\left(x\right)}{24\,c^{\frac{3}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+3/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="maxima")
[Out] -1/24*(c^(6/n)*x^6*cos(2*a) - 4*c^(3/n)*x^3 + 6*cos(2*a)*log(x))/c^(3/n)
```

mupad [B] time = 2.97, size = 92, normalized size = 1.21

$$\frac{x^3}{6}-\frac{x^3\,{\mathrm{e}}^{-a\,2{}\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{\sqrt{-\frac{1}{n^2}}\,3{}\mathrm{i}}}\,1{}\mathrm{i}}{12\,n\,\sqrt{-\frac{1}{n^2}}+12{}\mathrm{i}}+\frac{x^3\,{\mathrm{e}}^{a\,2{}\mathrm{i}}\,{\left(c\,x^n\right)}^{\sqrt{-\frac{1}{n^2}}\,3{}\mathrm{i}}\,1{}\mathrm{i}}{12\,n\,\sqrt{-\frac{1}{n^2}}-12{}\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a + (3*log(c*x^n)*(-1/n^2)^(1/2))/2)^2,x)
[Out] x^3/6 - (x^3*exp(-a*2i)/(c*x^n)^((-1/n^2)^(1/2)*3i)*1i)/(12*n*(-1/n^2)^(1/2
) + 12i) + (x^3*exp(a*2i)*(c*x^n)^((-1/n^2)^(1/2)*3i)*1i)/(12*n*(-1/n^2)^(1
/2) - 12i)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sin(a+3/2*ln(c*x**n)*(-1/n**2)**(1/2))**2,x)
[Out] Timed out
```

3.35 $\int x \sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=76

$$-\frac{1}{16}x^2e^{-2a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{2/n}-\frac{1}{4}x^2e^{2a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-2/n}+\frac{x^2}{4}$$

```
[Out] 1/4*x^2-1/16*x^2*(c*x^n)^(2/n)/exp(2*a*n*(-1/n^2)^(1/2))-1/4*exp(2*a*n*(-1/
n^2)^(1/2))*x^2*ln(x)/((c*x^n)^(2/n))
```

Rubi [A] time = 0.06, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {4493, 4489}

$$-\frac{1}{16}x^2e^{-2a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{2/n}-\frac{1}{4}x^2e^{2a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-2/n}+\frac{x^2}{4}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^2,x]
```

```
[Out] x^2/4 - (x^2*(c*x^n)^(2/n))/(16*E^(2*a*Sqrt[-n^(-2)]*n)) - (E^(2*a*Sqrt[-n^
(-2)]*n)*x^2*Log[x])/(4*(c*x^n)^(2/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log(x)\right)dx,x,cx^n\right)}{n}$$
$$= -\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int\left(\frac{e^{2a\sqrt{-\frac{1}{n^2}}n}}{x}-2x^{-1+\frac{2}{n}}+e^{-2a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{4}{n}}\right)dx,x,cx^n\right)}{4n}$$
$$= \frac{x^2}{4}-\frac{1}{16}e^{-2a\sqrt{-\frac{1}{n^2}}n}x^2\left(cx^n\right)^{2/n}-\frac{1}{4}e^{2a\sqrt{-\frac{1}{n^2}}n}x^2\left(cx^n\right)^{-2/n}\log(x)$$

Mathematica [F] time = 0.18, size = 0, normalized size = 0.00

$$\int x\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x*Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^2,x]
```

```
[Out] Integrate[x*Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^2, x]
```

fricas [C] time = 0.54, size = 60, normalized size = 0.79

$$-\frac{1}{16}\left(x^4-4x^2e^{\left(\frac{2\left(ian-\log(c)\right)}{n}\right)}+4e^{\left(\frac{4\left(ian-\log(c)\right)}{n}\right)}\log(x)\right)e^{\left(-\frac{2\left(ian-\log(c)\right)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="fricas")
```

```
[Out] -1/16*(x^4 - 4*x^2*e^(2*(I*a*n - log(c))/n) + 4*e^(4*(I*a*n - log(c))/n)*lo
g(x))*e^(-2*(I*a*n - log(c))/n)
```

giac [A] time = 0.96, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="giac")
```

```
[Out] +Infinity
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int x\left(\sin^2\left(a+\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

```
[Out] int(x*sin(a+ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

maxima [A] time = 0.36, size = 47, normalized size = 0.62

$$-\frac{c^{\frac{4}{n}}x^4\cos\left(2\,a\right)-4\,c^{\frac{2}{n}}x^2+4\,\cos\left(2\,a\right)\log(x)}{16\,c^{\frac{2}{n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/16*(c^(4/n)*x^4*cos(2*a) - 4*c^(2/n)*x^2 + 4*cos(2*a)*log(x))/c^(2/n)
```

mupad [B] time = 2.89, size = 92, normalized size = 1.21

$$\frac{x^2}{4}-\frac{x^2\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{\left(c\,x^n\right)^{\sqrt{-\frac{1}{n^2}}\,2\mathrm{i}}}\,1\mathrm{i}}{8\,n\,\sqrt{-\frac{1}{n^2}}+8\mathrm{i}}+\frac{x^2\,\mathrm{e}^{a\,2\mathrm{i}}\,\left(c\,x^n\right)^{\sqrt{-\frac{1}{n^2}}\,2\mathrm{i}}\,1\mathrm{i}}{8\,n\,\sqrt{-\frac{1}{n^2}}-8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a + log(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

```
[Out] x^2/4 - (x^2*exp(-a*2i)/(c*x^n)^((-1/n^2)^(1/2)*2i)*1i)/(8*n*(-1/n^2)^(1/2)
 + 8i) + (x^2*exp(a*2i)*(c*x^n)^((-1/n^2)^(1/2)*2i)*1i)/(8*n*(-1/n^2)^(1/2)
 - 8i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+ln(c*x**n)*(-1/n**2)**(1/2))**2,x)
```

```
[Out] Integral(x*sin(a + sqrt(-1/n**2)*log(c*x**n))**2, x)
```

3.36 $\int \sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=68

$$-\frac{1}{8}xe^{-2a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{\frac{1}{n}}-\frac{1}{4}xe^{2a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-1/n}+\frac{x}{2}$$

```
[Out] 1/2*x-1/8*x*(c*x^n)^(1/n)/exp(2*a*n*(-1/n^2)^(1/2))-1/4*exp(2*a*n*(-1/n^2)^
(1/2))*x*ln(x)/((c*x^n)^(1/n))
```

Rubi [A] time = 0.05, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {4483, 4489}

$$-\frac{1}{8}xe^{-2a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{\frac{1}{n}}-\frac{1}{4}xe^{2a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-1/n}+\frac{x}{2}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] x/2 - (x*(c*x^n)^n^(-1))/(8*E^(2*a*Sqrt[-n^(-2)]*n)) - (E^(2*a*Sqrt[-n^(-2)
]*n)*x*Log[x])/(4*(c*x^n)^n^(-1))
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rubi steps

$$\int \sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log(x)\right)dx,x,cx^n\right)}{n}$$

$$= -\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\left(\frac{e^{2a\sqrt{-\frac{1}{n^2}}\,n}}{x}-2x^{-1+\frac{1}{n}}+e^{-2a\sqrt{-\frac{1}{n^2}}\,n}x^{-1+\frac{2}{n}}\right)dx,x,cx^n\right)}{4n}$$

$$= \frac{x}{2}-\frac{1}{8}e^{-2a\sqrt{-\frac{1}{n^2}}\,n}x\left(cx^n\right)^{\frac{1}{n}}-\frac{1}{4}e^{2a\sqrt{-\frac{1}{n^2}}\,n}x\left(cx^n\right)^{-1/n}\log(x)$$

Mathematica [F] time = 0.13, size = 0, normalized size = 0.00

$$\int \sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

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

fricas [C] time = 0.43, size = 57, normalized size = 0.84

$$-\frac{1}{8}\left(x^2-4\,xe^{\left(\frac{2i\,an-\log(c)}{n}\right)}+2\,e^{\left(\frac{2\left(2i\,an-\log(c)\right)}{n}\right)}\log(x)\right)e^{\left(-\frac{2i\,an-\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="fricas")
[Out] -1/8*(x^2 - 4*x*e^((2*I*a*n - log(c))/n) + 2*e^(2*(2*I*a*n - log(c))/n)*log
(x))*e^(-(2*I*a*n - log(c))/n)
```

giac [A] time = 0.80, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="giac")
[Out] +Infinity
```

maple [F] time = 0.09, size = 0, normalized size = 0.00

$$\int \sin^2\left(a + \frac{\ln(c\,x^n)\sqrt{-\frac{1}{n^2}}}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/2*ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

```
[Out] int(sin(a+1/2*ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

maxima [A] time = 0.36, size = 41, normalized size = 0.60

$$-\frac{c^{\frac{2}{n}}x^2\cos(2\,a) - 4\,c^{\left(\frac{1}{n}\right)}x + 2\,\cos(2\,a)\log(x)}{8\,c^{\left(\frac{1}{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 2.66, size = 86, normalized size = 1.26

$$\frac{x}{2} - \frac{x\,e^{-a\,2i}\,\frac{1}{(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,1i}}\,1i}{4\,n\,\sqrt{-\frac{1}{n^2}}+4i} + \frac{x\,e^{a\,2i}\,(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,1i}\,1i}{4\,n\,\sqrt{-\frac{1}{n^2}}-4i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + (log(c*x^n)*(-1/n^2)^(1/2))/2)^2,x)
```

```
[Out] x/2 - (x*exp(-a*2i)/(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(4*n*(-1/n^2)^(1/2) + 4
i) + (x*exp(a*2i)*(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(4*n*(-1/n^2)^(1/2) - 4i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin^2\left(a + \frac{\sqrt{-\frac{1}{n^2}}\log(cx^n)}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*ln(c*x**n)*(-1/n**2)**(1/2))**2,x)
```

```
[Out] Integral(sin(a + sqrt(-1/n**2)*log(c*x**n)/2)**2, x)
```

3.37 $\int \frac{\sin^2(a)}{x} \, dx$

Optimal. Leaf size=7

$$\sin^2(a)\log(x)$$

```
[Out] ln(x)*sin(a)^2
```

Rubi [A] time = 0.01, antiderivative size = 7, 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 = {12, 29}

$$\sin^2(a)\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a]^2/x,x]
```

```
[Out] Log[x]*Sin[a]^2
```

Rule 12

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

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^2(a)}{x} \, dx &= \sin^2(a) \int \frac{1}{x} \, dx\\ &= \log(x)\sin^2(a)\end{aligned}$$

Mathematica [A] time = 0.00, size = 7, normalized size = 1.00

$$\sin^2(a)\log(x)$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a]^2/x,x]
```

```
[Out] Log[x]*Sin[a]^2
```

fricas [A] time = 0.40, size = 10, normalized size = 1.43

$$-\left(\cos(a)^2 - 1\right)\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)^2/x,x, algorithm="fricas")
```

```
[Out] -(cos(a)^2 - 1)*log(x)
```

giac [A] time = 0.16, size = 8, normalized size = 1.14

$$\log\left(|x|\right)\sin(a)^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)^2/x,x, algorithm="giac")
```

```
[Out] log(abs(x))*sin(a)^2
```

maple [A] time = 0.00, size = 8, normalized size = 1.14

$$\ln(x)\left(\sin^2(a)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a)^2/x,x)
```

```
[Out] ln(x)*sin(a)^2
```

maxima [A] time = 0.31, size = 7, normalized size = 1.00

$$\log(x)\sin(a)^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)^2/x,x, algorithm="maxima")
```

```
[Out] log(x)*sin(a)^2
```

mupad [B] time = 0.02, size = 7, normalized size = 1.00

$$\sin(a)^2\,\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a)^2/x,x)
```

```
[Out] sin(a)^2*log(x)
```

sympy [**A**] time = 0.05, size = 7, normalized size = 1.00

$$\log(x)\sin^2(a)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)**2/x,x)
```

```
[Out] log(x)*sin(a)**2
```

3.38 $\int \frac{\sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)}{x^2}\,dx$

Optimal. Leaf size=74

$$\frac{e^{2a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}}{8x}-\frac{e^{-2a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\,(cx^n)^{\frac{1}{n}}}{4x}-\frac{1}{2x}$$

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

Rubi [A] time = 0.07, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4493, 4489}

$$\frac{e^{2a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}}{8x}-\frac{e^{-2a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\,(cx^n)^{\frac{1}{n}}}{4x}-\frac{1}{2x}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2/x^2,x]
```

```
[Out] -1/(2*x) + E^(2*a*Sqrt[-n^(-2)]*n)/(8*x*(c*x^n)^n^(-1)) - ((c*x^n)^n^(-1)*L
og[x])/(4*E^(2*a*Sqrt[-n^(-2)]*n)*x)
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{(cx^n)^{\frac{1}{n}}\,\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log(x)\right)dx, x, cx^n\right)}{nx}$$

$$= -\frac{(cx^n)^{\frac{1}{n}}\,\text{Subst}\left(\int\left(\frac{e^{-2a\sqrt{-\frac{1}{n^2}}\,n}}{x}-2x^{-\frac{1+n}{n}}+e^{2a\sqrt{-\frac{1}{n^2}}\,n}x^{-\frac{2+n}{n}}\right)dx, x, cx^n\right)}{4nx}$$

$$= -\frac{1}{2x}+\frac{e^{2a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}}{8x}-\frac{e^{-2a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{\frac{1}{n}}\log(x)}{4x}$$

Mathematica [F] time = 0.21, size = 0, normalized size = 0.00

$$\int \frac{\sin^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2/x^2,x]
```

```
[Out] Integrate[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2/x^2, x]
```

fricas [C] time = 0.43, size = 62, normalized size = 0.84

$$-\frac{\left(2\,x^2\log(x)+4\,xe^{\left(\frac{2i\,an-\log(c)}{n}\right)}-e^{\left(\frac{2\left(2i\,an-\log(c)\right)}{n}\right)}\right)e^{\left(-\frac{2i\,an-\log(c)}{n}\right)}}{8\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2/x^2,x, algorithm="fricas")
```

```
[Out] -1/8*(2*x^2*log(x) + 4*x*e^((2*I*a*n - log(c))/n) - e^(2*(2*I*a*n - log(c))
/n))*e^(-(2*I*a*n - log(c))/n)/x^2
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(\frac{1}{2}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)+a\right)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2/x^2,x, algorithm="giac")
[Out] integrate(sin(1/2*sqrt(-1/n^2)*log(c*x^n) + a)^2/x^2, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\sin^{2}\left(a+\frac{\ln(c\,x^{n})\sqrt{-\frac{1}{n^{2}}}}{2}\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/2*ln(c*x^n)*(-1/n^2)^(1/2))^2/x^2,x)
[Out] int(sin(a+1/2*ln(c*x^n)*(-1/n^2)^(1/2))^2/x^2,x)
```

maxima [A] time = 0.36, size = 48, normalized size = 0.65

$$-\frac{2\,c^{\frac{2}{n}}x^{3}\cos\left(2\,a\right)\log(x)+4\,c^{\left(\frac{1}{n}\right)}x^{2}-x\cos\left(2\,a\right)}{8\,c^{\left(\frac{1}{n}\right)}x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2/x^2,x, algorithm="maxima")
[Out] -1/8*(2*c^(2/n)*x^3*cos(2*a)*log(x) + 4*c^(1/n)*x^2 - x*cos(2*a))/(c^(1/n)*
x^3)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+\frac{\ln(c\,x^{n})\,\sqrt{-\frac{1}{n^{2}}}}{2}\right)^{2}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [C] time = 28.49, size = 240, normalized size = 3.24

$$\frac{in\sqrt{\frac{1}{n^{2}}}\,\log\left(x\right)\sin\left(2a+in\sqrt{\frac{1}{n^{2}}}\,\log\left(x\right)+i\sqrt{\frac{1}{n^{2}}}\,\log\left(c\right)\right)}{4x}+\frac{in\sqrt{\frac{1}{n^{2}}}\,\sin\left(2a+in\sqrt{\frac{1}{n^{2}}}\,\log\left(x\right)+i\sqrt{\frac{1}{n^{2}}}\,\log\left(c\right)\right)}{4x}+\frac{i\sqrt{\frac{1}{n^{2}}}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*ln(c*x**n)*(-1/n**2)**(1/2))**2/x**2,x)
```

```
[Out] I*n*sqrt(n**(-2))*log(x)*sin(2*a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2
))*log(c))/(4*x) + I*n*sqrt(n**(-2))*sin(2*a + I*n*sqrt(n**(-2))*log(x) + I
*sqrt(n**(-2))*log(c))/(4*x) + I*sqrt(n**(-2))*log(c)*sin(2*a + I*n*sqrt(n*
*(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(4*x) - log(x)*cos(2*a + I*n*sqrt(n
**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(4*x) - 1/(2*x) - log(c)*cos(2*a +
 I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(4*n*x)
```

3.39 $\int \frac{\sin^2\left(a+\sqrt{-\frac{1}{n^2}} \log(cx^n)\right)}{x^3} dx$

Optimal. Leaf size=76

$$\frac{e^{2a\sqrt{-\frac{1}{n^2}}n}(cx^n)^{-2/n}}{16x^2}-\frac{e^{-2a\sqrt{-\frac{1}{n^2}}n}\log(x)(cx^n)^{2/n}}{4x^2}-\frac{1}{4x^2}$$

```
[Out] -1/4/x^2+1/16*exp(2*a*n*(-1/n^2)^(1/2))/x^2/((c*x^n)^(2/n))-1/4*(c*x^n)^(2/
n)*ln(x)/exp(2*a*n*(-1/n^2)^(1/2))/x^2
```

Rubi [A] time = 0.06, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {4493, 4489}

$$\frac{e^{2a\sqrt{-\frac{1}{n^2}}n}(cx^n)^{-2/n}}{16x^2}-\frac{e^{-2a\sqrt{-\frac{1}{n^2}}n}\log(x)(cx^n)^{2/n}}{4x^2}-\frac{1}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^2/x^3,x]
```

```
[Out] -1/(4*x^2) + E^(2*a*Sqrt[-n^(-2)]*n)/(16*x^2*(c*x^n)^(2/n)) - ((c*x^n)^(2/n
)*Log[x])/(4*E^(2*a*Sqrt[-n^(-2)]*n)*x^2)
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{(cx^n)^{2/n}\,\mathrm{Subst}\left(\int x^{-1-\frac{2}{n}}\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{nx^2}$$

$$= -\frac{(cx^n)^{2/n}\,\mathrm{Subst}\left(\int\left(\frac{e^{-2a\sqrt{-\frac{1}{n^2}}\,n}}{x}-2x^{-\frac{2+n}{n}}+e^{2a\sqrt{-\frac{1}{n^2}}\,n}x^{-\frac{4+n}{n}}\right)dx, x, cx^n\right)}{4nx^2}$$

$$= -\frac{1}{4x^2}+\frac{e^{2a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-2/n}}{16x^2}-\frac{e^{-2a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{2/n}\log(x)}{4x^2}$$

Mathematica [F] time = 0.17, size = 0, normalized size = 0.00

$$\int \frac{\sin^2\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^2/x^3,x]
[Out] Integrate[Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^2/x^3, x]
```

fricas [C] time = 0.43, size = 65, normalized size = 0.86

$$-\frac{\left(4\,x^4\log(x)+4\,x^2e^{\left(\frac{2\left(i\,an-\log(c)\right)}{n}\right)}-e^{\left(\frac{4\left(i\,an-\log(c)\right)}{n}\right)}\right)e^{\left(-\frac{2\left(i\,an-\log(c)\right)}{n}\right)}}{16\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2))^2/x^3,x, algorithm="fricas")
[Out] -1/16*(4*x^4*log(x) + 4*x^2*e^(2*(I*a*n - log(c))/n) - e^(4*(I*a*n - log(c)
)/n))*e^(-2*(I*a*n - log(c))/n)/x^4
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)+a\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2))^2/x^3,x, algorithm="giac")
```

```
[Out] integrate(sin(sqrt(-1/n^2)*log(c*x^n) + a)^2/x^3, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\sin^2\left(a + \ln(c\,x^n)\sqrt{-\frac{1}{n^2}}\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+ln(c*x^n)*(-1/n^2)^(1/2))^2/x^3,x)
```

```
[Out] int(sin(a+ln(c*x^n)*(-1/n^2)^(1/2))^2/x^3,x)
```

maxima [A] time = 0.37, size = 54, normalized size = 0.71

$$-\frac{4\,c^{\frac{4}{n}}x^6\cos(2\,a)\log(x) + 4\,c^{\frac{2}{n}}x^4 - x^2\cos(2\,a)}{16\,c^{\frac{2}{n}}x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+log(c*x^n)*(-1/n^2)^(1/2))^2/x^3,x, algorithm="maxima")
```

```
[Out] -1/16*(4*c^(4/n)*x^6*cos(2*a)*log(x) + 4*c^(2/n)*x^4 - x^2*cos(2*a))/(c^(2/
n)*x^6)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a + \ln(c\,x^n)\,\sqrt{-\frac{1}{n^2}}\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [C] time = 16.77, size = 462, normalized size = 6.08

$$\frac{in\sqrt{\frac{1}{n^2}}\log(x)\sin\left(a + in\sqrt{\frac{1}{n^2}}\log(x) + i\sqrt{\frac{1}{n^2}}\log(c)\right)\cos\left(a + in\sqrt{\frac{1}{n^2}}\log(x) + i\sqrt{\frac{1}{n^2}}\log(c)\right)}{2x^2} + \frac{3in\sqrt{\frac{1}{n^2}}\sin\left(a +\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+ln(c*x**n)*(-1/n**2)**(1/2))**2/x**3,x)
```

```
[Out] I*n*sqrt(n**(-2))*log(x)*sin(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))
*log(c))*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(2*x**2
) + 3*I*n*sqrt(n**(-2))*sin(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*
log(c))*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(4*x**2)
 + I*sqrt(n**(-2))*log(c)*sin(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2)
)*log(c))*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(2*x**
2) + log(x)*sin(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))**2/(
4*x**2) - log(x)*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))
**2/(4*x**2) - cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))**
2/(2*x**2) + log(c)*sin(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(
c))**2/(4*n*x**2) - log(c)*cos(a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-2
))*log(c))**2/(4*n*x**2)
```

3.40 $\int x^m \sin^3\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\,\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=226

$$-\frac{4x^{m+1}\sin^3\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\,\log\left(cx^n\right)\right)}{5(m+1)}+\frac{8x^{m+1}\sin\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\,\log\left(cx^n\right)\right)}{5(m+1)}-\frac{4n\sqrt{-\frac{(m+1)^2}{n^2}}\,x^{m+1}\cos\left(a+\frac{1}{2}\sqrt{-\cdots}\right.}{5(m+1)^2}$$

```
[Out] 8/5*x^(1+m)*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))/(1+m)-4/5*x^(1+m)*sin
(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3/(1+m)-4/5*n*x^(1+m)*cos(a+1/2*ln(c
*x^n)*(-(1+m)^2/n^2)^(1/2))*(-(1+m)^2/n^2)^(1/2)/(1+m)^2+6/5*n*x^(1+m)*cos(
a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1
/2))^2*(-(1+m)^2/n^2)^(1/2)/(1+m)^2
```

Rubi [A] time = 0.08, antiderivative size = 226, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {4487, 4485}

$$-\frac{4x^{m+1}\sin^3\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\,\log\left(cx^n\right)\right)}{5(m+1)}+\frac{8x^{m+1}\sin\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\,\log\left(cx^n\right)\right)}{5(m+1)}-\frac{4n\sqrt{-\frac{(m+1)^2}{n^2}}\,x^{m+1}\cos\left(a+\frac{1}{2}\sqrt{-\cdots}\right.}{5(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^3,x]
```

```
[Out] (-4*Sqrt[-((1 + m)^2/n^2)]*n*x^(1 + m)*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[
c*x^n])/2])/(5*(1 + m)^2) + (8*x^(1 + m)*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Lo
g[c*x^n])/2])/(5*(1 + m)) + (6*Sqrt[-((1 + m)^2/n^2)]*n*x^(1 + m)*Cos[a + (
Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c
*x^n])/2]^2)/(5*(1 + m)^2) - (4*x^(1 + m)*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*L
og[c*x^n])/2]^3)/(5*(1 + m))
```

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^m \sin^3\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx = \frac{6\sqrt{-\frac{(1+m)^2}{n^2}}\,nx^{1+m}\cos\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)\sin^2\left(a+\frac{1}{2}\sqrt{-\right.}{5(1+m)^2}$$

$$= -\frac{4\sqrt{-\frac{(1+m)^2}{n^2}}\,nx^{1+m}\cos\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)}{5(1+m)^2}+\frac{8x^{1+m}\sin}{}$$

Mathematica [A] time = 1.50, size = 169, normalized size = 0.75

$$\frac{x^{m+1}\left(2(m+1)\left(5\sin\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)+\sin\left(3a+\frac{3}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)\right)-5n\sqrt{-\frac{(m+1)^2}{n^2}}\cos\left(a+\frac{1}{2}\right.\right.}{10(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^3,x]
```

```
[Out] (x^(1 + m)*(-5*Sqrt[-((1 + m)^2/n^2)]*n*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log
[c*x^n])/2] - 3*Sqrt[-((1 + m)^2/n^2)]*n*Cos[3*a + (3*Sqrt[-((1 + m)^2/n^2)
]*Log[c*x^n])/2] + 2*(1 + m)*(5*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])
/2] + Sin[3*a + (3*Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2])))/(10*(1 + m)^2)
```

fricas [C] time = 0.44, size = 128, normalized size = 0.57

$$\frac{\left(5i\,e^{\left(-\frac{(m+1)n\log(x)-2i\,an+(m+1)\log(c)}{n}\right)}-15i\,e^{\left(-\frac{2\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}\right)}-5i\,e^{\left(-\frac{3\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}\right)}-i\right)e^{\left(\frac{5\left((m+1)n\log\right.}{}\right.}}{20\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x, algorithm="fr
icas")
```

```
[Out] 1/20*(5*I*e^(-((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n) - 15*I*e^(-2
*((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n) - 5*I*e^(-3*((m + 1)*n*lo
g(x) - 2*I*a*n + (m + 1)*log(c))/n) - I)*e^(5/2*((m + 1)*n*log(x) - 2*I*a*n
 + (m + 1)*log(c))/n + (2*I*a*n - (m + 1)*log(c))/n)/(m + 1)
```

giac [C] time = 10.24, size = 1870, normalized size = 8.27

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x, algorithm="gi
ac")
```

```
[Out] 1/4*(8*I*m^3*n^4*x*x^m*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)
*log(c))/n^2) - 24*I*m^3*n^4*x*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + ab
s(m*n + n)*log(c))/n^2) + 24*I*m^3*n^4*x*x^m*e^(-I*a + 1/2*(n*abs(m*n + n)*
log(x) + abs(m*n + n)*log(c))/n^2) - 8*I*m^3*n^4*x*x^m*e^(-3*I*a + 3/2*(n*a
bs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*I*m^2*n^4*x*x^m*e^(3*I*
a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 12*I*m^2*n^3*x
*x^m*abs(m*n + n)*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(
c))/n^2) - 72*I*m^2*n^4*x*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n
 + n)*log(c))/n^2) - 12*I*m^2*n^3*x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*
n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 72*I*m^2*n^4*x*x^m*e^(-I*a + 1/
2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 12*I*m^2*n^3*x*x^m*a
bs(m*n + n)*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2
) - 24*I*m^2*n^4*x*x^m*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n
)*log(c))/n^2) + 12*I*m^2*n^3*x*x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n
 + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 2*I*(m*n + n)^2*m*n^2*x*x^m*e^(3
*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*I*m*n^4*
x*x^m*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 2
4*I*m*n^3*x*x^m*abs(m*n + n)*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*
n + n)*log(c))/n^2) + 54*I*(m*n + n)^2*m*n^2*x*x^m*e^(I*a - 1/2*(n*abs(m*n
+ n)*log(x) + abs(m*n + n)*log(c))/n^2) - 72*I*m*n^4*x*x^m*e^(I*a - 1/2*(n*
abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 24*I*m*n^3*x*x^m*abs(m*n
+ n)*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 54*I
*(m*n + n)^2*m*n^2*x*x^m*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n
)*log(c))/n^2) + 72*I*m*n^4*x*x^m*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x) + ab
s(m*n + n)*log(c))/n^2) - 24*I*m*n^3*x*x^m*abs(m*n + n)*e^(-I*a + 1/2*(n*ab
s(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 2*I*(m*n + n)^2*m*n^2*x*x^m
*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 24*I*
m*n^4*x*x^m*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n
^2) + 24*I*m*n^3*x*x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x)
```

```
+ abs(m*n + n)*log(c))/n^2) - 2*I*(m*n + n)^2*n^2*x*x^m*e^(3*I*a - 3/2*(n*a
bs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 8*I*n^4*x*x^m*e^(3*I*a - 3
/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 3*I*(m*n + n)^2*n*x
*x^m*abs(m*n + n)*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(
c))/n^2) + 12*I*n^3*x*x^m*abs(m*n + n)*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x
) + abs(m*n + n)*log(c))/n^2) + 54*I*(m*n + n)^2*n^2*x*x^m*e^(I*a - 1/2*(n*
abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 24*I*n^4*x*x^m*e^(I*a - 1
/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 27*I*(m*n + n)^2*n*
x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c
))/n^2) - 12*I*n^3*x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) +
 abs(m*n + n)*log(c))/n^2) - 54*I*(m*n + n)^2*n^2*x*x^m*e^(-I*a + 1/2*(n*ab
s(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*I*n^4*x*x^m*e^(-I*a + 1/
2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 27*I*(m*n + n)^2*n*x
*x^m*abs(m*n + n)*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c
))/n^2) - 12*I*n^3*x*x^m*abs(m*n + n)*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x)
+ abs(m*n + n)*log(c))/n^2) + 2*I*(m*n + n)^2*n^2*x*x^m*e^(-3*I*a + 3/2*(n*
abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 8*I*n^4*x*x^m*e^(-3*I*a +
 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 3*I*(m*n + n)^2*n
*x*x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*l
og(c))/n^2) + 12*I*n^3*x*x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n + n)*l
og(x) + abs(m*n + n)*log(c))/n^2))/(16*m^4*n^4 + 64*m^3*n^4 - 40*(m*n + n)^
2*m^2*n^2 + 96*m^2*n^4 - 80*(m*n + n)^2*m*n^2 + 64*m*n^4 + 9*(m*n + n)^4 -
40*(m*n + n)^2*n^2 + 16*n^4)
```

maple [F] time = 0.09, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sin^{3}\left(a + \frac{\ln\left(c\,x^{n}\right)\sqrt{-\frac{(1+m)^{2}}{n^{2}}}}{2}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x)
[Out] int(x^m*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x)
```

maxima [A] time = 0.45, size = 195, normalized size = 0.86

$$-\frac{\left(c^{\frac{3m}{n}+\frac{3}{n}} x e^{\left(m\log(x)+\frac{3m\log\left(x^{n}\right)}{n}+\frac{3\log\left(x^{n}\right)}{n}\right)}\sin(3a) - 5c^{\frac{2m}{n}+\frac{2}{n}} x e^{\left(m\log(x)+\frac{2m\log\left(x^{n}\right)}{n}+\frac{2\log\left(x^{n}\right)}{n}\right)}\sin(a) - 15c^{\frac{m}{n}+\frac{1}{n}} x e^{\left(m\log(x)+\right.}\right.}{20\left(c^{\frac{3m}{2n}+\frac{3}{2n}}m + c^{\frac{3m}{2n}+\frac{3}{2n}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x, algorithm="ma
xima")
```

```
[Out] -1/20*(c^(3*m/n + 3/n)*x*e^(m*log(x) + 3*m*log(x^n)/n + 3*log(x^n)/n)*sin(3
*a) - 5*c^(2*m/n + 2/n)*x*e^(m*log(x) + 2*m*log(x^n)/n + 2*log(x^n)/n)*sin(
a) - 15*c^(m/n + 1/n)*x*e^(m*log(x) + m*log(x^n)/n + log(x^n)/n)*sin(a) - 5
*x*x^m*sin(3*a))*e^(-3/2*m*log(x^n)/n - 3/2*log(x^n)/n)/(c^(3/2*m/n + 3/2/n
)*m + c^(3/2*m/n + 3/2/n))
```

mupad [B] time = 4.71, size = 297, normalized size = 1.31

$$-\frac{x\,x^m\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{(c\,x^n)^{\frac{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}{2}}}\left(2\,m+2+n\,\sqrt{-\frac{(m+1)^2}{n^2}}\,1\mathrm{i}\right)1\mathrm{i}}{4\,(m\,1\mathrm{i}+1\mathrm{i})^2}+\frac{x\,x^m\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^n)^{\frac{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}{2}}\left(2\,m+2-n\,\sqrt{-\frac{(m+}{n}}\right.}{4\,(m\,1\mathrm{i}+1\mathrm{i})^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a + (log(c*x^n)*(-(m + 1)^2/n^2)^(1/2))/2)^3,x)
```

```
[Out] (x*x^m*exp(a*1i)*(c*x^n)^(((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i)/2)*(2*
m - n*(-(m + 1)^2/n^2)^(1/2)*1i + 2)*1i)/(4*(m*1i + 1i)^2) - (x*x^m*exp(-a*
1i)/(c*x^n)^(((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i)/2)*(2*m + n*(-(m +
1)^2/n^2)^(1/2)*1i + 2)*1i)/(4*(m*1i + 1i)^2) - (x*x^m*exp(-a*3i)/(c*x^n)^(
((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*3i)/2)*(2*m + n*(-(m + 1)^2/n^2)^(1/
2)*3i + 2)*1i)/(20*(m*1i + 1i)^2) + (x*x^m*exp(a*3i)*(c*x^n)^(((- (2*m)/n^2
 - 1/n^2 - m^2/n^2)^(1/2)*3i)/2)*(2*m - n*(-(m + 1)^2/n^2)^(1/2)*3i + 2)*1i
)/(20*(m*1i + 1i)^2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sin^3\left(a + \frac{\sqrt{-\frac{m^2}{n^2} - \frac{2m}{n^2} - \frac{1}{n^2}}\,\log(cx^n)}{2}\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sin(a+1/2*ln(c*x**n)*(-(1+m)**2/n**2)**(1/2))**3,x)
```

```
[Out] Integral(x**m*sin(a + sqrt(-m**2/n**2 - 2*m/n**2 - 1/n**2)*log(c*x**n)/2)**
3, x)
```

3.41 $\int x^2 \sin^3\left(a+\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)dx$

Optimal. Leaf size=172

$$-\frac{3}{16}\sqrt{-\frac{1}{n^2}}\,nx^3e^{a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}-\frac{1}{48}\sqrt{-\frac{1}{n^2}}\,nx^3e^{-3a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{3/n}+\frac{3}{32}\sqrt{-\frac{1}{n^2}}\,nx^3e^{-a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{\frac{1}{n}}+\frac{1}{8}\sqrt{-\frac{1}{n^2}}\,nx$$

```
[Out] -3/16*exp(a*n*(-1/n^2)^(1/2))*n*x^3*(-1/n^2)^(1/2)/((c*x^n)^(1/n))+3/32*n*x
^3*(c*x^n)^(1/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))-1/48*n*x^3*(c*x^n)^
(3/n)*(-1/n^2)^(1/2)/exp(3*a*n*(-1/n^2)^(1/2))+1/8*exp(3*a*n*(-1/n^2)^(1/2)
)*n*x^3*ln(x)*(-1/n^2)^(1/2)/((c*x^n)^(3/n))
```

Rubi [A] time = 0.16, antiderivative size = 172, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {4493, 4489}

$$-\frac{3}{16}\sqrt{-\frac{1}{n^2}}\,nx^3e^{a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{-1/n}-\frac{1}{48}\sqrt{-\frac{1}{n^2}}\,nx^3e^{-3a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{3/n}+\frac{3}{32}\sqrt{-\frac{1}{n^2}}\,nx^3e^{-a\sqrt{-\frac{1}{n^2}}\,n}(cx^n)^{\frac{1}{n}}+\frac{1}{8}\sqrt{-\frac{1}{n^2}}\,nx$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^3,x]
```

```
[Out] (-3*E^(a*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n*x^3)/(16*(c*x^n)^n^(-1)) + (3*Sqr
t[-n^(-2)]*n*x^3*(c*x^n)^n^(-1))/(32*E^(a*Sqrt[-n^(-2)]*n)) - (Sqrt[-n^(-2)
]*n*x^3*(c*x^n)^(3/n))/(48*E^(3*a*Sqrt[-n^(-2)]*n)) + (E^(3*a*Sqrt[-n^(-2)]
*n)*Sqrt[-n^(-2)]*n*x^3*Log[x])/(8*(c*x^n)^(3/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \sin^3\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}}\sin^3\left(a+\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{n}$$

$$= \frac{1}{8}\left(\sqrt{-\frac{1}{n^2}}x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int\left(\frac{e^{3a\sqrt{-\frac{1}{n^2}}n}}{x} - 3e^{a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{2}{n}} + 3e^{-a\sqrt{-\cdots}}\right.\right.$$

$$= -\frac{3}{16}e^{a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx^3\left(cx^n\right)^{-1/n} + \frac{3}{32}e^{-a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx^3\left(cx^n\right)^{\frac{1}{n}} - \frac{1}{48}e^{-\cdots}$$

Mathematica [F] time = 0.31, size = 0, normalized size = 0.00

$$\int x^2 \sin^3\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^2*Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^3,x]
```

```
[Out] Integrate[x^2*Sin[a + Sqrt[-n^(-2)]*Log[c*x^n]]^3, x]
```

fricas [C] time = 0.50, size = 82, normalized size = 0.48

$$\frac{1}{96}\left(-2i\,x^6 + 9i\,x^4e^{\left(\frac{2(i\,an-\log(c))}{n}\right)} - 18i\,x^2e^{\left(\frac{4(i\,an-\log(c))}{n}\right)} + 12i\,e^{\left(\frac{6(i\,an-\log(c))}{n}\right)}\log(x)\right)e^{\left(-\frac{3(i\,an-\log(c))}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="fricas")
```

```
[Out] 1/96*(-2*I*x^6 + 9*I*x^4*e^(2*(I*a*n - log(c))/n) - 18*I*x^2*e^(4*(I*a*n -
log(c))/n) + 12*I*e^(6*(I*a*n - log(c))/n)*log(x))*e^(-3*(I*a*n - log(c))/n
)
```

giac [F(-2)] time = 0.00, size = 0, normalized size = 0.00

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError >> Unable to parse Giac output: ((-9*
i)*n^4*x^3*exp((-3*i)*a)*exp((3*n*abs(n)*ln(x)+3*abs(n)*ln(c))/n^2)+27*i*n^
4*x^3*exp((-i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)+9*i*n^4*x^3*exp(-(
3*n*abs(n)*ln(x)+3*abs(n)*ln(c))/n^2)*exp(3*i*a)+(-27*i)*n^4*x^3*exp(-(n*ab
s(n)*ln(x)+abs(n)*ln(c))/n^2)*exp(i*a)+9*i*n^3*x^3*abs(n)*exp((-3*i)*a)*exp
((3*n*abs(n)*ln(x)+3*abs(n)*ln(c))/n^2)+(-9*i)*n^3*x^3*abs(n)*exp((-i)*a)*e
xp((n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)+9*i*n^3*x^3*abs(n)*exp(-(3*n*abs(n)*l
n(x)+3*abs(n)*ln(c))/n^2)*exp(3*i*a)+(-9*i)*n^3*x^3*abs(n)*exp(-(n*abs(n)*l
n(x)+abs(n)*ln(c))/n^2)*exp(i*a)+i*n^2*x^3*n^2*exp((-3*i)*a)*exp((3*n*abs(n
)*ln(x)+3*abs(n)*ln(c))/n^2)+(-27*i)*n^2*x^3*n^2*exp((-i)*a)*exp((n*abs(n)*
ln(x)+abs(n)*ln(c))/n^2)+(-i)*n^2*x^3*n^2*exp(-(3*n*abs(n)*ln(x)+3*abs(n)*l
n(c))/n^2)*exp(3*i*a)+27*i*n^2*x^3*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))/n
^2)*exp(i*a)+(-i)*n*x^3*abs(n)*n^2*exp((-3*i)*a)*exp((3*n*abs(n)*ln(x)+3*ab
s(n)*ln(c))/n^2)+9*i*n*x^3*abs(n)*n^2*exp((-i)*a)*exp((n*abs(n)*ln(x)+abs(n
)*ln(c))/n^2)+(-i)*n*x^3*abs(n)*n^2*exp(-(3*n*abs(n)*ln(x)+3*abs(n)*ln(c))/
n^2)*exp(3*i*a)+9*i*n*x^3*abs(n)*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))/n^2
)*exp(i*a))/(216*n^4-240*n^2*n^2+24*n^4)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^2 \left(\sin^3\left(a+\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

```
[Out] int(x^2*sin(a+ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

maxima [A] time = 0.38, size = 90, normalized size = 0.52

$$\frac{18\,c^{\frac{2}{n}}x^3\sin(a)-12\,(x^n)^{\left(\frac{1}{n}\right)}\log(x)\sin\left(3\,a\right)-\left(2\,c^{\frac{6}{n}}x^6\sin\left(3\,a\right)-9\,c^{\frac{4}{n}}x^4\sin(a)\right)(x^n)^{\left(\frac{1}{n}\right)}}{96\,c^{\frac{3}{n}}(x^n)^{\left(\frac{1}{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sin(a+log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="maxima")
```

```
[Out] 1/96*(18*c^(2/n)*x^3*sin(a) - 12*(x^n)^(1/n)*log(x)*sin(3*a) - (2*c^(6/n)*x
^6*sin(3*a) - 9*c^(4/n)*x^4*sin(a))*(x^n)^(1/n))/(c^(3/n)*(x^n)^(1/n))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\sin\left(a+\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}\right)^3 dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sin(a+ln(c*x**n)*(-1/n**2)**(1/2))**3,x)
```

```
[Out] Timed out
```

3.42 $\int x \sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=178

$$-\frac{9}{32}\sqrt{-\frac{1}{n^2}}\,nx^2e^{a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{-\frac{2}{3}/n}+\frac{9}{64}\sqrt{-\frac{1}{n^2}}\,nx^2e^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{2}{3}/n}-\frac{1}{32}\sqrt{-\frac{1}{n^2}}\,nx^2e^{-3a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{2/n}+\frac{1}{8}\sqrt{-\frac{1}{n^2}}$$

```
[Out] -9/32*exp(a*n*(-1/n^2)^(1/2))*n*x^2*(-1/n^2)^(1/2)/((c*x^n)^(2/3/n))+9/64*n
*x^2*(c*x^n)^(2/3/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))-1/32*n*x^2*(c*x
^n)^(2/n)*(-1/n^2)^(1/2)/exp(3*a*n*(-1/n^2)^(1/2))+1/8*exp(3*a*n*(-1/n^2)^(
1/2))*n*x^2*ln(x)*(-1/n^2)^(1/2)/((c*x^n)^(2/n))
```

Rubi [A] time = 0.11, antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {4493, 4489}

$$-\frac{9}{32}\sqrt{-\frac{1}{n^2}}\,nx^2e^{a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{-\frac{2}{3}/n}+\frac{9}{64}\sqrt{-\frac{1}{n^2}}\,nx^2e^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{2}{3}/n}-\frac{1}{32}\sqrt{-\frac{1}{n^2}}\,nx^2e^{-3a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{2/n}+\frac{1}{8}\sqrt{-\frac{1}{n^2}}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + (2*Sqrt[-n^(-2)]*Log[c*x^n])/3]^3,x]
```

```
[Out] (-9*E^(a*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n*x^2)/(32*(c*x^n)^(2/(3*n))) + (9*
Sqrt[-n^(-2)]*n*x^2*(c*x^n)^(2/(3*n)))/(64*E^(a*Sqrt[-n^(-2)]*n)) - (Sqrt[-
n^(-2)]*n*x^2*(c*x^n)^(2/n))/(32*E^(3*a*Sqrt[-n^(-2)]*n)) + (E^(3*a*Sqrt[-n
^(-2)]*n)*Sqrt[-n^(-2)]*n*x^2*Log[x])/(8*(c*x^n)^(2/n))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\log(x)\right)dx,x,cx^n\right)}{n}$$

$$= \frac{1}{8}\left(\sqrt{-\frac{1}{n^2}}x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int\left(\frac{e^{3a\sqrt{-\frac{1}{n^2}}n}}{x} - 3e^{a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{4}{3n}} + 3e^{-a\sqrt{\cdot}}\right.\right.$$

$$= -\frac{9}{32}e^{a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx^2\left(cx^n\right)^{-\frac{2}{3}/n} + \frac{9}{64}e^{-a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}nx^2\left(cx^n\right)^{\frac{2}{3}/n} - $$

Mathematica [F] time = 0.35, size = 0, normalized size = 0.00

$$\int x\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x*Sin[a + (2*Sqrt[-n^(-2)]*Log[c*x^n])/3]^3,x]
[Out] Integrate[x*Sin[a + (2*Sqrt[-n^(-2)]*Log[c*x^n])/3]^3, x]
```

fricas [C] time = 0.55, size = 84, normalized size = 0.47

$$\frac{1}{64}\left(-2ix^4 + 9ix^{\frac{8}{3}}e^{\left(\frac{2(3ian-2\log(c))}{3n}\right)} - 18ix^{\frac{4}{3}}e^{\left(\frac{4(3ian-2\log(c))}{3n}\right)} + 24ie^{\left(\frac{2(3ian-2\log(c))}{n}\right)}\log\left(x^{\frac{1}{3}}\right)\right)e^{\left(-\frac{3ian-2\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="fricas")
[Out] 1/64*(-2*I*x^4 + 9*I*x^(8/3)*e^(2/3*(3*I*a*n - 2*log(c))/n) - 18*I*x^(4/3)*
e^(4/3*(3*I*a*n - 2*log(c))/n) + 24*I*e^(2*(3*I*a*n - 2*log(c))/n)*log(x^(1
/3)))*e^(-(3*I*a*n - 2*log(c))/n)
```

giac [F(-2)] time = 0.00, size = 0, normalized size = 0.00

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError >> Unable to parse Giac output: ((-9*
i)*n^4*x^2*exp((-3*i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)+27*i*n^
4*x^2*exp((-i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)+(-27*i)*n^
4*x^2*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)*exp(i*a)+9*i*n^4*x^2*
exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)*exp(3*i*a)+9*i*n^3*x^2*abs(n)*e
xp((-3*i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)+(-9*i)*n^3*x^2*abs(
n)*exp((-i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)+(-9*i)*n^3*x^
2*abs(n)*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)*exp(i*a)+9*i*n^3*x
^2*abs(n)*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)*exp(3*i*a)+i*n^2*x^2*
n^2*exp((-3*i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)+(-27*i)*n^2*x^
2*n^2*exp((-i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)+27*i*n^2*x
^2*n^2*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)*exp(i*a)+(-i)*n^2*x^
2*n^2*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)*exp(3*i*a)+(-i)*n*x^2*abs
(n)*n^2*exp((-3*i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)+9*i*n*x^2*
abs(n)*n^2*exp((-i)*a)*exp((2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)+9*i*n
*x^2*abs(n)*n^2*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))*1/3/n^2)*exp(i*a)+(-
i)*n*x^2*abs(n)*n^2*exp(-(2*n*abs(n)*ln(x)+2*abs(n)*ln(c))/n^2)*exp(3*i*a))
/(144*n^4-160*n^2*n^2+16*n^4)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x \left(\sin^3\left(a + \frac{2\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}}{3}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+2/3*ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

```
[Out] int(x*sin(a+2/3*ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

maxima [A] time = 0.37, size = 112, normalized size = 0.63

$$\frac{9\,c^{\frac{10}{3\,n}}x^2\left(x^n\right)^{\frac{4}{3\,n}}\sin(a) - 8\,c^{\frac{2}{3\,n}}\left(x^n\right)^{\frac{2}{3\,n}}\log(x)\sin\left(3\,a\right) + 18\,c^{\frac{2}{n}}x^2\sin(a) - 2\,c^{\frac{14}{3\,n}}e^{\left(\frac{2\,\log\left(x^n\right)}{3\,n}+4\,\log(x)\right)}\sin\left(3\,a\right)}{64\,c^{\frac{8}{3\,n}}\left(x^n\right)^{\frac{2}{3\,n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="maxima")
```

```
[Out] 1/64*(9*c^(10/3/n)*x^2*(x^n)^(4/3/n)*sin(a) - 8*c^(2/3/n)*(x^n)^(2/3/n)*log
(x)*sin(3*a) + 18*c^(2/n)*x^2*sin(a) - 2*c^(14/3/n)*e^(2/3*log(x^n)/n + 4*l
og(x))*sin(3*a))/(c^(8/3/n)*(x^n)^(2/3/n))
```

mupad [B] time = 3.32, size = 163, normalized size = 0.92

$$-x^2\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{(c\,x^n)^{\frac{\sqrt{-\frac{1}{n^2}}\,2\mathrm{i}}{3}}}\left(\frac{9\,n\,\sqrt{-\frac{1}{n^2}}}{128}-\frac{27}{128}\mathrm{i}\right)-x^2\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^n)^{\frac{\sqrt{-\frac{1}{n^2}}\,2\mathrm{i}}{3}}\left(\frac{9\,n\,\sqrt{-\frac{1}{n^2}}}{128}+\frac{27}{128}\mathrm{i}\right)+\frac{x^2\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,2\mathrm{i}}}}{16\,n\,\sqrt{-\frac{1}{n^2}}+16\mathrm{i}}+\frac{x^2\,\mathrm{e}^{a}}{16}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x^2*exp(-a*3i)/(c*x^n)^((-1/n^2)^(1/2)*2i))/(16*n*(-1/n^2)^(1/2) + 16i) -
x^2*exp(a*1i)*(c*x^n)^(((-1/n^2)^(1/2)*2i)/3)*((9*n*(-1/n^2)^(1/2))/128 + 2
7i/128) - x^2*exp(-a*1i)/(c*x^n)^(((-1/n^2)^(1/2)*2i)/3)*((9*n*(-1/n^2)^(1/
2))/128 - 27i/128) + (x^2*exp(a*3i)*(c*x^n)^((-1/n^2)^(1/2)*2i))/(16*n*(-1/
n^2)^(1/2) - 16i)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+2/3*ln(c*x**n)*(-1/n**2)**(1/2))**3,x)
```

```
[Out] Timed out
```

3.43 $\int \sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=168

$$-\frac{9}{16}\sqrt{-\frac{1}{n^2}}\,nxe^{a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{-\frac{1}{3}/n}+\frac{9}{32}\sqrt{-\frac{1}{n^2}}\,nxe^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{3}/n}-\frac{1}{16}\sqrt{-\frac{1}{n^2}}\,nxe^{-3a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{8}\sqrt{-\frac{1}{n^2}}\,nxe$$

```
[Out] -9/16*exp(a*n*(-1/n^2)^(1/2))*n*x*(-1/n^2)^(1/2)/((c*x^n)^(1/3/n))+9/32*n*x
*(c*x^n)^(1/3/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))-1/16*n*x*(c*x^n)^(1
/n)*(-1/n^2)^(1/2)/exp(3*a*n*(-1/n^2)^(1/2))+1/8*exp(3*a*n*(-1/n^2)^(1/2))*
n*x*ln(x)*(-1/n^2)^(1/2)/((c*x^n)^(1/n))
```

Rubi [A] time = 0.10, antiderivative size = 168, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {4483, 4489}

$$-\frac{9}{16}\sqrt{-\frac{1}{n^2}}\,nxe^{a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{-\frac{1}{3}/n}+\frac{9}{32}\sqrt{-\frac{1}{n^2}}\,nxe^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{3}/n}-\frac{1}{16}\sqrt{-\frac{1}{n^2}}\,nxe^{-3a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{8}\sqrt{-\frac{1}{n^2}}\,nxe$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3,x]
```

```
[Out] (-9*E^(a*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n*x)/(16*(c*x^n)^(1/(3*n))) + (9*Sq
rt[-n^(-2)]*n*x*(c*x^n)^(1/(3*n)))/(32*E^(a*Sqrt[-n^(-2)]*n)) - (Sqrt[-n^(-
2)]*n*x*(c*x^n)^n^(-1))/(16*E^(3*a*Sqrt[-n^(-2)]*n)) + (E^(3*a*Sqrt[-n^(-2)
]*n)*Sqrt[-n^(-2)]*n*x*Log[x])/(8*(c*x^n)^n^(-1))
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rubi steps

$$\int \sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)dx = \frac{\left(x(cx^n)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log(x)\right)dx,x,cx^n\right)}{n}$$

$$= \frac{1}{8}\left(\sqrt{-\frac{1}{n^2}}\,x(cx^n)^{-1/n}\right)\text{Subst}\left(\int\left(\frac{e^{3a\sqrt{-\frac{1}{n^2}}\,n}}{x} - 3e^{a\sqrt{-\frac{1}{n^2}}\,n}x^{-1+\frac{2}{3n}} + 3e^{-a\sqrt{-\frac{1}{n^2}}}\right.\right.$$

$$= -\frac{9}{16}e^{a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,nx(cx^n)^{-\frac{1}{3}/n} + \frac{9}{32}e^{-a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,nx(cx^n)^{\frac{1}{3}/n} - \frac{1}{16}e$$

Mathematica [F] time = 0.21, size = 0, normalized size = 0.00

$$\int \sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3,x]
```

```
[Out] Integrate[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3, x]
```

fricas [C] time = 0.46, size = 84, normalized size = 0.50

$$\frac{1}{32}\left(9i\,x^{\frac{4}{3}}e^{\left(\frac{2(3i\,an-\log(c))}{3n}\right)} - 2i\,x^2 + 12i\,e^{\left(\frac{2(3i\,an-\log(c))}{n}\right)}\log\left(x^{\frac{1}{3}}\right) - 18i\,x^{\frac{2}{3}}e^{\left(\frac{4(3i\,an-\log(c))}{3n}\right)}\right)e^{\left(-\frac{3i\,an-\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="fricas")
```

```
[Out] 1/32*(9*I*x^(4/3)*e^(2/3*(3*I*a*n - log(c))/n) - 2*I*x^2 + 12*I*e^(2*(3*I*a
*n - log(c))/n)*log(x^(1/3)) - 18*I*x^(2/3)*e^(4/3*(3*I*a*n - log(c))/n))*e
^(-(3*I*a*n - log(c))/n)
```

giac [F(-2)] time = 0.00, size = 0, normalized size = 0.00

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError >> Unable to parse Giac output: ((-9*
i)*n^4*x*exp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)+27*i*n^4*x*ex
p((-i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)+(-27*i)*n^4*x*exp(-(n*
abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)*exp(i*a)+9*i*n^4*x*exp(-(n*abs(n)*ln(x)
+abs(n)*ln(c))/n^2)*exp(3*i*a)+9*i*n^3*x*abs(n)*exp((-3*i)*a)*exp((n*abs(n)
*ln(x)+abs(n)*ln(c))/n^2)+(-9*i)*n^3*x*abs(n)*exp((-i)*a)*exp((n*abs(n)*ln(
x)+abs(n)*ln(c))*1/3/n^2)+(-9*i)*n^3*x*abs(n)*exp(-(n*abs(n)*ln(x)+abs(n)*l
n(c))*1/3/n^2)*exp(i*a)+9*i*n^3*x*abs(n)*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))
/n^2)*exp(3*i*a)+i*n^2*x*n^2*exp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c)
)/n^2)+(-27*i)*n^2*x*n^2*exp((-i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/
n^2)+27*i*n^2*x*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)*exp(i*a)+(-
i)*n^2*x*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)*exp(3*i*a)+(-i)*n*x*ab
s(n)*n^2*exp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)+9*i*n*x*abs(n
)*n^2*exp((-i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)+9*i*n*x*abs(n)
*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)*exp(i*a)+(-i)*n*x*abs(n)*n
^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)*exp(3*i*a))/(72*n^4-80*n^2*n^2+8
*n^4)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \sin^3\left(a + \frac{\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}}{3}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/3*ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

```
[Out] int(sin(a+1/3*ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

maxima [A] time = 0.36, size = 106, normalized size = 0.63

$$-\frac{4\,c^{\frac{1}{3\,n}}\left(x^n\right)^{\frac{1}{3\,n}}\log(x)\sin\left(3\,a\right) - 9\,c^{\frac{5}{3\,n}}x\left(x^n\right)^{\frac{2}{3\,n}}\sin(a) + 2\,c^{\frac{7}{3\,n}}e^{\left(\frac{\log\left(x^n\right)}{3\,n}+2\,\log(x)\right)}\sin\left(3\,a\right) - 18\,c^{\left(\frac{1}{n}\right)}x\sin(a)}{32\,c^{\frac{4}{3\,n}}\left(x^n\right)^{\frac{1}{3\,n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="maxima")
```

```
[Out] -1/32*(4*c^(1/3/n)*(x^n)^(1/3/n)*log(x)*sin(3*a) - 9*c^(5/3/n)*x*(x^n)^(2/3
/n)*sin(a) + 2*c^(7/3/n)*e^(1/3*log(x^n)/n + 2*log(x))*sin(3*a) - 18*c^(1/n
)*x*sin(a))/(c^(4/3/n)*(x^n)^(1/3/n))
```

mupad [B] time = 2.98, size = 155, normalized size = 0.92

$$-x\,e^{-a\,1i}\,\frac{1}{(c\,x^n)^{\frac{\sqrt{-\frac{1}{n^2}}\,1i}{3}}}\left(\frac{9\,n\,\sqrt{-\frac{1}{n^2}}}{64}-\frac{27}{64}i\right)-x\,e^{a\,1i}\,(c\,x^n)^{\frac{\sqrt{-\frac{1}{n^2}}\,1i}{3}}\left(\frac{9\,n\,\sqrt{-\frac{1}{n^2}}}{64}+\frac{27}{64}i\right)+\frac{x\,e^{-a\,3i}\,\frac{1}{(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,1i}}}{8\,n\,\sqrt{-\frac{1}{n^2}}+8i}+\frac{x\,e^{a\,3i}\,(c\,x}{8\,n\,\sqrt{-}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*exp(-a*3i)/(c*x^n)^((-1/n^2)^(1/2)*1i))/(8*n*(-1/n^2)^(1/2) + 8i) - x*ex
p(a*1i)*(c*x^n)^(((-1/n^2)^(1/2)*1i)/3)*((9*n*(-1/n^2)^(1/2))/64 + 27i/64)
- x*exp(-a*1i)/(c*x^n)^(((-1/n^2)^(1/2)*1i)/3)*((9*n*(-1/n^2)^(1/2))/64 - 2
7i/64) + (x*exp(a*3i)*(c*x^n)^((-1/n^2)^(1/2)*1i))/(8*n*(-1/n^2)^(1/2) - 8i
)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin^3\left(a+\frac{\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)}{3}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*ln(c*x**n)*(-1/n**2)**(1/2))**3,x)
```

```
[Out] Integral(sin(a + sqrt(-1/n**2)*log(c*x**n)/3)**3, x)
```

3.44 $\int \frac{\sin^3(a)}{x} \, dx$

Optimal. Leaf size=7

$$\sin^3(a)\log(x)$$

```
[Out] ln(x)*sin(a)^3
```

Rubi [A] time = 0.00, antiderivative size = 7, 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 = {12, 29}

$$\sin^3(a)\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a]^3/x,x]
```

```
[Out] Log[x]*Sin[a]^3
```

Rule 12

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

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^3(a)}{x} \, dx &= \sin^3(a) \int \frac{1}{x} \, dx\\ &= \log(x)\sin^3(a)\end{aligned}$$

Mathematica [A] time = 0.00, size = 7, normalized size = 1.00

$$\sin^3(a)\log(x)$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a]^3/x,x]
```

```
[Out] Log[x]*Sin[a]^3
```

fricas [A] time = 0.39, size = 12, normalized size = 1.71

$$-\left(\cos(a)^2 - 1\right)\log(x)\sin(a)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)^3/x,x, algorithm="fricas")
[Out] -(cos(a)^2 - 1)*log(x)*sin(a)
```

giac [A] time = 0.22, size = 8, normalized size = 1.14

$$\log\left(|x|\right)\sin(a)^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)^3/x,x, algorithm="giac")
[Out] log(abs(x))*sin(a)^3
```

maple [A] time = 0.00, size = 8, normalized size = 1.14

$$\ln(x)\left(\sin^3(a)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a)^3/x,x)
[Out] ln(x)*sin(a)^3
```

maxima [A] time = 0.30, size = 7, normalized size = 1.00

$$\log(x)\sin(a)^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [B] time = 2.12, size = 7, normalized size = 1.00

$$\sin(a)^3\,\ln(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a)^3/x,x)
```

```
[Out] sin(a)^3*log(x)
```

sympy [A] time = 0.05, size = 7, normalized size = 1.00

$$\log(x)\sin^3(a)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a)**3/x,x)
```

```
[Out] log(x)*sin(a)**3
```

3.45 $\int \frac{\sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)}{x^2}\,dx$

Optimal. Leaf size=176

$$-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{3a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-1/n}}{16x}+\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-\frac{1}{3}/n}}{32x}-\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{\frac{1}{3}/n}}{16x}-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-3a\sqrt{-\frac{1}{n^2}}\,n}\log(x}{8x}$$

```
[Out] -1/16*exp(3*a*n*(-1/n^2)^(1/2))*n*(-1/n^2)^(1/2)/x/((c*x^n)^(1/n))+9/32*exp
(a*n*(-1/n^2)^(1/2))*n*(-1/n^2)^(1/2)/x/((c*x^n)^(1/3/n))-9/16*n*(c*x^n)^(1
/3/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))/x-1/8*n*(c*x^n)^(1/n)*ln(x)*(-
1/n^2)^(1/2)/exp(3*a*n*(-1/n^2)^(1/2))/x
```

Rubi [A] time = 0.13, antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4493, 4489}

$$-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{3a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-1/n}}{16x}+\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-\frac{1}{3}/n}}{32x}-\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{\frac{1}{3}/n}}{16x}-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-3a\sqrt{-\frac{1}{n^2}}\,n}\log(x}{8x}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3/x^2,x]
```

```
[Out] -(E^(3*a*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n)/(16*x*(c*x^n)^n^(-1)) + (9*E^(a*
Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n)/(32*x*(c*x^n)^(1/(3*n))) - (9*Sqrt[-n^(-2
)]*n*(c*x^n)^(1/(3*n)))/(16*E^(a*Sqrt[-n^(-2)]*n)*x) - (Sqrt[-n^(-2)]*n*(c*
x^n)^n^(-1)*Log[x])/(8*E^(3*a*Sqrt[-n^(-2)]*n)*x)
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\operatorname{Subst}\left(\int x^{-1-\frac{1}{n}}\sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{nx}$$

$$= -\frac{\left(\sqrt{-\frac{1}{n^2}}\left(cx^n\right)^{\frac{1}{n}}\right)\operatorname{Subst}\left(\int\left(\frac{e^{-3a\sqrt{-\frac{1}{n^2}}n}}{x}+3e^{a\sqrt{-\frac{1}{n^2}}n}x^{-1-\frac{4}{3n}}-3e^{-a\sqrt{-\frac{1}{n^2}}n}x^{-1-}\right.\right.}{8x}$$

$$= -\frac{e^{3a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}\,n\left(cx^n\right)^{-1/n}}{16x}+\frac{9e^{a\sqrt{-\frac{1}{n^2}}n}\sqrt{-\frac{1}{n^2}}\,n\left(cx^n\right)^{-\frac{1}{3}/n}}{32x}-\frac{9e^{-a\sqrt{-\frac{1}{n^2}}n}}{}$$

Mathematica [F] time = 0.24, size = 0, normalized size = 0.00

$$\int \frac{\sin^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3/x^2,x]
[Out] Integrate[Sin[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3/x^2, x]
```

fricas [C] time = 0.45, size = 87, normalized size = 0.49

$$\frac{\left(-12i\,x^2\log\left(x^{\frac{1}{3}}\right)-18i\,x^{\frac{4}{3}}e^{\left(\frac{2\left(3i\,an-\log(c)\right)}{3n}\right)}+9i\,x^{\frac{2}{3}}e^{\left(\frac{4\left(3i\,an-\log(c)\right)}{3n}\right)}-2i\,e^{\left(\frac{2\left(3i\,an-\log(c)\right)}{n}\right)}\right)e^{\left(-\frac{3i\,an-\log(c)}{n}\right)}}{32\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3/x^2,x, algorithm="fricas")
[Out] 1/32*(-12*I*x^2*log(x^(1/3)) - 18*I*x^(4/3)*e^(2/3*(3*I*a*n - log(c))/n) +
9*I*x^(2/3)*e^(4/3*(3*I*a*n - log(c))/n) - 2*I*e^(2*(3*I*a*n - log(c))/n))*
e^(-(3*I*a*n - log(c))/n)/x^2
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)+a\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3/x^2,x, algorithm="giac")
```

```
[Out] integrate(sin(1/3*sqrt(-1/n^2)*log(c*x^n) + a)^3/x^2, x)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \frac{\sin^3\left(a+\frac{\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}}{3}\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/3*ln(c*x^n)*(-1/n^2)^(1/2))^3/x^2,x)
```

```
[Out] int(sin(a+1/3*ln(c*x^n)*(-1/n^2)^(1/2))^3/x^2,x)
```

maxima [A] time = 0.37, size = 122, normalized size = 0.69

$$-\frac{\left(4\,c^{\frac{7}{3\,n}}xe^{\left(\frac{\log\left(x^n\right)}{3\,n}+2\,\log\left(x\right)\right)}\log\left(x\right)\sin\left(3\,a\right)-2\,c^{\frac{1}{3\,n}}x\left(x^n\right)^{\frac{1}{3\,n}}\sin\left(3\,a\right)+9\,c^{\left(\frac{1}{n}\right)}x^2\sin(a)+18\,c^{\frac{5}{3\,n}}e^{\left(\frac{2\,\log\left(x^n\right)}{3\,n}+2\,\log\left(x\right)\right)}\sin(a$$
$$32\,c^{\frac{4}{3\,n}}x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3/x^2,x, algorithm="maxima")
```

```
[Out] -1/32*(4*c^(7/3/n)*x*e^(1/3*log(x^n)/n + 2*log(x))*log(x)*sin(3*a) - 2*c^(1
/3/n)*x*(x^n)^(1/3/n)*sin(3*a) + 9*c^(1/n)*x^2*sin(a) + 18*c^(5/3/n)*e^(2/3
*log(x^n)/n + 2*log(x))*sin(a))*e^(-1/3*log(x^n)/n - 2*log(x))/(c^(4/3/n)*x
)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+\frac{\ln\left(c\,x^n\right)\sqrt{-\frac{1}{n^2}}}{3}\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [C] time = 90.21, size = 316, normalized size = 1.80

$$-\frac{in\sqrt{\frac{1}{n^2}}\log(x)\cos\left(3a+in\sqrt{\frac{1}{n^2}}\log(x)+i\sqrt{\frac{1}{n^2}}\log(c)\right)}{8x}-\frac{9in\sqrt{\frac{1}{n^2}}\cos\left(a+\frac{in\sqrt{\frac{1}{n^2}}\log(x)}{3}+\frac{i\sqrt{\frac{1}{n^2}}\log(c)}{3}\right)}{32x}-\frac{i\sqrt{\frac{1}{n^2}}\,\mathrm{l}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/3*ln(c*x**n)*(-1/n**2)**(1/2))**3/x**2,x)
```

```
[Out] -I*n*sqrt(n**(-2))*log(x)*cos(3*a + I*n*sqrt(n**(-2))*log(x) + I*sqrt(n**(-
2))*log(c))/(8*x) - 9*I*n*sqrt(n**(-2))*cos(a + I*n*sqrt(n**(-2))*log(x)/3
+ I*sqrt(n**(-2))*log(c)/3)/(32*x) - I*sqrt(n**(-2))*log(c)*cos(3*a + I*n*s
qrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(8*x) - log(x)*sin(3*a + I*n*
sqrt(n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(8*x) - 27*sin(a + I*n*sqrt(
n**(-2))*log(x)/3 + I*sqrt(n**(-2))*log(c)/3)/(32*x) + sin(3*a + I*n*sqrt(n
**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(8*x) - log(c)*sin(3*a + I*n*sqrt(
n**(-2))*log(x) + I*sqrt(n**(-2))*log(c))/(8*n*x)
```

3.46 $\int \frac{\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\log(cx^n)\right)}{x^3}\,dx$

Optimal. Leaf size=178

$$-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{3a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-2/n}}{32x^2}+\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-\frac{2}{3}/n}}{64x^2}-\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{\frac{2}{3}/n}}{32x^2}-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-3a\sqrt{-\frac{1}{n^2}}\,n}\,\log(x}{8x^2}$$

```
[Out] -1/32*exp(3*a*n*(-1/n^2)^(1/2))*n*(-1/n^2)^(1/2)/x^2/((c*x^n)^(2/n))+9/64*e
xp(a*n*(-1/n^2)^(1/2))*n*(-1/n^2)^(1/2)/x^2/((c*x^n)^(2/3/n))-9/32*n*(c*x^n
)^(2/3/n)*(-1/n^2)^(1/2)/exp(a*n*(-1/n^2)^(1/2))/x^2-1/8*n*(c*x^n)^(2/n)*ln
(x)*(-1/n^2)^(1/2)/exp(3*a*n*(-1/n^2)^(1/2))/x^2
```

Rubi [A] time = 0.11, antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4493, 4489}

$$-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{3a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-2/n}}{32x^2}+\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{-\frac{2}{3}/n}}{64x^2}-\frac{9\sqrt{-\frac{1}{n^2}}\,ne^{-a\sqrt{-\frac{1}{n^2}}\,n}\,(cx^n)^{\frac{2}{3}/n}}{32x^2}-\frac{\sqrt{-\frac{1}{n^2}}\,ne^{-3a\sqrt{-\frac{1}{n^2}}\,n}\,\log(x}{8x^2}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (2*Sqrt[-n^(-2)]*Log[c*x^n])/3]^3/x^3,x]
```

```
[Out] -(E^(3*a*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n)/(32*x^2*(c*x^n)^(2/n)) + (9*E^(a
*Sqrt[-n^(-2)]*n)*Sqrt[-n^(-2)]*n)/(64*x^2*(c*x^n)^(2/(3*n))) - (9*Sqrt[-n^
(-2)]*n*(c*x^n)^(2/(3*n)))/(32*E^(a*Sqrt[-n^(-2)]*n)*x^2) - (Sqrt[-n^(-2)]*
n*(c*x^n)^(2/n)*Log[x])/(8*E^(3*a*Sqrt[-n^(-2)]*n)*x^2)
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n}\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\,\log(x)\right)dx,x,cx^n\right)}{nx^2}$$

$$= -\frac{\left(\sqrt{-\frac{1}{n^2}}\,\left(cx^n\right)^{2/n}\right)\text{Subst}\left(\int\left(\frac{e^{-3a\sqrt{-\frac{1}{n^2}}\,n}}{x}+3e^{a\sqrt{-\frac{1}{n^2}}\,n}x^{-1-\frac{8}{3n}}-3e^{-a\sqrt{-\frac{1}{n^2}}\,n}x^{-\cdots}\right.\right.}{8x^2}$$

$$= -\frac{e^{3a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,n\left(cx^n\right)^{-2/n}}{32x^2}+\frac{9e^{a\sqrt{-\frac{1}{n^2}}\,n}\sqrt{-\frac{1}{n^2}}\,n\left(cx^n\right)^{-\frac{2}{3}/n}}{64x^2}-\frac{9e^{-a\sqrt{-\frac{1}{n^2}}\,n}\cdots}{3\cdots}$$

Mathematica [F] time = 0.26, size = 0, normalized size = 0.00

$$\int \frac{\sin^3\left(a+\frac{2}{3}\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)\right)}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sin[a + (2*Sqrt[-n^(-2)]*Log[c*x^n])/3]^3/x^3,x]
```

```
[Out] Integrate[Sin[a + (2*Sqrt[-n^(-2)]*Log[c*x^n])/3]^3/x^3, x]
```

fricas [C] time = 0.45, size = 87, normalized size = 0.49

$$\frac{\left(-24i\,x^4\log\left(x^{\frac{1}{3}}\right)-18i\,x^{\frac{8}{3}}e^{\left(\frac{2\left(3i\,an-2\log(c)\right)}{3n}\right)}+9i\,x^{\frac{4}{3}}e^{\left(\frac{4\left(3i\,an-2\log(c)\right)}{3n}\right)}-2i\,e^{\left(\frac{2\left(3i\,an-2\log(c)\right)}{n}\right)}\right)e^{\left(-\frac{3i\,an-2\log(c)}{n}\right)}}{64\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2/3*log(c*x^n)*(-1/n^2)^(1/2))^3/x^3,x, algorithm="fricas")
```

```
[Out] 1/64*(-24*I*x^4*log(x^(1/3)) - 18*I*x^(8/3)*e^(2/3*(3*I*a*n - 2*log(c))/n)
+ 9*I*x^(4/3)*e^(4/3*(3*I*a*n - 2*log(c))/n) - 2*I*e^(2*(3*I*a*n - 2*log(c)
)/n))*e^(-(3*I*a*n - 2*log(c))/n)/x^4
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(\frac{2}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)+a\right)^3}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2/3*log(c*x^n)*(-1/n^2)^(1/2))^3/x^3,x, algorithm="giac")
```

```
[Out] integrate(sin(2/3*sqrt(-1/n^2)*log(c*x^n) + a)^3/x^3, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\sin^{3}\left(a+\frac{2\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}}{3}\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+2/3*ln(c*x^n)*(-1/n^2)^(1/2))^3/x^3,x)
```

```
[Out] int(sin(a+2/3*ln(c*x^n)*(-1/n^2)^(1/2))^3/x^3,x)
```

maxima [A] time = 0.38, size = 128, normalized size = 0.72

$$-\frac{\left(8\,c^{\frac{14}{3\,n}}x^{2}e^{\left(\frac{2\,\log\left(x^{n}\right)}{3\,n}+4\,\log(x)\right)}\log(x)\sin\left(3\,a\right)+9\,c^{\frac{2}{n}}x^{4}\sin(a)-2\,c^{\frac{2}{3\,n}}x^{2}\left(x^{n}\right)^{\frac{2}{3\,n}}\sin\left(3\,a\right)+18\,c^{\frac{10}{3\,n}}e^{\left(\frac{4\,\log\left(x^{n}\right)}{3\,n}+4\,\log(x)\right)}\sin(}{64\,c^{\frac{8}{3\,n}}x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2/3*log(c*x^n)*(-1/n^2)^(1/2))^3/x^3,x, algorithm="maxima")
```

```
[Out] -1/64*(8*c^(14/3/n)*x^2*e^(2/3*log(x^n)/n + 4*log(x))*log(x)*sin(3*a) + 9*c
^(2/n)*x^4*sin(a) - 2*c^(2/3/n)*x^2*(x^n)^(2/3/n)*sin(3*a) + 18*c^(10/3/n)*
e^(4/3*log(x^n)/n + 4*log(x))*sin(a))*e^(-2/3*log(x^n)/n - 4*log(x))/(c^(8/
3/n)*x^2)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\sin\left(a+\frac{2\,\ln\left(c\,x^n\right)\,\sqrt{-\frac{1}{n^2}}}{3}\right)}^3}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [C] time = 113.38, size = 352, normalized size = 1.98

$$-\frac{in\sqrt{\frac{1}{n^2}}\log(x)\cos\left(3a+2in\sqrt{\frac{1}{n^2}}\log(x)+2i\sqrt{\frac{1}{n^2}}\log(c)\right)}{8x^2}-\frac{9in\sqrt{\frac{1}{n^2}}\cos\left(a+\frac{2in\sqrt{\frac{1}{n^2}}\log(x)}{3}+\frac{2i\sqrt{\frac{1}{n^2}}\log(c)}{3}\right)}{64x^2}-\frac{i\sqrt{\cdots}}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+2/3*ln(c*x**n)*(-1/n**2)**(1/2))**3/x**3,x)
```

```
[Out] -I*n*sqrt(n**(-2))*log(x)*cos(3*a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n
**(-2))*log(c))/(8*x**2) - 9*I*n*sqrt(n**(-2))*cos(a + 2*I*n*sqrt(n**(-2))*
log(x)/3 + 2*I*sqrt(n**(-2))*log(c)/3)/(64*x**2) - I*sqrt(n**(-2))*log(c)*c
os(3*a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(-2))*log(c))/(8*x**2) -
log(x)*sin(3*a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(-2))*log(c))/(8*
x**2) - 27*sin(a + 2*I*n*sqrt(n**(-2))*log(x)/3 + 2*I*sqrt(n**(-2))*log(c)/
3)/(64*x**2) + sin(3*a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**(-2))*log
(c))/(16*x**2) - log(c)*sin(3*a + 2*I*n*sqrt(n**(-2))*log(x) + 2*I*sqrt(n**
(-2))*log(c))/(8*n*x**2)
```

3.47 $\int x^m \sin\left(a+\frac{1}{2}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx$

Optimal. Leaf size=112

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

```
[Out] -1/4*exp(a*(1+m)/(-(1+m)^2)^(1/2))*x^(1+m)*(c*x^2)^(1/2+1/2*m)/(-(1+m)^2)^(
1/2)+1/2*exp(a*(-(1+m)^2)^(1/2)/(1+m))*(1+m)*x^(1+m)*(c*x^2)^(-1/2-1/2*m)*l
n(x)/(-(1+m)^2)^(1/2)
```

Rubi [A] time = 0.19, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4493, 4489}

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

Antiderivative was successfully verified.

```
[In] Int[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/2],x]
```

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

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sin\left(a+\frac{1}{2}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx = \frac{1}{2}\left(x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{2}}\sin\left(a+\frac{1}{2}\sqrt{-(1+m)^2}\,\text{l}\right.\right.$$

$$= \frac{\left((1+m)x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\right)\text{Subst}\left(\int\left(\frac{e^{\frac{a\sqrt{-(1+m)^2}}{1+m}}}{x} - e^{\frac{a(1+m)}{\sqrt{-(1+m)^2}}}x^m\right)\right.}{4\sqrt{-(1+m)^2}}$$

$$= -\frac{e^{\frac{a(1+m)}{\sqrt{-(1+m)^2}}}x^{1+m}\left(cx^2\right)^{\frac{1+m}{2}}}{4\sqrt{-(1+m)^2}} + \frac{e^{\frac{a\sqrt{-(1+m)^2}}{1+m}}(1+m)x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\text{lo}}{2\sqrt{-(1+m)^2}}$$

Mathematica [F] time = 0.28, size = 0, normalized size = 0.00

$$\int x^m \sin\left(a+\frac{1}{2}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/2],x]
[Out] Integrate[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/2], x]
```

fricas [C] time = 0.44, size = 50, normalized size = 0.45

$$\frac{\left(i\,x^2x^{2\,m} + (-2i\,m-2i)e^{\left(-(m+1)\log(c)+2i\,a\right)}\log(x)\right)e^{\left(\frac{1}{2}(m+1)\log(c)-i\,a\right)}}{4\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^2)*(-(1+m)^2)^(1/2)),x, algorithm="fricas")
[Out] 1/4*(I*x^2*x^(2*m) + (-2*I*m - 2*I)*e^(-(m + 1)*log(c) + 2*I*a)*log(x))*e^(
1/2*(m + 1)*log(c) - I*a)/(m + 1)
```

giac [C] time = 0.79, size = 189, normalized size = 1.69

$$-\frac{i\,mxx^me^{\left(\frac{1}{2}|m+1|\log(c)+|m+1|\log(x)-i\,a\right)} - i\,xx^m|m+1|e^{\left(\frac{1}{2}|m+1|\log(c)+|m+1|\log(x)-i\,a\right)} - i\,mxx^me^{\left(-\frac{1}{2}|m+1|\log(c)-|m+1|\log(x)+\right.}}{2\left((m+1)^2\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^2)*(-(1+m)^2)^(1/2)),x, algorithm="giac")
```

```
[Out] -1/2*(I*m*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - I*a) - I*x*x
^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - I*a) - I*m*x*x
^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + I*a) - I*x*x^m*abs(m + 1
)*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + I*a) + I*x*x^m*e^(1/2*abs
(m + 1)*log(c) + abs(m + 1)*log(x) - I*a) - I*x*x^m*e^(-1/2*abs(m + 1)*log(
c) - abs(m + 1)*log(x) + I*a))/((m + 1)^2 - m^2 - 2*m - 1)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int x^{m} \sin\left(a+\frac{\ln\left(c\,x^{2}\right)\sqrt{-\left(1+m\right)^{2}}}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a+1/2*ln(c*x^2)*(-(1+m)^2)^(1/2)),x)
```

```
[Out] int(x^m*sin(a+1/2*ln(c*x^2)*(-(1+m)^2)^(1/2)),x)
```

maxima [A] time = 0.35, size = 48, normalized size = 0.43

$$\frac{c^{m+1}x^{2}x^{2\,m}\sin(a)+2\,(m\sin(a)+\sin(a))\log(x)}{4\left(c^{\frac{1}{2}\,m}m+c^{\frac{1}{2}\,m}\right)\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/2*log(c*x^2)*(-(1+m)^2)^(1/2)),x, algorithm="maxima")
```

```
[Out] 1/4*(c^(m + 1)*x^2*x^(2*m)*sin(a) + 2*(m*sin(a) + sin(a))*log(x))/((c^(1/2*
m)*m + c^(1/2*m))*sqrt(c))
```

mupad [B] time = 3.13, size = 139, normalized size = 1.24

$$\frac{\frac{1}{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}\,x\,x^{m}\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{\left(x^2\right)^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}\,1\mathrm{i}}{2\,m+2-\sqrt{-{\left(m+1\right)}^2}\,2\mathrm{i}}-\frac{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}\,x\,x^{m}\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(x^2\right)^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}\,1\mathrm{i}}{2\,m+2+\sqrt{-{\left(m+1\right)}^2}\,2\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a + (log(c*x^2)*(-(m + 1)^2)^(1/2))/2),x)
```

```
[Out] (1/c^(((- 2*m - m^2 - 1)^(1/2)*1i)/2)*x*x^m*exp(-a*1i)/(x^2)^(((- 2*m - m^2
 - 1)^(1/2)*1i)/2)*1i)/(2*m - (-(m + 1)^2)^(1/2)*2i + 2) - (c^(((- 2*m - m^
```

```
2 - 1)^(1/2)*1i)/2)*x*x^m*exp(a*1i)*(x^2)^(((- 2*m - m^2 - 1)^(1/2)*1i)/2)*
1i)/(2*m + (-(m + 1)^2)^(1/2)*2i + 2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sin\left(a + \frac{\sqrt{-m^2 - 2m - 1}\,\log\left(cx^2\right)}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sin(a+1/2*ln(c*x**2)*(-(1+m)**2)**(1/2)),x)
```

```
[Out] Integral(x**m*sin(a + sqrt(-m**2 - 2*m - 1)*log(c*x**2)/2), x)
```

3.48 $\int \sin\left(a + \frac{1}{2}i\log\left(cx^2\right)\right)\,dx$

Optimal. Leaf size=52

$$\frac{ie^{-ia}cx^3}{4\sqrt{cx^2}} - \frac{ie^{ia}x\log(x)}{2\sqrt{cx^2}}$$

```
[Out] 1/4*I*c*x^3/exp(I*a)/(c*x^2)^(1/2)-1/2*I*exp(I*a)*x*ln(x)/(c*x^2)^(1/2)
```

Rubi [A] time = 0.04, antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {4483, 4489}

$$\frac{ie^{-ia}cx^3}{4\sqrt{cx^2}} - \frac{ie^{ia}x\log(x)}{2\sqrt{cx^2}}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (I/2)*Log[c*x^2]],x]
```

```
[Out] ((I/4)*c*x^3)/(E^(I*a)*Sqrt[c*x^2]) - ((I/2)*E^(I*a)*x*Log[x])/Sqrt[c*x^2]
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rubi steps

$$\int \sin\left(a+\frac{1}{2}i\log\left(cx^2\right)\right)\,dx = \frac{x\,\text{Subst}\left(\int \frac{\sin\left(a+\frac{1}{2}i\log(x)\right)}{\sqrt{x}}\,dx,x,cx^2\right)}{2\sqrt{cx^2}}$$
$$= -\frac{(ix)\,\text{Subst}\left(\int\left(-e^{-ia}+\frac{e^{ia}}{x}\right)dx,x,cx^2\right)}{4\sqrt{cx^2}}$$
$$= \frac{ice^{-ia}x^3}{4\sqrt{cx^2}} - \frac{ie^{ia}x\log(x)}{2\sqrt{cx^2}}$$

Mathematica [A] time = 0.06, size = 44, normalized size = 0.85

$$\frac{x\left(\sin(a)\left(cx^2+2\log(x)\right)+i\cos(a)\left(cx^2-2\log(x)\right)\right)}{4\sqrt{cx^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + (I/2)*Log[c*x^2]],x]
[Out] (x*(I*Cos[a]*(c*x^2 - 2*Log[x]) + (c*x^2 + 2*Log[x])*Sin[a]))/(4*Sqrt[c*x^2
])
```

fricas [A] time = 0.44, size = 24, normalized size = 0.46

$$\frac{\left(i\,cx^2-2i\,e^{(2i\,a)}\log(x)\right)e^{(-i\,a)}}{4\,\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*I*log(c*x^2)),x, algorithm="fricas")
[Out] 1/4*(I*c*x^2 - 2*I*e^(2*I*a)*log(x))*e^(-I*a)/sqrt(c)
```

giac [A] time = 0.31, size = 29, normalized size = 0.56

$$-\frac{-i\,c^{\frac{3}{2}}x^2e^{(-i\,a)}+2i\,\sqrt{c}\,e^{(i\,a)}\log(x)}{4\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*I*log(c*x^2)),x, algorithm="giac")
```

```
[Out] -1/4*(-I*c^(3/2)*x^2*e^(-I*a) + 2*I*sqrt(c)*e^(I*a)*log(x))/c
```

maple [B] time = 0.04, size = 106, normalized size = 2.04

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/2*I*ln(c*x^2)),x)
```

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

maxima [A] time = 0.36, size = 31, normalized size = 0.60

$$\frac{cx^{2}(i\cos(a)+\sin(a))-2\,(i\cos(a)-\sin(a))\log(x)}{4\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*I*log(c*x^2)),x, algorithm="maxima")
```

```
[Out] 1/4*(c*x^2*(I*cos(a) + sin(a)) - 2*(I*cos(a) - sin(a))*log(x))/sqrt(c)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \sin\left(a+\frac{\ln\left(c\,x^{2}\right)\,1\mathrm{i}}{2}\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + (log(c*x^2)*1i)/2),x)
```

```
[Out] int(sin(a + (log(c*x^2)*1i)/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(a+\frac{i\log\left(cx^{2}\right)}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/2*I*ln(c*x**2)),x)
```

```
[Out] Integral(sin(a + I*log(c*x**2)/2), x)
```

3.49 $\int x^m \sin^2\left(a+\frac{1}{4}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx$

Optimal. Leaf size=106

$$-\frac{e^{\frac{2a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\left(cx^2\right)^{\frac{m+1}{2}}}{8(m+1)}-\frac{1}{4}e^{-\frac{2a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\log(x)\left(cx^2\right)^{\frac{1}{2}(-m-1)}+\frac{x^{m+1}}{2(m+1)}$$

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

Rubi [A] time = 0.14, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4493, 4489}

$$-\frac{e^{\frac{2a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\left(cx^2\right)^{\frac{m+1}{2}}}{8(m+1)}-\frac{1}{4}e^{-\frac{2a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\log(x)\left(cx^2\right)^{\frac{1}{2}(-m-1)}+\frac{x^{m+1}}{2(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/4]^2,x]
```

```
[Out] x^(1 + m)/(2*(1 + m)) - (E^((2*a*(1 + m))/Sqrt[-(1 + m)^2])*x^(1 + m)*(c*x^
2)^((1 + m)/2))/(8*(1 + m)) - (x^(1 + m)*(c*x^2)^((-1 - m)/2)*Log[x])/(4*E^
((2*a*(1 + m))/Sqrt[-(1 + m)^2]))
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sin^2\left(a+\frac{1}{4}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx = \frac{1}{2}\left(x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{2}}\sin^2\left(a+\frac{1}{4}\sqrt{-(1+m)^2}\right.\right.$$

$$= -\left(\frac{1}{8}\left(x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\right)\text{Subst}\left(\int\left(\frac{e^{-\frac{2a(1+m)}{\sqrt{-(1+m)^2}}}}{x} - 2x^{\frac{1}{2}(-1+m)} + e^{\sqrt{}}\right.\right.\right.$$

$$= \frac{x^{1+m}}{2(1+m)} - \frac{e^{\frac{2a(1+m)}{\sqrt{-(1+m)^2}}}x^{1+m}\left(cx^2\right)^{\frac{1+m}{2}}}{8(1+m)} - \frac{1}{4}e^{-\frac{2a(1+m)}{\sqrt{-(1+m)^2}}}x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-}$$

Mathematica [F] time = 0.35, size = 0, normalized size = 0.00

$$\int x^m \sin^2\left(a+\frac{1}{4}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/4]^2,x]
```

```
[Out] Integrate[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/4]^2, x]
```

fricas [C] time = 0.44, size = 75, normalized size = 0.71

$$-\frac{\left(2\,(m+1)e^{\left(-(m+1)\log(c)-2\,(m+1)\log(x)+4i\,a\right)}\log(x) - 4\,e^{\left(-\frac{1}{2}\,(m+1)\log(c)-(m+1)\log(x)+2i\,a\right)} + 1\right)e^{\left(\frac{1}{2}\,(m+1)\log(c)+2\,(m+1)\log(x)-\right.}}{8\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/4*log(c*x^2)*(-(1+m)^2)^(1/2))^2,x, algorithm="fricas
")
```

```
[Out] -1/8*(2*(m + 1)*e^(-(m + 1)*log(c) - 2*(m + 1)*log(x) + 4*I*a)*log(x) - 4*e
^(-1/2*(m + 1)*log(c) - (m + 1)*log(x) + 2*I*a) + 1)*e^(1/2*(m + 1)*log(c)
+ 2*(m + 1)*log(x) - 2*I*a)/(m + 1)
```

giac [C] time = 2.00, size = 350, normalized size = 3.30

$$\frac{m^2xx^me^{\left(\frac{1}{2}\,|m+1|\log(c)+|m+1|\log(x)-2i\,a\right)} - mxx^m|m+1|e^{\left(\frac{1}{2}\,|m+1|\log(c)+|m+1|\log(x)-2i\,a\right)} + m^2xx^me^{\left(-\frac{1}{2}\,|m+1|\log(c)-|m+1|\log(x)+2\right.}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/4*log(c*x^2)*(-(1+m)^2)^(1/2))^2,x, algorithm="giac")
```

```
[Out] 1/4*(m^2*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - 2*I*a) - m*x*
x^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - 2*I*a) + m^2*
x*x^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 2*I*a) + m*x*x^m*abs(
m + 1)*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 2*I*a) + 2*(m + 1)^2
*x*x^m - 2*m^2*x*x^m + 2*m*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(
x) - 2*I*a) - x*x^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x)
 - 2*I*a) + 2*m*x*x^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 2*I*a
) + x*x^m*abs(m + 1)*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 2*I*a)
 - 4*m*x*x^m + x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - 2*I*a)
+ x*x^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 2*I*a) - 2*x*x^m)/(
(m + 1)^2*m - m^3 + (m + 1)^2 - 3*m^2 - 3*m - 1)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sin^{2}\left(a + \frac{\ln\left(c\,x^{2}\right)\sqrt{-\left(1+m\right)^{2}}}{4}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a+1/4*ln(c*x^2)*(-(1+m)^2)^(1/2))^2,x)
```

```
[Out] int(x^m*sin(a+1/4*ln(c*x^2)*(-(1+m)^2)^(1/2))^2,x)
```

maxima [A] time = 0.37, size = 134, normalized size = 1.26

$$-\frac{c^{m+1}x^{2}x^{2\,m}\cos\left(2\,a\right) - 4\left(\cos\left(2\,a\right)^{2} + \sin\left(2\,a\right)^{2}\right)c^{\frac{1}{2}\,m+\frac{1}{2}}x x^{m} + 2\left(\cos\left(2\,a\right)^{3} + \cos\left(2\,a\right)\sin\left(2\,a\right)^{2} + \left(\cos\left(2\,a\right)^{3} + \right.\right.}{8\left(\left(\cos\left(2\,a\right)^{2} + \sin\left(2\,a\right)^{2}\right)c^{\frac{1}{2}\,m}m + \left(\cos\left(2\,a\right)^{2} + \sin\left(2\,a\right)^{2}\right)c^{\frac{1}{2}\,m}\right)\sqrt{c}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/4*log(c*x^2)*(-(1+m)^2)^(1/2))^2,x, algorithm="maxima
")
```

```
[Out] -1/8*(c^(m + 1)*x^2*x^(2*m)*cos(2*a) - 4*(cos(2*a)^2 + sin(2*a)^2)*c^(1/2*m
 + 1/2)*x*x^m + 2*(cos(2*a)^3 + cos(2*a)*sin(2*a)^2 + (cos(2*a)^3 + cos(2*a
)*sin(2*a)^2)*m)*log(x))/(((cos(2*a)^2 + sin(2*a)^2)*c^(1/2*m)*m + (cos(2*a
)^2 + sin(2*a)^2)*c^(1/2*m))*sqrt(c))
```

mupad [B] time = 3.04, size = 149, normalized size = 1.41

$$\frac{x\,x^m}{2\,m+2}-\frac{\frac{1}{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}\,x\,x^m\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{\left(x^2\right)^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}}{4\,m+4-\sqrt{-(m+1)^2}\,4\mathrm{i}}-\frac{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}\,x\,x^m\,\mathrm{e}^{a\,2\mathrm{i}}\,\left(x^2\right)^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}{4\,m+4+\sqrt{-(m+1)^2}\,4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a + (log(c*x^2)*(-(m + 1)^2)^(1/2))/4)^2,x)
```

```
[Out] (x*x^m)/(2*m + 2) - (1/c^(((- 2*m - m^2 - 1)^(1/2)*1i)/2)*x*x^m*exp(-a*2i)/
(x^2)^(((- 2*m - m^2 - 1)^(1/2)*1i)/2))/(4*m - (-(m + 1)^2)^(1/2)*4i + 4) -
 (c^(((- 2*m - m^2 - 1)^(1/2)*1i)/2)*x*x^m*exp(a*2i)*(x^2)^(((- 2*m - m^2 -
 1)^(1/2)*1i)/2))/(4*m + (-(m + 1)^2)^(1/2)*4i + 4)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sin^2\left(a+\frac{\sqrt{-m^2-2m-1}\,\log\left(cx^2\right)}{4}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sin(a+1/4*ln(c*x**2)*(-(1+m)**2)**(1/2))**2,x)
```

```
[Out] Integral(x**m*sin(a + sqrt(-m**2 - 2*m - 1)*log(c*x**2)/4)**2, x)
```

3.50 $\int \sin^2\left(a+\frac{1}{4} i \log\left(cx^2\right)\right) dx$

Optimal. Leaf size=53

$$-\frac{e^{2ia}x\log(x)}{4\sqrt{cx^2}}-\frac{e^{-2ia}cx^3}{8\sqrt{cx^2}}+\frac{x}{2}$$

```
[Out] 1/2*x-1/8*c*x^3/exp(2*I*a)/(c*x^2)^(1/2)-1/4*exp(2*I*a)*x*ln(x)/(c*x^2)^(1/
2)
```

Rubi [A] time = 0.05, antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4483, 4489}

$$-\frac{e^{-2ia}cx^3}{8\sqrt{cx^2}}-\frac{e^{2ia}x\log(x)}{4\sqrt{cx^2}}+\frac{x}{2}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (I/4)*Log[c*x^2]]^2,x]
```

```
[Out] x/2 - (c*x^3)/(8*E^((2*I)*a)*Sqrt[c*x^2]) - (E^((2*I)*a)*x*Log[x])/(4*Sqrt[
c*x^2])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rubi steps

$$\int \sin^2\left(a+\frac{1}{4}i\log\left(cx^2\right)\right)dx = \frac{x\,\mathrm{Subst}\left(\int \frac{\sin^2\left(a+\frac{1}{4}i\log(x)\right)}{\sqrt{x}}dx,x,cx^2\right)}{2\sqrt{cx^2}}$$
$$= -\frac{x\,\mathrm{Subst}\left(\int \left(e^{-2ia}+\frac{e^{2ia}}{x}-\frac{2}{\sqrt{x}}\right)dx,x,cx^2\right)}{8\sqrt{cx^2}}$$
$$= \frac{x}{2}-\frac{ce^{-2ia}x^3}{8\sqrt{cx^2}}-\frac{e^{2ia}x\log(x)}{4\sqrt{cx^2}}$$

Mathematica [**A**] time = 0.10, size = 60, normalized size = 1.13

$$\frac{x\left(i\sin(2a)\left(cx^2-2\log(x)\right)-\cos(2a)\left(cx^2+2\log(x)\right)+4\sqrt{cx^2}\right)}{8\sqrt{cx^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + (I/4)*Log[c*x^2]]^2,x]
```

```
[Out] (x*(4*Sqrt[c*x^2] - Cos[2*a]*(c*x^2 + 2*Log[x]) + I*(c*x^2 - 2*Log[x])*Sin[
2*a]))/(8*Sqrt[c*x^2])
```

fricas [**B**] time = 0.83, size = 145, normalized size = 2.74

$$\frac{\left(4\,x^2e^{(2i\,a)}-\frac{xe^{(4i\,a)}\log\left(\frac{\left(\sqrt{cx^2}\left(x^2+1\right)e^{(2i\,a)}+\frac{\left(cx^3-cx\right)e^{(2i\,a)}}{\sqrt{c}}\right)e^{(-2i\,a)}}{8\,x^2}\right)}{\sqrt{c}}+\frac{xe^{(4i\,a)}\log\left(\frac{\left(\sqrt{cx^2}\left(x^2+1\right)e^{(2i\,a)}-\frac{\left(cx^3-cx\right)e^{(2i\,a)}}{\sqrt{c}}\right)e^{(-2i\,a)}}{8\,x^2}\right)}{\sqrt{c}}-\sqrt{cx^2}\left(x^2-1\right)\right)e^{(-}}{8\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/4*I*log(c*x^2))^2,x, algorithm="fricas")
```

```
[Out] 1/8*(4*x^2*e^(2*I*a) - x*e^(4*I*a)*log(1/8*(sqrt(c*x^2)*(x^2 + 1)*e^(2*I*a)
 + (c*x^3 - c*x)*e^(2*I*a)/sqrt(c))*e^(-2*I*a)/x^2)/sqrt(c) + x*e^(4*I*a)*l
og(1/8*(sqrt(c*x^2)*(x^2 + 1)*e^(2*I*a) - (c*x^3 - c*x)*e^(2*I*a)/sqrt(c))*
e^(-2*I*a)/x^2)/sqrt(c) - sqrt(c*x^2)*(x^2 - 1))*e^(-2*I*a)/x
```

giac [A] time = 0.37, size = 32, normalized size = 0.60

$$\frac{1}{2}\,x-\frac{c^{\frac{3}{2}}x^{2}e^{(-2i\,a)}+2\,\sqrt{c}\,e^{(2i\,a)}\log(x)}{8\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/4*I*log(c*x^2))^2,x, algorithm="giac")
```

```
[Out] 1/2*x - 1/8*(c^(3/2)*x^2*e^(-2*I*a) + 2*sqrt(c)*e^(2*I*a)*log(x))/c
```

maple [B] time = 0.09, size = 173, normalized size = 3.26

$$\frac{\frac{x}{4}+\frac{5x\left(\tan^{2}\left(\frac{a}{2}+\frac{i\ln\left(c\,x^{2}\right)}{8}\right)\right)}{2}+\frac{x\left(\tan^{4}\left(\frac{a}{2}+\frac{i\ln\left(c\,x^{2}\right)}{8}\right)\right)}{4}-\frac{x\ln\left(c\,x^{2}\right)}{8}+\frac{3x\ln\left(c\,x^{2}\right)\left(\tan^{2}\left(\frac{a}{2}+\frac{i\ln\left(c\,x^{2}\right)}{8}\right)\right)}{4}-\frac{x\ln\left(c\,x^{2}\right)\left(\tan^{4}\left(\frac{a}{2}+\frac{i\ln\left(c\,x^{2}\right)}{8}\right)\right)}{8}-ix\ln(c}{\left(1+\tan^{2}\left(\frac{a}{2}+\frac{i\ln\left(c\,x^{2}\right)}{8}\right)\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/4*I*ln(c*x^2))^2,x)
```

```
[Out] (1/4*x+5/2*x*tan(1/2*a+1/8*I*ln(c*x^2))^2+1/4*x*tan(1/2*a+1/8*I*ln(c*x^2))^
4-1/8*x*ln(c*x^2)+3/4*x*ln(c*x^2)*tan(1/2*a+1/8*I*ln(c*x^2))^2-1/8*x*ln(c*x
^2)*tan(1/2*a+1/8*I*ln(c*x^2))^4-1/2*I*x*ln(c*x^2)*tan(1/2*a+1/8*I*ln(c*x^2
))+1/2*I*x*ln(c*x^2)*tan(1/2*a+1/8*I*ln(c*x^2))^3)/(1+tan(1/2*a+1/8*I*ln(c*
x^2))^2)^2
```

maxima [A] time = 0.35, size = 48, normalized size = 0.91

$$\frac{4\,cx-\left(cx^{2}(\cos\left(2\,a\right)-i\,\sin\left(2\,a\right))+(2\,\cos\left(2\,a\right)+2i\,\sin\left(2\,a\right))\log(x)\right)\sqrt{c}}{8\,c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/4*I*log(c*x^2))^2,x, algorithm="maxima")
```

```
[Out] 1/8*(4*c*x - (c*x^2*(cos(2*a) - I*sin(2*a)) + (2*cos(2*a) + 2*I*sin(2*a))*l
og(x))*sqrt(c))/c
```

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \sin\left(a+\frac{\ln\left(c\,x^{2}\right)\,1\mathrm{i}}{4}\right)^{2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + (log(c*x^2)*1i)/4)^2,x)
```

```
[Out] int(sin(a + (log(c*x^2)*1i)/4)^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin^2\left(a + \frac{i\log\left(cx^2\right)}{4}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/4*I*ln(c*x**2))**2,x)
```

```
[Out] Integral(sin(a + I*log(c*x**2)/4)**2, x)
```

3.51 $\int x^m \sin^3\left(a+\frac{1}{6}\sqrt{-(1+m)^2}\log\left(cx^2\right)\right)dx$

Optimal. Leaf size=218

$$\frac{9e^{\frac{a\sqrt{-(m+1)^2}}{m+1}}x^{m+1}\left(cx^2\right)^{\frac{1}{6}(-m-1)}}{16\sqrt{-(m+1)^2}}-\frac{9e^{\frac{a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\left(cx^2\right)^{\frac{m+1}{6}}}{32\sqrt{-(m+1)^2}}+\frac{e^{\frac{3a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\left(cx^2\right)^{\frac{m+1}{2}}}{16\sqrt{-(m+1)^2}}-\frac{(m+1)e^{-\frac{3a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\log(x)}{8\sqrt{-(m+1)^2}}$$

```
[Out] 9/16*exp(a*(-(1+m)^2)^(1/2)/(1+m))*x^(1+m)*(c*x^2)^(-1/6-1/6*m)/(-(1+m)^2)^
(1/2)-9/32*exp(a*(1+m)/(-(1+m)^2)^(1/2))*x^(1+m)*(c*x^2)^(1/6+1/6*m)/(-(1+m
)^2)^(1/2)+1/16*exp(3*a*(1+m)/(-(1+m)^2)^(1/2))*x^(1+m)*(c*x^2)^(1/2+1/2*m)
/(-(1+m)^2)^(1/2)-1/8*(1+m)*x^(1+m)*(c*x^2)^(-1/2-1/2*m)*ln(x)/exp(3*a*(1+m
)/(-(1+m)^2)^(1/2))/(-(1+m)^2)^(1/2)
```

Rubi [A] time = 0.30, antiderivative size = 218, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4493, 4489}

$$\frac{9e^{\frac{a\sqrt{-(m+1)^2}}{m+1}}x^{m+1}\left(cx^2\right)^{\frac{1}{6}(-m-1)}}{16\sqrt{-(m+1)^2}}-\frac{9e^{\frac{a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\left(cx^2\right)^{\frac{m+1}{6}}}{32\sqrt{-(m+1)^2}}+\frac{e^{\frac{3a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\left(cx^2\right)^{\frac{m+1}{2}}}{16\sqrt{-(m+1)^2}}-\frac{(m+1)e^{-\frac{3a(m+1)}{\sqrt{-(m+1)^2}}}x^{m+1}\log(x)}{8\sqrt{-(m+1)^2}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/6]^3,x]
```

```
[Out] (9*E^((a*Sqrt[-(1 + m)^2])/(1 + m))*x^(1 + m)*(c*x^2)^((-1 - m)/6))/(16*Sqr
t[-(1 + m)^2]) - (9*E^((a*(1 + m))/Sqrt[-(1 + m)^2])*x^(1 + m)*(c*x^2)^((1
+ m)/6))/(32*Sqrt[-(1 + m)^2]) + (E^((3*a*(1 + m))/Sqrt[-(1 + m)^2])*x^(1 +
 m)*(c*x^2)^((1 + m)/2))/(16*Sqrt[-(1 + m)^2]) - ((1 + m)*x^(1 + m)*(c*x^2)
^((-1 - m)/2)*Log[x])/(8*E^((3*a*(1 + m))/Sqrt[-(1 + m)^2])*Sqrt[-(1 + m)^2
])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sin^3\left(a+\frac{1}{6}\sqrt{-(1+m)^2}\,\log\left(cx^2\right)\right)dx = \frac{1}{2}\left(x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{2}}\sin^3\left(a+\frac{1}{6}\sqrt{-(1+m)^2}\right.\right.$$

$$= \frac{\left(\sqrt{-(1+m)^2}\,x^{1+m}\left(cx^2\right)^{\frac{1}{2}(-1-m)}\right)\text{Subst}\left(\int\left(\frac{e^{-\frac{3a(1+m)}{\sqrt{-(1+m)^2}}}}{x} - 3e^{\frac{a\sqrt{-(1+m)}}{1+m}}\right.\right.}{16(1+m}$$

$$= \frac{9e^{\frac{a\sqrt{-(1+m)^2}}{1+m}}x^{1+m}\left(cx^2\right)^{\frac{1}{6}(-1-m)}}{16\sqrt{-(1+m)^2}} - \frac{9e^{\frac{a(1+m)}{\sqrt{-(1+m)^2}}}x^{1+m}\left(cx^2\right)^{\frac{1+m}{6}}}{32\sqrt{-(1+m)^2}} + \frac{e^{\frac{3a(1+m}{\sqrt{-(1+m}}}}{16}$$

Mathematica [F] time = 0.52, size = 0, normalized size = 0.00

$$\int x^m \sin^3\left(a+\frac{1}{6}\sqrt{-(1+m)^2}\,\log\left(cx^2\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/6]^3,x]
[Out] Integrate[x^m*Sin[a + (Sqrt[-(1 + m)^2]*Log[c*x^2])/6]^3, x]
```

fricas [C] time = 0.43, size = 97, normalized size = 0.44

$$\frac{\left((4i\,m+4i)e^{\left(-(m+1)\log(c)-2\,(m+1)\log(x)+6i\,a\right)}\log(x) + 9i\,e^{\left(-\frac{1}{3}\,(m+1)\log(c)-\frac{2}{3}\,(m+1)\log(x)+2i\,a\right)} - 18i\,e^{\left(-\frac{2}{3}\,(m+1)\log(c)-\frac{4}{3}\,(m+1)\,\text{lo}\right.}\right.}{32\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/6*log(c*x^2)*(-(1+m)^2)^(1/2))^3,x, algorithm="fricas
")

[Out] 1/32*((4*I*m + 4*I)*e^(-(m + 1)*log(c) - 2*(m + 1)*log(x) + 6*I*a)*log(x) +
 9*I*e^(-1/3*(m + 1)*log(c) - 2/3*(m + 1)*log(x) + 2*I*a) - 18*I*e^(-2/3*(m
 + 1)*log(c) - 4/3*(m + 1)*log(x) + 4*I*a) - 2*I)*e^(1/2*(m + 1)*log(c) + 2
*(m + 1)*log(x) - 3*I*a)/(m + 1)
```

giac [C] time = 3.96, size = 1297, normalized size = 5.95

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sin(a+1/6*log(c*x^2)*(-(1+m)^2)^(1/2))^3,x, algorithm="giac")
```

```
[Out] 1/8*(I*(m + 1)^2*m*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - 3*I
*a) - 9*I*m^3*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) - 3*I*a) -
 I*(m + 1)^2*x*x^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x)
- 3*I*a) + 9*I*m^2*x*x^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*l
og(x) - 3*I*a) - 27*I*(m + 1)^2*m*x*x^m*e^(1/6*abs(m + 1)*log(c) + 1/3*abs(
m + 1)*log(x) - I*a) + 27*I*m^3*x*x^m*e^(1/6*abs(m + 1)*log(c) + 1/3*abs(m
+ 1)*log(x) - I*a) + 9*I*(m + 1)^2*x*x^m*abs(m + 1)*e^(1/6*abs(m + 1)*log(c
) + 1/3*abs(m + 1)*log(x) - I*a) - 9*I*m^2*x*x^m*abs(m + 1)*e^(1/6*abs(m +
1)*log(c) + 1/3*abs(m + 1)*log(x) - I*a) + 27*I*(m + 1)^2*m*x*x^m*e^(-1/6*a
bs(m + 1)*log(c) - 1/3*abs(m + 1)*log(x) + I*a) - 27*I*m^3*x*x^m*e^(-1/6*ab
s(m + 1)*log(c) - 1/3*abs(m + 1)*log(x) + I*a) + 9*I*(m + 1)^2*x*x^m*abs(m
+ 1)*e^(-1/6*abs(m + 1)*log(c) - 1/3*abs(m + 1)*log(x) + I*a) - 9*I*m^2*x*x
^m*abs(m + 1)*e^(-1/6*abs(m + 1)*log(c) - 1/3*abs(m + 1)*log(x) + I*a) - I*
(m + 1)^2*m*x*x^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 3*I*a) +
9*I*m^3*x*x^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 3*I*a) - I*(m
 + 1)^2*x*x^m*abs(m + 1)*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 3*
I*a) + 9*I*m^2*x*x^m*abs(m + 1)*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(
x) + 3*I*a) + I*(m + 1)^2*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x
) - 3*I*a) - 27*I*m^2*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(x) -
3*I*a) + 18*I*m*x*x^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(c) + abs(m + 1)*log(
x) - 3*I*a) - 27*I*(m + 1)^2*x*x^m*e^(1/6*abs(m + 1)*log(c) + 1/3*abs(m + 1
)*log(x) - I*a) + 81*I*m^2*x*x^m*e^(1/6*abs(m + 1)*log(c) + 1/3*abs(m + 1)*
log(x) - I*a) - 18*I*m*x*x^m*abs(m + 1)*e^(1/6*abs(m + 1)*log(c) + 1/3*abs(
m + 1)*log(x) - I*a) + 27*I*(m + 1)^2*x*x^m*e^(-1/6*abs(m + 1)*log(c) - 1/3
*abs(m + 1)*log(x) + I*a) - 81*I*m^2*x*x^m*e^(-1/6*abs(m + 1)*log(c) - 1/3*
abs(m + 1)*log(x) + I*a) - 18*I*m*x*x^m*abs(m + 1)*e^(-1/6*abs(m + 1)*log(c
) - 1/3*abs(m + 1)*log(x) + I*a) - I*(m + 1)^2*x*x^m*e^(-1/2*abs(m + 1)*log
(c) - abs(m + 1)*log(x) + 3*I*a) + 27*I*m^2*x*x^m*e^(-1/2*abs(m + 1)*log(c)
 - abs(m + 1)*log(x) + 3*I*a) + 18*I*m*x*x^m*abs(m + 1)*e^(-1/2*abs(m + 1)*
log(c) - abs(m + 1)*log(x) + 3*I*a) - 27*I*m*x*x^m*e^(1/2*abs(m + 1)*log(c)
 + abs(m + 1)*log(x) - 3*I*a) + 9*I*x*x^m*abs(m + 1)*e^(1/2*abs(m + 1)*log(
c) + abs(m + 1)*log(x) - 3*I*a) + 81*I*m*x*x^m*e^(1/6*abs(m + 1)*log(c) + 1
/3*abs(m + 1)*log(x) - I*a) - 9*I*x*x^m*abs(m + 1)*e^(1/6*abs(m + 1)*log(c)
 + 1/3*abs(m + 1)*log(x) - I*a) - 81*I*m*x*x^m*e^(-1/6*abs(m + 1)*log(c) -
1/3*abs(m + 1)*log(x) + I*a) - 9*I*x*x^m*abs(m + 1)*e^(-1/6*abs(m + 1)*log(
c) - 1/3*abs(m + 1)*log(x) + I*a) + 27*I*m*x*x^m*e^(-1/2*abs(m + 1)*log(c)
- abs(m + 1)*log(x) + 3*I*a) + 9*I*x*x^m*abs(m + 1)*e^(-1/2*abs(m + 1)*log(
```

```
c) - abs(m + 1)*log(x) + 3*I*a) - 9*I*x*x^m*e^(1/2*abs(m + 1)*log(c) + abs(
m + 1)*log(x) - 3*I*a) + 27*I*x*x^m*e^(1/6*abs(m + 1)*log(c) + 1/3*abs(m +
1)*log(x) - I*a) - 27*I*x*x^m*e^(-1/6*abs(m + 1)*log(c) - 1/3*abs(m + 1)*lo
g(x) + I*a) + 9*I*x*x^m*e^(-1/2*abs(m + 1)*log(c) - abs(m + 1)*log(x) + 3*I
*a))/((m + 1)^4 - 10*(m + 1)^2*m^2 + 9*m^4 - 20*(m + 1)^2*m + 36*m^3 - 10*(
m + 1)^2 + 54*m^2 + 36*m + 9)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^{m}\left(\sin^{3}\left(a+\frac{\ln\left(c\,x^{2}\right)\sqrt{-\left(1+m\right)^{2}}}{6}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a+1/6*ln(c*x^2)*(-(1+m)^2)^(1/2))^3,x)
```

```
[Out] int(x^m*sin(a+1/6*ln(c*x^2)*(-(1+m)^2)^(1/2))^3,x)
```

maxima [A] time = 0.37, size = 206, normalized size = 0.94

$$\frac{9\left(\cos\left(2\,a\right)\sin\left(3\,a\right)-\cos\left(3\,a\right)\sin\left(2\,a\right)\right)c^{\frac{5}{6}\,m+\frac{5}{6}}x^{\frac{5}{3}}x^{\frac{4}{3}\,m}+18\left(\cos\left(3\,a\right)\sin\left(4\,a\right)-\cos\left(4\,a\right)\sin\left(3\,a\right)\right)c^{\frac{1}{2}\,m+\frac{1}{2}}x\,x^{\frac{2}{3}\,m}-2}{32\left(\left(\cos\left(3\,a\right)^{2}+\sin\left(3\,a\right)^{2}\right)c^{\frac{2}{3}\,m}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/32*(9*(cos(2*a)*sin(3*a) - cos(3*a)*sin(2*a))*c^(5/6*m + 5/6)*x^(5/3)*x^(
4/3*m) + 18*(cos(3*a)*sin(4*a) - cos(4*a)*sin(3*a))*c^(1/2*m + 1/2)*x*x^(2/
3*m) - 2*(c^(7/6*m + 1)*x^2*x^(2*m)*sin(3*a) + 2*((cos(3*a)^2*sin(3*a) + si
n(3*a)^3)*c^(1/6*m)*m + (cos(3*a)^2*sin(3*a) + sin(3*a)^3)*c^(1/6*m))*log(x
))*c^(1/6)*x^(1/3))/(((cos(3*a)^2 + sin(3*a)^2)*c^(2/3*m)*m + (cos(3*a)^2 +
 sin(3*a)^2)*c^(2/3*m))*c^(2/3)*x^(1/3))
```

mupad [B] time = 4.08, size = 291, normalized size = 1.33

$$-\frac{\frac{1}{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}\,x\,x^{m}\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{\left(x^2\right)^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}}\,1\mathrm{i}}{8\,m+8-\sqrt{-{\left(m+1\right)}^2}\,8\mathrm{i}}+\frac{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}\,x\,x^{m}\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(x^2\right)}^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{2}}\,1\mathrm{i}}{8\,m+8+\sqrt{-{\left(m+1\right)}^2}\,8\mathrm{i}}-\frac{\frac{1}{c^{\frac{\sqrt{-m^2-2\,m-1}\,1\mathrm{i}}{6}}}\,x\,x^{m}\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{}{\left(x^2\right)}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sin(a + (log(c*x^2)*(-(m + 1)^2)^(1/2))/6)^3,x)
```

```
[Out] (c^(((- 2*m - m^2 - 1)^(1/2)*1i)/2)*x*x^m*exp(a*3i)*(x^2)^(((- 2*m - m^2 -
1)^(1/2)*1i)/2)*1i)/(8*m + (-(m + 1)^2)^(1/2)*8i + 8) - (1/c^(((- 2*m - m^2
 - 1)^(1/2)*1i)/2)*x*x^m*exp(-a*3i)/(x^2)^(((- 2*m - m^2 - 1)^(1/2)*1i)/2)*
1i)/(8*m - (-(m + 1)^2)^(1/2)*8i + 8) - (1/c^(((- 2*m - m^2 - 1)^(1/2)*1i)/
6)*x*x^m*exp(-a*1i)/(x^2)^(((- 2*m - m^2 - 1)^(1/2)*1i)/6)*(27*m + (-(m + 1
)^2)^(1/2)*9i + 27)*1i)/(64*(m*1i + 1i)^2) + (c^(((- 2*m - m^2 - 1)^(1/2)*1
i)/6)*x*x^m*exp(a*1i)*(x^2)^(((- 2*m - m^2 - 1)^(1/2)*1i)/6)*(27*m - (-(m +
 1)^2)^(1/2)*9i + 27)*1i)/(64*(m*1i + 1i)^2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m}\sin^{3}\left(a+\frac{\sqrt{-m^{2}-2m-1}\,\log\left(cx^{2}\right)}{6}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sin(a+1/6*ln(c*x**2)*(-(1+m)**2)**(1/2))**3,x)
```

```
[Out] Integral(x**m*sin(a + sqrt(-m**2 - 2*m - 1)*log(c*x**2)/6)**3, x)
```

3.52 $\int \sin^3\left(a + \frac{1}{6}i\log\left(cx^2\right)\right)\,dx$

Optimal. Leaf size=98

$$\frac{9}{32}ie^{-ia}x\sqrt[6]{cx^2} - \frac{9ie^{ia}x}{16\sqrt[6]{cx^2}} + \frac{ie^{3ia}x\log(x)}{8\sqrt{cx^2}} - \frac{ie^{-3ia}cx^3}{16\sqrt{cx^2}}$$

```
[Out] -9/16*I*exp(I*a)*x/(c*x^2)^(1/6)+9/32*I*x*(c*x^2)^(1/6)/exp(I*a)-1/16*I*c*x
^3/exp(3*I*a)/(c*x^2)^(1/2)+1/8*I*exp(3*I*a)*x*ln(x)/(c*x^2)^(1/2)
```

Rubi [A] time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4483, 4489}

$$-\frac{ie^{-3ia}cx^3}{16\sqrt{cx^2}} + \frac{9}{32}ie^{-ia}x\sqrt[6]{cx^2} - \frac{9ie^{ia}x}{16\sqrt[6]{cx^2}} + \frac{ie^{3ia}x\log(x)}{8\sqrt{cx^2}}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + (I/6)*Log[c*x^2]]^3,x]
```

```
[Out] ((-I/16)*c*x^3)/(E^((3*I)*a)*Sqrt[c*x^2]) - (((9*I)/16)*E^(I*a)*x)/(c*x^2)^
(1/6) + (((9*I)/32)*x*(c*x^2)^(1/6))/E^(I*a) + ((I/8)*E^((3*I)*a)*x*Log[x])
/Sqrt[c*x^2]
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4489

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(m + 1)^p/(2^p*b^p*d^p*p^p), Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d
^2*p)/(m + 1))/x^((m + 1)/p) - x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x]
, x], x] /; FreeQ[{a, b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m
 + 1)^2, 0]
```

Rubi steps

$$\int \sin^3\left(a+\frac{1}{6}i\log\left(cx^2\right)\right)dx = \frac{x\,\mathrm{Subst}\left(\int \frac{\sin^3\left(a+\frac{1}{6}i\log(x)\right)}{\sqrt{x}}dx,x,cx^2\right)}{2\sqrt{cx^2}}$$
$$= \frac{(ix)\,\mathrm{Subst}\left(\int\left(-e^{-3ia}+\frac{e^{3ia}}{x}-\frac{3e^{ia}}{x^{2/3}}+\frac{3e^{-ia}}{\sqrt[3]{x}}\right)dx,x,cx^2\right)}{16\sqrt{cx^2}}$$
$$= -\frac{ice^{-3ia}x^3}{16\sqrt{cx^2}}-\frac{9ie^{ia}x}{16\sqrt[6]{cx^2}}+\frac{9}{32}ie^{-ia}x\sqrt[6]{cx^2}+\frac{ie^{3ia}x\log(x)}{8\sqrt{cx^2}}$$

Mathematica [A] time = 0.13, size = 103, normalized size = 1.05

$$\frac{x\left(-2cx^2\sin(3a)+9\sin(a)\left(cx^2\right)^{2/3}+18\sin(a)\sqrt[3]{cx^2}+9i\cos(a)\sqrt[3]{cx^2}\left(\sqrt[3]{cx^2}-2\right)-2i\cos(3a)\left(cx^2-2\log(x)\right)\right.}{32\sqrt{cx^2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + (I/6)*Log[c*x^2]]^3,x]
```

```
[Out] (x*((9*I)*(c*x^2)^(1/3)*(-2 + (c*x^2)^(1/3))*Cos[a] - (2*I)*Cos[3*a]*(c*x^2
 - 2*Log[x]) + 18*(c*x^2)^(1/3)*Sin[a] + 9*(c*x^2)^(2/3)*Sin[a] - 2*c*x^2*S
in[3*a] - 4*Log[x]*Sin[3*a]))/(32*Sqrt[c*x^2])
```

fricas [B] time = 4.42, size = 204, normalized size = 2.08

$$-\frac{\left(2\,cx\sqrt{-\frac{e^{(6i\,a)}}{c}}\,e^{(3i\,a)}\log\left(\frac{\left(4\,\sqrt{cx^2}\left(x^2+1\right)e^{(3i\,a)}+\left(4i\,cx^3-4i\,cx\right)\sqrt{-\frac{e^{(6i\,a)}}{c}}\right)e^{(-3i\,a)}}{32\,x^2}\right)-2\,cx\sqrt{-\frac{e^{(6i\,a)}}{c}}\,e^{(3i\,a)}\log\left(\frac{\left(4\,\sqrt{cx^2}\left(x^2+1\right)e^{(3i\,a)}+\left(-\right.\right.}{}\right.\right.}{32\,cx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/6*I*log(c*x^2))^3,x, algorithm="fricas")
```

```
[Out] -1/32*(2*c*x*sqrt(-e^(6*I*a)/c)*e^(3*I*a)*log(1/32*(4*sqrt(c*x^2)*(x^2 + 1)
*e^(3*I*a) + (4*I*c*x^3 - 4*I*c*x)*sqrt(-e^(6*I*a)/c))*e^(-3*I*a)/x^2) - 2*
c*x*sqrt(-e^(6*I*a)/c)*e^(3*I*a)*log(1/32*(4*sqrt(c*x^2)*(x^2 + 1)*e^(3*I*a
) + (-4*I*c*x^3 + 4*I*c*x)*sqrt(-e^(6*I*a)/c))*e^(-3*I*a)/x^2) - 9*I*(c*x^2
)^(1/6)*c*x^2*e^(2*I*a) + 18*I*(c*x^2)^(5/6)*e^(4*I*a) - sqrt(c*x^2)*(-2*I*
c*x^2 + 2*I*c))*e^(-3*I*a)/(c*x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(a + \frac{1}{6}i\log\left(cx^2\right)\right)^3 dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/6*I*log(c*x^2))^3,x, algorithm="giac")
```

```
[Out] integrate(sin(a + 1/6*I*log(c*x^2))^3, x)
```

maple [B] time = 0.11, size = 284, normalized size = 2.90

$$-\frac{23ix}{40} + \frac{27x\tan\left(\frac{a}{2}+\frac{i\ln\left(cx^2\right)}{12}\right)}{10} + \frac{27x\left(\tan^5\left(\frac{a}{2}+\frac{i\ln\left(cx^2\right)}{12}\right)\right)}{10} + \frac{33ix\left(\tan^2\left(\frac{a}{2}+\frac{i\ln\left(cx^2\right)}{12}\right)\right)}{8} + \frac{23ix\left(\tan^6\left(\frac{a}{2}+\frac{i\ln\left(cx^2\right)}{12}\right)\right)}{40} - \frac{33ix\left(\tan^4\left(\frac{a}{2}+\frac{i\ln\left(cx^2\right)}{12}\right)\right)}{8} -$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+1/6*I*ln(c*x^2))^3,x)
```

```
[Out] (-23/40*I*x+27/10*x*tan(1/2*a+1/12*I*ln(c*x^2))+27/10*x*tan(1/2*a+1/12*I*ln
(c*x^2))^5+33/8*I*x*tan(1/2*a+1/12*I*ln(c*x^2))^2+23/40*I*x*tan(1/2*a+1/12*
I*ln(c*x^2))^6-33/8*I*x*tan(1/2*a+1/12*I*ln(c*x^2))^4-3/8*x*ln(c*x^2)*tan(1
/2*a+1/12*I*ln(c*x^2))+5/4*x*ln(c*x^2)*tan(1/2*a+1/12*I*ln(c*x^2))^3-3/8*x*
ln(c*x^2)*tan(1/2*a+1/12*I*ln(c*x^2))^5+1/16*I*x*ln(c*x^2)-15/16*I*x*ln(c*x
^2)*tan(1/2*a+1/12*I*ln(c*x^2))^2+15/16*I*x*ln(c*x^2)*tan(1/2*a+1/12*I*ln(c
*x^2))^4-1/16*I*x*ln(c*x^2)*tan(1/2*a+1/12*I*ln(c*x^2))^6)/(1+tan(1/2*a+1/1
2*I*ln(c*x^2))^2)^3
```

maxima [A] time = 0.36, size = 75, normalized size = 0.77

$$-\frac{9c^{\frac{4}{3}}x^{\frac{4}{3}}(-i\cos(a)-\sin(a)) + 18cx^{\frac{2}{3}}(i\cos(a)-\sin(a)) + 2\left(cx^2(i\cos(3a)+\sin(3a)) + 2(-i\cos(3a)+\sin(3a\right.}{32c^{\frac{7}{6}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/6*I*log(c*x^2))^3,x, algorithm="maxima")
```

```
[Out] -1/32*(9*c^(4/3)*x^(4/3)*(-I*cos(a) - sin(a)) + 18*c*x^(2/3)*(I*cos(a) - si
n(a)) + 2*(c*x^2*(I*cos(3*a) + sin(3*a)) + 2*(-I*cos(3*a) + sin(3*a))*log(x
))*c^(2/3))/c^(7/6)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sin\left(a+\frac{\ln\left(c\,x^2\right)\,1\mathrm{i}}{6}\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + (log(c*x^2)*1i)/6)^3,x)
```

```
[Out] int(sin(a + (log(c*x^2)*1i)/6)^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin^{3}\left(a+\frac{i\log\left(cx^{2}\right)}{6}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+1/6*I*ln(c*x**2))**3,x)
```

```
[Out] Integral(sin(a + I*log(c*x**2)/6)**3, x)
```

3.53 $\int x\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\,dx$

Optimal. Leaf size=111

$$\frac{2x^2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{4i}{bn}\right);\frac{1}{4}\left(3-\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(4-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

```
[Out] 2*x^2*hypergeom([-1/2, -1/4-I/b/n],[3/4-I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))*
sin(a+b*ln(c*x^n))^(1/2)/(4-I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)
```

Rubi [A] time = 0.09, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4493, 4491, 364}

$$\frac{2x^2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{4i}{bn}\right);\frac{1}{4}\left(3-\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(4-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[Sin[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^2*Hypergeometric2F1[-1/2, (-1 - (4*I)/(b*n))/4, (3 - (4*I)/(b*n))/4, E
^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Sin[a + b*Log[c*x^n]]])/((4 - I*b*n)*Sqr
t[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sqrt{\sin(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$
$$=\frac{\left(x^2\left(cx^n\right)^{\frac{ib}{2}-\frac{2}{n}}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{2}{n}}\sqrt{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$
$$=\frac{2x^2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{4i}{bn}\right);\frac{1}{4}\left(3-\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(4-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Mathematica [A] time = 1.39, size = 94, normalized size = 0.85

$$\frac{2x^2\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,\frac{5}{4}-\frac{i}{bn};\frac{3}{4}-\frac{i}{bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{-4+ibn}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sqrt[Sin[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*x^2*Hypergeometric2F1[1, 5/4 - I/(b*
n), 3/4 - I/(b*n), E^((2*I)*(a + b*Log[c*x^n]))]*Sqrt[Sin[a + b*Log[c*x^n]]
])/(-4 + I*b*n)
```

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*sin(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate(x*sqrt(sin(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.25, size = 0, normalized size = 0.00

$$\int x\left(\sqrt{\sin}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n))^(1/2),x)
[Out] int(x*sin(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\sqrt{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a + b*log(c*x^n))^(1/2),x)
[Out] int(x*sin(a + b*log(c*x^n))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(x*sqrt(sin(a + b*log(c*x**n))), x)
```

3.54 $\int \sqrt{\sin \left(a+b \log \left(c x^n\right)\right)} \, dx$

Optimal. Leaf size=110

$$\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{bn+2i}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(2-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

```
[Out] 2*x*hypergeom([-1/2, 1/4*(-2*I-b*n)/b/n],[3/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)
^(2*I*b))*sin(a+b*ln(c*x^n))^(1/2)/(2-I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))
^(1/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4483, 4491, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{bn+2i}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(2-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Sin[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Hypergeometric2F1[-1/2, -(2*I + b*n)/(4*b*n), (3 - (2*I)/(b*n))/4, E^(
(2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Sin[a + b*Log[c*x^n]]])/((2 - I*b*n)*Sqrt[
1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\begin{aligned}\int \sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\,dx &= \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sqrt{\sin(a+b\log(x))}\,dx,x,cx^n\right)}{n}\\ &= \frac{\left(x\left(cx^n\right)^{\frac{ib}{2}-\frac{1}{n}}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1}{n}}\sqrt{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}\\ &= \frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{2i+bn}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(2-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}\end{aligned}$$

Mathematica [A] time = 1.36, size = 96, normalized size = 0.87

$$\frac{2x\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,\frac{5}{4}-\frac{i}{2bn};\frac{3}{4}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{-2+ibn}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[Sin[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Hypergeometric2F1[1, 5/4 - (I/2)/(
b*n), 3/4 - (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))]*Sqrt[Sin[a + b*Log[c
*x^n]]])/(-2 + I*b*n)
```

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(sin(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\sin \left(b \log \left(cx^{n}\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(sin(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \sqrt{\sin}\, \left(a + b \ln \left(c\, x^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(1/2),x)
[Out] int(sin(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\sin \left(b \log \left(cx^{n}\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{\sin \left(a + b\, \ln \left(c\, x^{n}\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(1/2),x)
[Out] int(sin(a + b*log(c*x^n))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\sin \left(a + b \log \left(cx^{n}\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(sqrt(sin(a + b*log(c*x**n))), x)
```

3.55 $\int \frac{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx$

Optimal. Leaf size=29

$$\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

```
[Out] -2*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*
x^n))*EllipticE(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))/b/n
```

Rubi [A] time = 0.03, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {2639}

$$\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Sin[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*EllipticE[(a - Pi/2 + b*Log[c*x^n])/2, 2])/(b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx &= \frac{\text{Subst}\left(\int \sqrt{\sin(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= \frac{2E\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}\end{aligned}$$

Mathematica [A] time = 0.08, size = 32, normalized size = 1.10

$$-\frac{2E\left(\frac{1}{2}\left(-a-b\log\left(cx^n\right)+\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Sin[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (-2*EllipticE[(-a + Pi/2 - b*Log[c*x^n])/2, 2])/(b*n)
```

fricas [F] time = 0.49, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(sin(b*log(c*x^n) + a))/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(sin(b*log(c*x^n) + a))/x, x)
```

maple [A] time = 0.07, size = 129, normalized size = 4.45

$$-\frac{\sqrt{\sin\left(a+b\ln\left(c\,x^n\right)\right)+1}\,\sqrt{-2\sin\left(a+b\ln\left(c\,x^n\right)\right)+2}\,\sqrt{-\sin\left(a+b\ln\left(c\,x^n\right)\right)}\,\left(2\,\mathrm{EllipticE}\left(\sqrt{\sin\left(a+b\ln\left(c\,x\right.\right.}\right.\right.}{n\cos\left(a+b\ln\left(c\,x^n\right)\right)\sqrt{\sin\left(a+b\ln\left(c\,x^n\right)\right)}\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(1/2)/x,x)
```

```
[Out] -1/n*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b
*ln(c*x^n)))^(1/2)*(2*EllipticE((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-E
llipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2)))/cos(a+b*ln(c*x^n))/sin(
a+b*ln(c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(sin(b*log(c*x^n) + a))/x, x)
```

mupad [B] time = 2.32, size = 26, normalized size = 0.90

$$\frac{2\,\mathrm{E}\left(\frac{a}{2}-\frac{\pi}{4}+\frac{b\,\ln(c\,x^n)}{2}\middle|2\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(1/2)/x,x)
```

```
[Out] (2*ellipticE(a/2 - pi/4 + (b*log(c*x^n))/2, 2))/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(1/2)/x,x)
```

```
[Out] Integral(sqrt(sin(a + b*log(c*x**n)))/x, x)
```

3.56 $\int \frac{\sqrt{\sin(a+b\log(cx^n))}}{x^2}\,dx$

Optimal. Leaf size=111

$$-\frac{2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(\frac{2i}{bn}-1\right);\frac{1}{4}\left(3+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x(2+ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

```
[Out] -2*hypergeom([-1/2, -1/4+1/2*I/b/n],[3/4+1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I
*b))*sin(a+b*ln(c*x^n))^(1/2)/(2+I*b*n)/x/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1
/2)
```

Rubi [A] time = 0.09, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4493, 4491, 364}

$$-\frac{2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(\frac{2i}{bn}-1\right);\frac{1}{4}\left(3+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x(2+ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Sin[a + b*Log[c*x^n]]]/x^2,x]
```

```
[Out] (-2*Hypergeometric2F1[-1/2, (-1 + (2*I)/(b*n))/4, (3 + (2*I)/(b*n))/4, E^((
2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Sin[a + b*Log[c*x^n]]])/((2 + I*b*n)*x*Sqrt
[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sqrt{\sin(a+b\log(x))}\,dx, x, cx^n\right)}{nx}$$
$$= \frac{\left(\left(cx^n\right)^{\frac{ib}{2}+\frac{1}{n}}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}-\frac{1}{n}}\sqrt{1-e^{2ia}x^{2ib}}\,dx, x, cx^n\right)}{nx\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$
$$= -\frac{2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1+\frac{2i}{bn}\right);\frac{1}{4}\left(3+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(2+ibn)x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Mathematica [A] time = 1.45, size = 99, normalized size = 0.89

$$-\frac{2i\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,\frac{5}{4}+\frac{i}{2bn};\frac{3}{4}+\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x(bn-2i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[Sin[a + b*Log[c*x^n]]]/x^2,x]
```

```
[Out] ((-2*I)*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*Hypergeometric2F1[1, 5/4 + (I/2
)/(b*n), 3/4 + (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))]*Sqrt[Sin[a + b*Lo
g[c*x^n]]])/((-2*I + b*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(sin(a+b*log(c*x^n))^(1/2)/x^2,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(b\log\left(cx^{n}\right)+a\right)}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(1/2)/x^2,x, algorithm="giac")
[Out] integrate(sqrt(sin(b*log(c*x^n) + a))/x^2, x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin}\,\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(1/2)/x^2,x)
[Out] int(sin(a+b*ln(c*x^n))^(1/2)/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(b\log\left(cx^{n}\right)+a\right)}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sqrt{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(1/2)/x^2,x)
[Out] int(sin(a + b*log(c*x^n))^(1/2)/x^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(a+b\log\left(cx^{n}\right)\right)}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(1/2)/x**2,x)
```

```
[Out] Integral(sqrt(sin(a + b*log(c*x**n)))/x**2, x)
```

3.57 $\int \frac{\sqrt{\sin(a+b\log(cx^n))}}{x^3}\,dx$

Optimal. Leaf size=111

$$-\frac{2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(\frac{4i}{bn}-1\right);\frac{1}{4}\left(3+\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x^2(4+ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

```
[Out] -2*hypergeom([-1/2, -1/4+I/b/n],[3/4+I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))*sin
(a+b*ln(c*x^n))^(1/2)/(4+I*b*n)/x^2/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)
```

Rubi [A] time = 0.09, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4493, 4491, 364}

$$-\frac{2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(\frac{4i}{bn}-1\right);\frac{1}{4}\left(3+\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x^2(4+ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Sin[a + b*Log[c*x^n]]]/x^3,x]
```

```
[Out] (-2*Hypergeometric2F1[-1/2, (-1 + (4*I)/(b*n))/4, (3 + (4*I)/(b*n))/4, E^((
2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Sin[a + b*Log[c*x^n]]])/((4 + I*b*n)*x^2*Sq
rt[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n}\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sqrt{\sin(a+b\log(x))}\,dx,x,cx^n\right)}{nx^2}$$

$$= \frac{\left(\left(cx^n\right)^{\frac{ib}{2}+\frac{2}{n}}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}-\frac{2}{n}}\sqrt{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{nx^2\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

$$= -\frac{2\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1+\frac{4i}{bn}\right);\frac{1}{4}\left(3+\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{(4+ibn)x^2\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}}$$

Mathematica [A] time = 1.43, size = 95, normalized size = 0.86

$$-\frac{2i\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,\frac{5}{4}+\frac{i}{bn};\frac{3}{4}+\frac{i}{bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x^2(bn-4i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[Sin[a + b*Log[c*x^n]]]/x^3,x]
```

```
[Out] ((-2*I)*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*Hypergeometric2F1[1, 5/4 + I/(b
*n), 3/4 + I/(b*n), E^((2*I)*(a + b*Log[c*x^n]))]*Sqrt[Sin[a + b*Log[c*x^n]
]])/((-4*I + b*n)*x^2)
```

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(sin(a+b*log(c*x^n))^(1/2)/x^3,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(1/2)/x^3,x, algorithm="giac")
[Out] integrate(sqrt(sin(b*log(c*x^n) + a))/x^3, x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin}\ \left(a+b\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(1/2)/x^3,x)
[Out] int(sin(a+b*ln(c*x^n))^(1/2)/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(1/2)/x^3,x, algorithm="maxima")
[Out] integrate(sqrt(sin(b*log(c*x^n) + a))/x^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sqrt{\sin\left(a+b\ \ln\left(c\,x^n\right)\right)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(1/2)/x^3,x)
[Out] int(sin(a + b*log(c*x^n))^(1/2)/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(1/2)/x**3,x)
```

```
[Out] Integral(sqrt(sin(a + b*log(c*x**n)))/x**3, x)
```

3.58 $\int x \sin^{\frac{3}{2}}(a + b\log(cx^n))\,dx$

Optimal. Leaf size=111

$$\frac{2x^2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{4i}{bn}\right);\frac{1}{4}\left(1-\frac{4i}{bn}\right);e^{2ia}(cx^n)^{2ib}\right)\sin^{\frac{3}{2}}(a+b\log(cx^n))}{(4-3ibn)\left(1-e^{2ia}(cx^n)^{2ib}\right)^{3/2}}$$

```
[Out] 2*x^2*hypergeom([-3/2, -3/4-I/b/n],[1/4-I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))*
sin(a+b*ln(c*x^n))^(3/2)/(4-3*I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)
```

Rubi [A] time = 0.08, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4493, 4491, 364}

$$\frac{2x^2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{4i}{bn}\right);\frac{1}{4}\left(1-\frac{4i}{bn}\right);e^{2ia}(cx^n)^{2ib}\right)\sin^{\frac{3}{2}}(a+b\log(cx^n))}{(4-3ibn)\left(1-e^{2ia}(cx^n)^{2ib}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^2*Hypergeometric2F1[-3/2, (-3 - (4*I)/(b*n))/4, (1 - (4*I)/(b*n))/4, E
^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^(3/2))/((4 - (3*I)*b*n)
*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\operatorname{Subst}\left(\int x^{-1+\frac{2}{n}}\sin^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x^2\left(cx^n\right)^{\frac{3ib}{2}-\frac{2}{n}}\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\operatorname{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{2}{n}}\left(1-e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx\right.}{n\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

$$=\frac{2x^2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{4i}{bn}\right);\frac{1}{4}\left(1-\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{(4-3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Mathematica [A] time = 1.83, size = 159, normalized size = 1.43

$$\frac{x^2\left(6b^2n^2\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{bn};\frac{5}{4}-\frac{i}{bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+(4+ibn)\left(3bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)-8\,\text{si}\right.\right.}{(-4-ibn)\left(9b^2n^2+16\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sin[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (x^2*(6*b^2*n^2*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1, 3
/4 - I/(b*n), 5/4 - I/(b*n), E^((2*I)*(a + b*Log[c*x^n]))] + (4 + I*b*n)*(-
8*Sin[a + b*Log[c*x^n]]^2 + 3*b*n*Sin[2*(a + b*Log[c*x^n])])))/((-4 - I*b*n
)*(16 + 9*b^2*n^2)*Sqrt[Sin[a + b*Log[c*x^n]]])
```

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*sin(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int x \sin\left(b \log\left(cx^{n}\right) + a\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
[Out] integrate(x*sin(b*log(c*x^n) + a)^(3/2), x)
```

maple **[F]** time = 0.05, size = 0, normalized size = 0.00

$$\int x \left(\sin^{\frac{3}{2}}\left(a + b \ln\left(c\, x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n))^(3/2),x)
[Out] int(x*sin(a+b*ln(c*x^n))^(3/2),x)
```

maxima **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int x \sin\left(b \log\left(cx^{n}\right) + a\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
[Out] integrate(x*sin(b*log(c*x^n) + a)^(3/2), x)
```

mupad **[F]** time = 0.00, size = -1, normalized size = -0.01

$$\int x \sin\left(a + b\, \ln\left(c\, x^{n}\right)\right)^{3/2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a + b*log(c*x^n))^(3/2),x)
[Out] int(x*sin(a + b*log(c*x^n))^(3/2), x)
```

sympy **[F(-1)]** time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*ln(c*x**n))**(3/2),x)
[Out] Timed out
```

3.59 $\int \sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=109

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(2-3ibn\right)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

```
[Out] 2*x*hypergeom([-3/2, -3/4-1/2*I/b/n],[1/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*
I*b))*sin(a+b*ln(c*x^n))^(3/2)/(2-3*I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(
3/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4483, 4491, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(2-3ibn\right)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x*Hypergeometric2F1[-3/2, (-3 - (2*I)/(b*n))/4, (1 - (2*I)/(b*n))/4, E^(
(2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^(3/2))/((2 - (3*I)*b*n)*(
1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
```

```
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sin^{\frac{3}{2}}(a+b\log(x))\,dx, x, cx^n\right)}{n}$$
$$= \frac{\left(x\left(cx^n\right)^{\frac{3ib}{2}-\frac{1}{n}}\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1}{n}}\left(1-e^{2ia}x^{2ib}\right)^{3/2}\,dx, x, cx^n\right)}{n\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$
$$= \frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{(2-3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Mathematica [A] time = 1.89, size = 161, normalized size = 1.48

$$\frac{x\left(6ib^2n^2\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+(bn-2i)\left(4\sin^2\left(a+b\log\left(cx^n\right)\right)-3bn\sin\ldots\right.\right.}{(bn-2i)\left(9b^2n^2+4\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (x*((6*I)*b^2*n^2*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1,
 3/4 - (I/2)/(b*n), 5/4 - (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))] + (-2*
I + b*n)*(4*Sin[a + b*Log[c*x^n]]^2 - 3*b*n*Sin[2*(a + b*Log[c*x^n])])))/((
-2*I + b*n)*(4 + 9*b^2*n^2)*Sqrt[Sin[a + b*Log[c*x^n]]])
```

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(sin(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \sin^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(3/2),x)
```

```
[Out] int(sin(a + b*log(c*x^n))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin^{\frac{3}{2}}{\left(a+b\log{\left(cx^{n}\right)}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(sin(a + b*log(c*x**n))**(3/2), x)
```

3.60 $\int \frac{\sin^{\frac{3}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=68

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\cos\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

```
[Out] -2/3*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(
c*x^n))*EllipticF(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))/b/n-2/3*cos(a+
b*ln(c*x^n))*sin(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.04, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2635, 2641}

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\cos\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (2*EllipticF[(a - Pi/2 + b*Log[c*x^n])/2, 2])/(3*b*n) - (2*Cos[a + b*Log[c*
x^n]]*Sqrt[Sin[a + b*Log[c*x^n]]])/(3*b*n)
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \sin^{\frac{3}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{3bn} + \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\sin(a+bx)}}\,dx, x, \log\left(\right.\right.}{3n}$$
$$= \frac{2F\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn} - \frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{3bn}$$

Mathematica [A] time = 0.14, size = 58, normalized size = 0.85

$$-\frac{2\left(F\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)+\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\cos\left(a+b\log\left(cx^n\right)\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (-2*(EllipticF[(-2*a + Pi - 2*b*Log[c*x^n])/4, 2] + Cos[a + b*Log[c*x^n]]*S
qrt[Sin[a + b*Log[c*x^n]]]))/(3*b*n)
```

fricas [F] time = 0.48, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sin(b*log(c*x^n) + a)^(3/2)/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(3/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2)/x, x)
```

maple [A] time = 0.06, size = 131, normalized size = 1.93

$$\frac{\frac{\sqrt{\sin(a+b\ln(c\,x^n))+1}\,\sqrt{-2\sin(a+b\ln(c\,x^n))+2}\,\sqrt{-\sin(a+b\ln(c\,x^n))}\,\mathrm{EllipticF}\left(\sqrt{\sin(a+b\ln(c\,x^n))+1},\frac{\sqrt{2}}{2}\right)}{3}-\frac{2\sin(a+b\ln(c\,x^n))\left(\cos^2(a+b\ln(c\,x^n))\right)}{3}}{n\cos\left(a+b\ln\left(c\,x^n\right)\right)\sqrt{\sin\left(a+b\ln\left(c\,x^n\right)\right)}\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(3/2)/x,x)
```

```
[Out] 1/n*(1/3*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin
(a+b*ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-
2/3*sin(a+b*ln(c*x^n))*cos(a+b*ln(c*x^n))^2)/cos(a+b*ln(c*x^n))/sin(a+b*ln(
c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2)/x, x)
```

mupad [B] time = 2.53, size = 65, normalized size = 0.96

$$-\frac{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^{5/2}\,{}_2\mathrm{F}_1\left(-\frac{1}{4},\frac{1}{2};\ \frac{3}{2};\ \cos\left(a+b\,\ln\left(c\,x^n\right)\right)^2\right)}{b\,n\left(\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^2\right)^{5/4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(3/2)/x,x)
```

```
[Out] -(cos(a + b*log(c*x^n))*sin(a + b*log(c*x^n))^(5/2)*hypergeom([-1/4, 1/2],
3/2, cos(a + b*log(c*x^n))^2))/(b*n*(sin(a + b*log(c*x^n))^2)^(5/4))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(3/2)/x,x)
```

```
[Out] Integral(sin(a + b*log(c*x**n))**(3/2)/x, x)
```

3.61 $\int \frac{\sin^{\frac{3}{2}}(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=111

$$-\frac{2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(\frac{2i}{bn}-3\right);\frac{1}{4}\left(1+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x(2+3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

```
[Out] -2*hypergeom([-3/2, -3/4+1/2*I/b/n],[1/4+1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I
*b))*sin(a+b*ln(c*x^n))^(3/2)/(2+3*I*b*n)/x/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^
(3/2)
```

Rubi [A] time = 0.09, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4493, 4491, 364}

$$-\frac{2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(\frac{2i}{bn}-3\right);\frac{1}{4}\left(1+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x(2+3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^(3/2)/x^2,x]
```

```
[Out] (-2*Hypergeometric2F1[-3/2, (-3 + (2*I)/(b*n))/4, (1 + (2*I)/(b*n))/4, E^((
2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^(3/2))/((2 + (3*I)*b*n)*x*
(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx &= \frac{\left(cx^n\right)^{\frac{1}{n}}\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sin^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{nx}\\ &= \frac{\left(\left(cx^n\right)^{\frac{3ib}{2}+\frac{1}{n}}\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{3ib}{2}-\frac{1}{n}}\left(1-e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx^n\right)}{nx\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}\\ &= -\frac{2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3+\frac{2i}{bn}\right);\frac{1}{4}\left(1+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{(2+3ibn)x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}\end{aligned}$$

Mathematica [A] time = 1.18, size = 172, normalized size = 1.55

$$\frac{6ib^2n^2\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}+\frac{i}{2bn};\frac{5}{4}+\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)-(bn+2i)\left(4\sin^2\left(a+b\log\left(cx^n\right)\right)+3bn\sin\right.}{x(bn+2i)(3bn-2i)(3bn+2i)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^(3/2)/x^2,x]
```

```
[Out] ((6*I)*b^2*n^2*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1, 3/
4 + (I/2)/(b*n), 5/4 + (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))] - (2*I +
b*n)*(4*Sin[a + b*Log[c*x^n]]^2 + 3*b*n*Sin[2*(a + b*Log[c*x^n])]))/((2*I +
 b*n)*(-2*I + 3*b*n)*(2*I + 3*b*n)*x*Sqrt[Sin[a + b*Log[c*x^n]]])
```

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(sin(a+b*log(c*x^n))^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2)/x^2, x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(3/2)/x^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^(3/2)/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2)/x^2, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{3/2}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(3/2)/x^2,x)
```

```
[Out] int(sin(a + b*log(c*x^n))^(3/2)/x^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(3/2)/x**2,x)
```

```
[Out] Integral(sin(a + b*log(c*x**n))**(3/2)/x**2, x)
```

3.62 $\int \frac{\sin^{\frac{3}{2}}(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=111

$$-\frac{2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(\frac{4i}{bn}-3\right);\frac{1}{4}\left(1+\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x^2(4+3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

```
[Out] -2*hypergeom([-3/2, -3/4+I/b/n],[1/4+I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))*sin
(a+b*ln(c*x^n))^(3/2)/(4+3*I*b*n)/x^2/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)
```

Rubi [A] time = 0.09, antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4493, 4491, 364}

$$-\frac{2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(\frac{4i}{bn}-3\right);\frac{1}{4}\left(1+\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x^2(4+3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^(3/2)/x^3,x]
```

```
[Out] (-2*Hypergeometric2F1[-3/2, (-3 + (4*I)/(b*n))/4, (1 + (4*I)/(b*n))/4, E^((
2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^(3/2))/((4 + (3*I)*b*n)*x^
2*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n}\operatorname{Subst}\left(\int x^{-1-\frac{2}{n}}\sin^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{nx^2}$$

$$= \frac{\left(\left(cx^n\right)^{\frac{3ib}{2}+\frac{2}{n}}\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\operatorname{Subst}\left(\int x^{-1-\frac{3ib}{2}-\frac{2}{n}}\left(1-e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx^n\right)}{nx^2\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

$$= -\frac{2\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3+\frac{4i}{bn}\right);\frac{1}{4}\left(1+\frac{4i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{(4+3ibn)x^2\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Mathematica [A] time = 1.20, size = 168, normalized size = 1.51

$$\frac{6ib^2n^2\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}+\frac{i}{bn};\frac{5}{4}+\frac{i}{bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)-(bn+4i)\left(8\sin^2\left(a+b\log\left(cx^n\right)\right)+3bn\sin\left(2\right.\right.}{x^2(bn+4i)(3bn-4i)(3bn+4i)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^(3/2)/x^3,x]
```

```
[Out] ((6*I)*b^2*n^2*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1, 3/
4 + I/(b*n), 5/4 + I/(b*n), E^((2*I)*(a + b*Log[c*x^n]))] - (4*I + b*n)*(8*
Sin[a + b*Log[c*x^n]]^2 + 3*b*n*Sin[2*(a + b*Log[c*x^n])]))/((4*I + b*n)*(-
4*I + 3*b*n)*(4*I + 3*b*n)*x^2*Sqrt[Sin[a + b*Log[c*x^n]]])
```

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(sin(a+b*log(c*x^n))^(3/2)/x^3,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(3/2)/x^3,x, algorithm="giac")
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2)/x^3, x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^(3/2)/x^3,x)
[Out] int(sin(a+b*ln(c*x^n))^(3/2)/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*log(c*x^n))^(3/2)/x^3,x, algorithm="maxima")
[Out] integrate(sin(b*log(c*x^n) + a)^(3/2)/x^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^(3/2)/x^3,x)
[Out] int(sin(a + b*log(c*x^n))^(3/2)/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**(3/2)/x**3,x)
```

```
[Out] Integral(sin(a + b*log(c*x**n))**(3/2)/x**3, x)
```

3.63 $\int \frac{1}{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}\,dx$

Optimal. Leaf size=109

$$\frac{2x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+ibn)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*x*hypergeom([1/2, 1/4-1/2*I/b/n],[5/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I*
b))*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)/(2+I*b*n)/sin(a+b*ln(c*x^n))^(1/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4483, 4491, 364}

$$\frac{2x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+ibn)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[Sin[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Sqrt[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2, (1 - (2
*I)/(b*n))/4, (5 - (2*I)/(b*n))/4, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((2 + I*
b*n)*Sqrt[Sin[a + b*Log[c*x^n]]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
```

```
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sqrt{\sin(a+b\log(x))}}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{ib}{2}-\frac{1}{n}}\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{ib}{2}+\frac{1}{n}}}{\sqrt{1-e^{2ia}x^{2ib}}}\,dx,x,cx^n\right)}{n\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

$$= \frac{2x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+ibn)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [A] time = 0.38, size = 96, normalized size = 0.88

$$\frac{2x\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{(-2-ibn)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/Sqrt[Sin[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Hypergeometric2F1[1, 3/4 - (I/2)/(
b*n), 5/4 - (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))])/((-2 - I*b*n)*Sqrt[
Sin[a + b*Log[c*x^n]]])
```

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/sin(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)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sin\left(b\log\left(cx^n\right) + a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(sin(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sin\left(a + b\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(1/sin(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sin\left(b\log\left(cx^n\right) + a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/sqrt(sin(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sqrt{\sin\left(a + b\,\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n))^(1/2),x)
```

```
[Out] int(1/sin(a + b*log(c*x^n))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sin\left(a + b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(1/sqrt(sin(a + b*log(c*x**n))), x)
```

3.64 $\int \frac{1}{x\sqrt{\sin(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=29

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

```
[Out] -2*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*
x^n))*EllipticF(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))/b/n
```

Rubi [A] time = 0.03, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {2641}

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Sin[a + b*Log[c*x^n]]]),x]
```

```
[Out] (2*EllipticF[(a - Pi/2 + b*Log[c*x^n])/2, 2])/(b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}\,dx &= \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\sin(a+bx)}}\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= \frac{2F\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}\end{aligned}$$

Mathematica [A] time = 0.09, size = 32, normalized size = 1.10

$$-\frac{2F\left(\frac{1}{2}\left(-a-b\log\left(cx^n\right)+\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Sin[a + b*Log[c*x^n]]]),x]
[Out] (-2*EllipticF[(-a + Pi/2 - b*Log[c*x^n])/2, 2])/(b*n)
```

fricas [F] time = 0.42, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\sqrt{\sin\left(b\log\left(cx^{n}\right)+a\right)}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
[Out] integral(1/(x*sqrt(sin(b*log(c*x^n) + a))), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{x\sqrt{\sin\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate(1/(x*sqrt(sin(b*log(c*x^n) + a))), x)
```

maple [A] time = 0.05, size = 102, normalized size = 3.52

$$\frac{\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+1}\,\sqrt{-2\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+2}\,\sqrt{-\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}\;\mathrm{EllipticF}\left(\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+}\right.}{n\cos\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/sin(a+b*ln(c*x^n))^(1/2),x)
[Out] 1/n*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*
ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))/cos(a
+b*ln(c*x^n))/sin(a+b*ln(c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{1}{x\sqrt{\sin\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/(x*sqrt(sin(b*log(c*x^n) + a))), x)
```

mupad [B] time = 2.55, size = 26, normalized size = 0.90

$$-\frac{2\,\mathrm{F}\left(\frac{\pi}{4}-\frac{a}{2}-\frac{b\,\ln(c\,x^n)}{2}\middle|2\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*sin(a + b*log(c*x^n))^(1/2)),x)
```

```
[Out] -(2*ellipticF(pi/4 - a/2 - (b*log(c*x^n))/2, 2))/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(sin(a + b*log(c*x**n)))), x)
```

3.65 $\int \frac{1}{\sin^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+3ibn)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*hypergeom([3/2, 3/4-1/2*I/b/n],[7/
4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+3*I*b*n)/sin(a+b*ln(c*x^n))^(3/
2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4483, 4491, 364}

$$\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+3ibn)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (2*x*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Hypergeometric2F1[3/2, (3 -
(2*I)/(b*n))/4, (7 - (2*I)/(b*n))/4, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((2 +
(3*I)*b*n)*Sin[a + b*Log[c*x^n]]^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sin^{\frac{3}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1}{n}}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{3ib}{2}+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^{3/2}}\,dx,x,cx^n\right)}{n\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+3ibn)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 0.92, size = 96, normalized size = 0.88

$$\frac{2x\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{1}{4}-\frac{i}{2bn};\frac{7}{4}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{(-2-3ibn)\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (2*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Hypergeometric2F1[1, 1/4 - (I/2)/(
b*n), 7/4 - (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))])/((-2 - (3*I)*b*n)*S
in[a + b*Log[c*x^n]]^(3/2))
```

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/sin(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(-3/2), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(1/sin(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(-3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n))^(3/2),x)
```

```
[Out] int(1/sin(a + b*log(c*x^n))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(sin(a + b*log(c*x**n))**(-3/2), x)
```

3.66 $\int \frac{1}{x\sin^{\frac{3}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=64

$$-\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*x
^n))*EllipticE(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))/b/n-2*cos(a+b*ln(
c*x^n))/b/n/sin(a+b*ln(c*x^n))^(1/2)
```

Rubi [A] time = 0.04, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2636, 2639}

$$-\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sin[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (-2*EllipticE[(a - Pi/2 + b*Log[c*x^n])/2, 2])/(b*n) - (2*Cos[a + b*Log[c*x
^n]])/(b*n*Sqrt[Sin[a + b*Log[c*x^n]]])
```

Rule 2636

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Sin[c + d*x])^(n + 1))/(b*d*(n + 1)), x] + Dist[(n + 2)/(b^2*(n + 1)), In
t[(b*Sin[c + d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] &&
IntegerQ[2*n]
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{1}{x\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sin^{\frac{3}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \sqrt{\sin(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2E\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)}{bn} - \frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [A] time = 0.18, size = 57, normalized size = 0.89

$$\frac{2\left(E\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sin[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (2*(EllipticE[(-2*a + Pi - 2*b*Log[c*x^n])/4, 2] - Cos[a + b*Log[c*x^n]]/Sq
rt[Sin[a + b*Log[c*x^n]]]))/(b*n)
```

fricas [F] time = 0.53, size = 0, normalized size = 0.00

$$\text{integral}\left(-\frac{\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}{x\cos\left(b\log\left(cx^n\right)+a\right)^2-x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(-sqrt(sin(b*log(c*x^n) + a))/(x*cos(b*log(c*x^n) + a)^2 - x), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/x/sin(a+b*log(c*x^n))^(3/2),x, algorithm="giac")

[Out] integrate(1/(x*sin(b*log(c*x^n) + a)^(3/2)), x)

maple [A] time = 0.06, size = 190, normalized size = 2.97

$$\frac{2\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+1}\ \sqrt{-2\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+2}\ \sqrt{-\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}\ \mathrm{EllipticE}\left(\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/x/sin(a+b*ln(c*x^n))^(3/2),x)

[Out] 1/n*(2*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*EllipticE((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-2*cos(a+b*ln(c*x^n))^2)/cos(a+b*ln(c*x^n))/sin(a+b*ln(c*x^n))^(1/2)/b

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \sin\left(b \log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/x/sin(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")

[Out] integrate(1/(x*sin(b*log(c*x^n) + a)^(3/2)), x)

mupad [B] time = 2.73, size = 65, normalized size = 1.02

$$-\frac{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)\,{\left({\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}^{2}\right)}^{1/4}\,{}_2\mathrm{F}_1\left(\frac{1}{2},\frac{5}{4};\ \frac{3}{2};\ {\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}^{2}\right)}{b\,n\,\sqrt{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/(x*sin(a + b*log(c*x^n))^(3/2)),x)

[Out] -(cos(a + b*log(c*x^n))*(sin(a + b*log(c*x^n))^2)^(1/4)*hypergeom([1/2, 5/4], 3/2, cos(a + b*log(c*x^n))^2))/(b*n*sin(a + b*log(c*x^n))^(1/2))

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \sin^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(1/(x*sin(a + b*log(c*x**n))**(3/2)), x)
```

3.67 $\int \frac{1}{\sin^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+5ibn)\sin^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*hypergeom([5/2, 5/4-1/2*I/b/n],[9/
4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+5*I*b*n)/sin(a+b*ln(c*x^n))^(5/
2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4483, 4491, 364}

$$\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+5ibn)\sin^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (2*x*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Hypergeometric2F1[5/2, (5 -
(2*I)/(b*n))/4, (9 - (2*I)/(b*n))/4, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((2 +
(5*I)*b*n)*Sin[a + b*Log[c*x^n]]^(5/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sin^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sin^{\frac{5}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1}{n}}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^{5/2}}\,dx,x,cx^n\right)}{n\sin^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+5ibn)\sin^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 1.51, size = 125, normalized size = 1.15

$$\frac{2x\left(i(bn+2i)\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)-bn\cot\left(a+b\log\left(cx^n\right)\right)-2\right)}{3b^2n^2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (2*x*(-2 - b*n*Cot[a + b*Log[c*x^n]] + I*(2*I + b*n)*(-1 + E^((2*I)*a)*(c*x
^n)^((2*I)*b))*Hypergeometric2F1[1, 3/4 - (I/2)/(b*n), 5/4 - (I/2)/(b*n), E
^((2*I)*(a + b*Log[c*x^n]))]))/(3*b^2*n^2*Sqrt[Sin[a + b*Log[c*x^n]]])
```

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/sin(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(-5/2), x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(1/sin(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(sin(b*log(c*x^n) + a)^(-5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n))^(5/2),x)
```

```
[Out] int(1/sin(a + b*log(c*x^n))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.68 $\int \frac{1}{x \sin^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=68

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] -2/3*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(
c*x^n))*EllipticF(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))/b/n-2/3*cos(a+
b*ln(c*x^n))/b/n/sin(a+b*ln(c*x^n))^(3/2)
```

Rubi [A] time = 0.04, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2636, 2641}

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sin[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (2*EllipticF[(a - Pi/2 + b*Log[c*x^n])/2, 2])/(3*b*n) - (2*Cos[a + b*Log[c*
x^n]])/(3*b*n*Sin[a + b*Log[c*x^n]]^(3/2))
```

Rule 2636

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Sin[c + d*x])^(n + 1))/(b*d*(n + 1)), x] + Dist[(n + 2)/(b^2*(n + 1)), In
t[(b*Sin[c + d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] &&
IntegerQ[2*n]
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{1}{x\sin^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\mathrm{Subst}\left(\int \frac{1}{\sin^{\frac{5}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} + \frac{\mathrm{Subst}\left(\int \frac{1}{\sqrt{\sin(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{3n}$$
$$= \frac{2F\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn} - \frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 0.20, size = 61, normalized size = 0.90

$$\frac{2\left(F\left(\frac{1}{4}\left(2a+2b\log\left(cx^n\right)-\pi\right)\middle|2\right)-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sin[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (2*(EllipticF[(2*a - Pi + 2*b*Log[c*x^n])/4, 2] - Cos[a + b*Log[c*x^n]]/Sin
[a + b*Log[c*x^n]]^(3/2)))/(3*b*n)
```

fricas [F] time = 0.58, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(-\frac{1}{\left(x\cos\left(b\log\left(cx^n\right)+a\right)^2-x\right)\sqrt{\sin\left(b\log\left(cx^n\right)+a\right)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] integral(-1/((x*cos(b*log(c*x^n) + a)^2 - x)*sqrt(sin(b*log(c*x^n) + a))),
x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sin\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*sin(b*log(c*x^n) + a)^(5/2)), x)
```

maple [A] time = 0.08, size = 131, normalized size = 1.93

$$\frac{\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+1}\,\sqrt{-2\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+2}\,\sqrt{-\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}\,\operatorname{EllipticF}\left(\sqrt{\sin\left(a+b\ln\left(c\,x^{n}\right)\right)+\cdots}\right.}{3n\sin\left(a+b\ln\left(c\,x^{n}\right)\right)^{\frac{3}{2}}\cos\left(a+b\ln\left(c\,x^{n}\right)\right)b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/sin(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] 1/3/n/sin(a+b*ln(c*x^n))^(3/2)*((sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln
(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))
+1)^(1/2),1/2*2^(1/2))*sin(a+b*ln(c*x^n))-2*cos(a+b*ln(c*x^n))^2)/cos(a+b*l
n(c*x^n))/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sin\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*sin(b*log(c*x^n) + a)^(5/2)), x)
```

mupad [B] time = 2.96, size = 65, normalized size = 0.96

$$-\frac{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)\,\left(\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{2}\right)^{3/4}\,{}_2\mathrm{F}_1\left(\frac{1}{2},\frac{7}{4};\ \frac{3}{2};\ \cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{2}\right)}{b\,n\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{3/2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*sin(a + b*log(c*x^n))^(5/2)),x)
```

```
[Out] -(cos(a + b*log(c*x^n))*(sin(a + b*log(c*x^n))^2)^(3/4)*hypergeom([1/2, 7/4
], 3/2, cos(a + b*log(c*x^n))^2))/(b*n*sin(a + b*log(c*x^n))^(3/2))
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sin(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.69 $\int \frac{1}{\sin^{\frac{3}{2}}(a-2i\log(cx))}\,dx$

Optimal. Leaf size=49

$$\frac{e^{-2ia}\left(1-e^{2ia}c^4x^4\right)}{2c^4x^3\sin^{\frac{3}{2}}(a-2i\log(cx))}$$

```
[Out] 1/2*(1-c^4*exp(2*I*a)*x^4)/c^4/exp(2*I*a)/x^3/sin(a-2*I*ln(c*x))^(3/2)
```

Rubi [A] time = 0.04, antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4483, 4481, 261}

$$\frac{e^{-2ia}\left(1-e^{2ia}c^4x^4\right)}{2c^4x^3\sin^{\frac{3}{2}}(a-2i\log(cx))}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a - (2*I)*Log[c*x]]^(-3/2),x]
```

```
[Out] (1 - c^4*E^((2*I)*a)*x^4)/(2*c^4*E^((2*I)*a)*x^3*Sin[a - (2*I)*Log[c*x]]^(3
/2))
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4481

```
Int[Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :> Dist[(Sin[d*(a +
b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, Int[(1 - E^(2*I*
a*d)*x^(2*I*b*d))^p/x^(I*b*d*p), x], x] /; FreeQ[{a, b, d, p}, x] &&  !Inte
gerQ[p]
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{1}{\sin^{\frac{3}{2}}(a-2i\log(cx))}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sin^{\frac{3}{2}}(a-2i\log(x))}\,dx, x, cx\right)}{c}$$

$$= \frac{\left(1-c^4e^{2ia}x^4\right)^{3/2}\text{Subst}\left(\int \frac{x^3}{\left(1-e^{2ia}x^4\right)^{3/2}}\,dx, x, cx\right)}{c^4x^3\sin^{\frac{3}{2}}(a-2i\log(cx))}$$

$$= \frac{e^{-2ia}\left(1-c^4e^{2ia}x^4\right)}{2c^4x^3\sin^{\frac{3}{2}}(a-2i\log(cx))}$$

Mathematica [A] time = 0.13, size = 81, normalized size = 1.65

$$\frac{x(\cos(a)-i\sin(a))\sqrt{\frac{2\sin(a)\left(c^4x^4+1\right)-2i\cos(a)\left(c^4x^4-1\right)}{c^2x^2}}}{\cos(a)\left(c^4x^4-1\right)+i\sin(a)\left(c^4x^4+1\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a - (2*I)*Log[c*x]]^(-3/2),x]
```

```
[Out] (x*(Cos[a] - I*Sin[a])*Sqrt[((-2*I)*(-1 + c^4*x^4)*Cos[a] + 2*(1 + c^4*x^4)
*Sin[a])/(c^2*x^2)])/((-1 + c^4*x^4)*Cos[a] + I*(1 + c^4*x^4)*Sin[a])
```

fricas [A] time = 0.51, size = 43, normalized size = 0.88

$$\frac{2\sqrt{\frac{1}{2}}\sqrt{-i\,c^4x^4+i\,e^{(-2i\,a)}}\,e^{\left(-\frac{3}{2}i\,a\right)}}{c^5x^4-ce^{(-2i\,a)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a-2*I*log(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] 2*sqrt(1/2)*sqrt(-I*c^4*x^4 + I*e^(-2*I*a))*e^(-3/2*I*a)/(c^5*x^4 - c*e^(-2
*I*a))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(a-2i\,\log\left(cx\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(a - 2*I*log(c*x))^(-3/2), x)
```

maple [F] time = 0.29, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin\left(a-2 i \ln\left(c x\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a-2*I*ln(c*x))^(3/2),x)
```

```
[Out] int(1/sin(a-2*I*ln(c*x))^(3/2),x)
```

maxima [B] time = 0.64, size = 402, normalized size = 8.20

$$\frac{\left(\left(\cos(a)^2+\sin(a)^2\right)c^4x^4+2\,c^2x^2\cos(a)+1\right)^{\frac{1}{4}}\left(\left(\cos(a)^2+\sin(a)^2\right)c^4x^4-2\,c^2x^2\cos(a)+1\right)^{\frac{1}{4}}\left(\left(\left(c^4x^4\left((i+1)\cos\right.\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a-2*I*log(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] ((cos(a)^2 + sin(a)^2)*c^4*x^4 + 2*c^2*x^2*cos(a) + 1)^(1/4)*((cos(a)^2 + s
in(a)^2)*c^4*x^4 - 2*c^2*x^2*cos(a) + 1)^(1/4)*(((c^4*x^4*((I + 1)*cos(3/2*
a) + (I - 1)*sin(3/2*a)) - (I + 1)*cos(1/2*a) + (I - 1)*sin(1/2*a))*cos(3/2
*arctan2(c^2*x^2*sin(a), -c^2*x^2*cos(a) + 1)) + (c^4*x^4*((I - 1)*cos(3/2*
a) - (I + 1)*sin(3/2*a)) - (I - 1)*cos(1/2*a) - (I + 1)*sin(1/2*a))*sin(3/2
*arctan2(c^2*x^2*sin(a), -c^2*x^2*cos(a) + 1)))*cos(3/2*arctan2(c^2*x^2*sin
(a), c^2*x^2*cos(a) + 1)) + ((c^4*x^4*(-(I - 1)*cos(3/2*a) + (I + 1)*sin(3/
2*a)) + (I - 1)*cos(1/2*a) + (I + 1)*sin(1/2*a))*cos(3/2*arctan2(c^2*x^2*si
n(a), -c^2*x^2*cos(a) + 1)) + (c^4*x^4*((I + 1)*cos(3/2*a) + (I - 1)*sin(3/
2*a)) - (I + 1)*cos(1/2*a) + (I - 1)*sin(1/2*a))*sin(3/2*arctan2(c^2*x^2*si
n(a), -c^2*x^2*cos(a) + 1)))*sin(3/2*arctan2(c^2*x^2*sin(a), c^2*x^2*cos(a)
 + 1)))/(((cos(a)^4 + 2*cos(a)^2*sin(a)^2 + sin(a)^4)*c^8*x^8 - 2*(cos(a)^2
 - sin(a)^2)*c^4*x^4 + 1)*c)
```

mupad [B] time = 2.94, size = 50, normalized size = 1.02

$$\frac{2\,x\,\sqrt{\frac{{\mathrm{e}}^{-a\,1{}\mathrm{i}}\,1{}\mathrm{i}}{2\,c^2\,x^2}-\frac{c^2\,x^2\,{\mathrm{e}}^{a\,1{}\mathrm{i}}\,1{}\mathrm{i}}{2}}}{c^4\,x^4\,{\mathrm{e}}^{a\,2{}\mathrm{i}}-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a - log(c*x)*2i)^(3/2),x)
```

```
[Out] (2*x*((exp(-a*1i)*1i)/(2*c^2*x^2) - (c^2*x^2*exp(a*1i)*1i)/2)^(1/2))/(c^4*x
^4*exp(a*2i) - 1)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sin^{\frac{3}{2}}\left(a-2i\log\left(cx\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sin(a-2*I*ln(c*x))**(3/2),x)
```

```
[Out] Integral(sin(a - 2*I*log(c*x))**(-3/2), x)
```

3.70 $\int (ex)^m \sin^4\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$

Optimal. Leaf size=337

$$\frac{(m+1)(ex)^{m+1}\sin^4\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(16b^2d^2n^2+(m+1)^2\right)}+\frac{12b^2d^2(m+1)n^2(ex)^{m+1}\sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(4b^2d^2n^2+(m+1)^2\right)\left(16b^2d^2n^2+(m+1)^2\right)}-\frac{4bdn(ex)^{m+1}\sin^3}{}$$

```
[Out] 24*b^4*d^4*n^4*(e*x)^(1+m)/e/(1+m)/((1+m)^2+4*b^2*d^2*n^2)/((1+m)^2+16*b^2*
d^2*n^2)-24*b^3*d^3*n^3*(e*x)^(1+m)*cos(d*(a+b*ln(c*x^n)))*sin(d*(a+b*ln(c*
x^n)))/e/((1+m)^2+4*b^2*d^2*n^2)/((1+m)^2+16*b^2*d^2*n^2)+12*b^2*d^2*(1+m)*
n^2*(e*x)^(1+m)*sin(d*(a+b*ln(c*x^n)))^2/e/((1+m)^2+4*b^2*d^2*n^2)/((1+m)^2
+16*b^2*d^2*n^2)-4*b*d*n*(e*x)^(1+m)*cos(d*(a+b*ln(c*x^n)))*sin(d*(a+b*ln(c
*x^n)))^3/e/((1+m)^2+16*b^2*d^2*n^2)+(1+m)*(e*x)^(1+m)*sin(d*(a+b*ln(c*x^n)
))^4/e/((1+m)^2+16*b^2*d^2*n^2)
```

Rubi [A] time = 0.17, antiderivative size = 337, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {4487, 32}

$$\frac{(m+1)(ex)^{m+1}\sin^4\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(16b^2d^2n^2+(m+1)^2\right)}+\frac{12b^2d^2(m+1)n^2(ex)^{m+1}\sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(4b^2d^2n^2+(m+1)^2\right)\left(16b^2d^2n^2+(m+1)^2\right)}-\frac{4bdn(ex)^{m+1}\sin^3}{}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^4,x]
```

```
[Out] (24*b^4*d^4*n^4*(e*x)^(1 + m))/(e*(1 + m)*((1 + m)^2 + 4*b^2*d^2*n^2)*((1 +
 m)^2 + 16*b^2*d^2*n^2)) - (24*b^3*d^3*n^3*(e*x)^(1 + m)*Cos[d*(a + b*Log[c
*x^n])]*Sin[d*(a + b*Log[c*x^n])])/(e*((1 + m)^2 + 4*b^2*d^2*n^2)*((1 + m)^
2 + 16*b^2*d^2*n^2)) + (12*b^2*d^2*(1 + m)*n^2*(e*x)^(1 + m)*Sin[d*(a + b*L
og[c*x^n])]^2)/(e*((1 + m)^2 + 4*b^2*d^2*n^2)*((1 + m)^2 + 16*b^2*d^2*n^2))
 - (4*b*d*n*(e*x)^(1 + m)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log[c*x^n]
)]^3)/(e*((1 + m)^2 + 16*b^2*d^2*n^2)) + ((1 + m)*(e*x)^(1 + m)*Sin[d*(a +
b*Log[c*x^n])]^4)/(e*((1 + m)^2 + 16*b^2*d^2*n^2))
```

Rule 32

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
```

```
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int (ex)^m \sin^4\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = -\frac{4bdn(ex)^{1+m}\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\sin^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left((1+m)^2+16b^2d^2n^2\right)} + \frac{(1+m\ldots}{\ldots}$$

$$= -\frac{24b^3d^3n^3(ex)^{1+m}\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left((1+m)^2+4b^2d^2n^2\right)\left((1+m)^2+16b^2d^2n^2\right)} + \frac{12b\ldots}{e\ldots}$$

$$= \frac{24b^4d^4n^4(ex)^{1+m}}{e(1+m)\left((1+m)^4+20b^2d^2(1+m)^2n^2+64b^4d^4n^4\right)} - \frac{24b^3d^3n^3(ex)^{1+m}\,c\ldots}{e\left((1+n\ldots\right.}$$

Mathematica [A] time = 2.00, size = 341, normalized size = 1.01

$$\frac{1}{8}x(ex)^m\left(\frac{4\sin(2bdn\log(x))\left((m+1)\sin\left(2d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)-2bdn\cos\left(2d\left(a+b\log\left(cx^n\right)-bn\,\mathrm{lo}\ldots\right.\right.\right.}{4b^2d^2n^2+m^2+2m+1}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^4,x]
```

```
[Out] (x*(e*x)^m*(3/(1 + m) + (4*Sin[2*b*d*n*Log[x]]*(-2*b*d*n*Cos[2*d*(a - b*n*L
og[x] + b*Log[c*x^n])] + (1 + m)*Sin[2*d*(a - b*n*Log[x] + b*Log[c*x^n])]))
/(1 + 2*m + m^2 + 4*b^2*d^2*n^2) - (4*Cos[2*b*d*n*Log[x]]*((1 + m)*Cos[2*d*
(a - b*n*Log[x] + b*Log[c*x^n])] + 2*b*d*n*Sin[2*d*(a - b*n*Log[x] + b*Log[
c*x^n])]))/(1 + 2*m + m^2 + 4*b^2*d^2*n^2) - (Sin[4*b*d*n*Log[x]]*(-4*b*d*n
*Cos[4*d*(a - b*n*Log[x] + b*Log[c*x^n])] + (1 + m)*Sin[4*d*(a - b*n*Log[x]
 + b*Log[c*x^n])]))/(1 + 2*m + m^2 + 16*b^2*d^2*n^2) + (Cos[4*b*d*n*Log[x]]
*((1 + m)*Cos[4*d*(a - b*n*Log[x] + b*Log[c*x^n])] + 4*b*d*n*Sin[4*d*(a - b
*n*Log[x] + b*Log[c*x^n])]))/(1 + 2*m + m^2 + 16*b^2*d^2*n^2)))/8
```

fricas [A] time = 0.57, size = 467, normalized size = 1.39

$$\frac{4\left(\left(4\left(b^3d^3m+b^3d^3\right)n^3+\left(bdm^3+3\,bdm^2+3\,bdm+bd\right)n\right)x\cos\left(bdn\log(x)+bd\log(c)+ad\right)^3-\left(10\left(b^3d^3m+\ldots\right.\right.\right.}{\ldots}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^4,x, algorithm="fricas")

[Out] (4*((4*(b^3*d^3*m + b^3*d^3)*n^3 + (b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n)*x*cos(b*d*n*log(x) + b*d*log(c) + a*d)^3 - (10*(b^3*d^3*m + b^3*d^3)*n^3 + (b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n)*x*cos(b*d*n*log(x) + b*d*log(c) + a*d))*e^(m*log(e) + m*log(x))*sin(b*d*n*log(x) + b*d*log(c) + a*d) + ((m^4 + 4*m^3 + 4*(b^2*d^2*m^2 + 2*b^2*d^2*m + b^2*d^2)*n^2 + 6*m^2 + 4*m + 1)*x*cos(b*d*n*log(x) + b*d*log(c) + a*d)^4 - 2*(m^4 + 4*m^3 + 10*(b^2*d^2*m^2 + 2*b^2*d^2*m + b^2*d^2)*n^2 + 6*m^2 + 4*m + 1)*x*cos(b*d*n*log(x) + b*d*log(c) + a*d)^2 + (24*b^4*d^4*n^4 + m^4 + 4*m^3 + 16*(b^2*d^2*m^2 + 2*b^2*d^2*m + b^2*d^2)*n^2 + 6*m^2 + 4*m + 1)*x)*e^(m*log(e) + m*log(x)))/(m^5 + 64*(b^4*d^4*m + b^4*d^4)*n^4 + 5*m^4 + 10*m^3 + 20*(b^2*d^2*m^3 + 3*b^2*d^2*m^2 + 3*b^2*d^2*m + b^2*d^2)*n^2 + 10*m^2 + 5*m + 1)

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^4,x, algorithm="giac")

[Out] Timed out

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\sin^4 \left(d \left(a + b \ln \left(c x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^4,x)

[Out] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^4,x)

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^4,x, algorithm="maxima")

[Out] Timed out

mupad [B] time = 4.04, size = 175, normalized size = 0.52

$$\frac{3\,x\,(e\,x)^m}{8\,m+8}-\frac{x\,\mathrm{e}^{a\,d\,2\mathrm{i}}\,(c\,x^n)^{b\,d\,2\mathrm{i}}\,(e\,x)^m}{4\,m+4+b\,d\,n\,8\mathrm{i}}-\frac{x\,\mathrm{e}^{-a\,d\,2\mathrm{i}}\,\frac{1}{(c\,x^n)^{b\,d\,2\mathrm{i}}}\,(e\,x)^m\,1\mathrm{i}}{m\,4\mathrm{i}+8\,b\,d\,n+4\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,d\,4\mathrm{i}}\,(c\,x^n)^{b\,d\,4\mathrm{i}}\,(e\,x)^m}{16\,m+16+b\,d\,n\,64\mathrm{i}}+\frac{x\,\mathrm{e}^{-a\,d\,4\mathrm{i}}\,\frac{1}{(c\,x^n)^{b\,d\,4\mathrm{i}}}\,(e\,x)^m\,1\mathrm{i}}{m\,16\mathrm{i}+64\,b\,d\,n+16\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(d*(a + b*log(c*x^n)))^4*(e*x)^m,x)
```

```
[Out] (3*x*(e*x)^m)/(8*m + 8) - (x*exp(a*d*2i)*(c*x^n)^(b*d*2i)*(e*x)^m)/(4*m + b
*d*n*8i + 4) - (x*exp(-a*d*2i)/(c*x^n)^(b*d*2i)*(e*x)^m*1i)/(m*4i + 8*b*d*n
 + 4i) + (x*exp(a*d*4i)*(c*x^n)^(b*d*4i)*(e*x)^m)/(16*m + b*d*n*64i + 16) +
 (x*exp(-a*d*4i)/(c*x^n)^(b*d*4i)*(e*x)^m*1i)/(m*16i + 64*b*d*n + 16i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-\frac{\begin{cases} \frac{\log(x)\cos(2ad)}{e} & \text{f} \\ \int (ex)^m \cos\left(-2ad + \frac{im\log(cx^n)}{n} + \frac{i\log(cx^n)}{n}\right) dx & \text{f} \\ \int (ex)^m \cos\left(2ad + \frac{im\log(cx^n)}{n} + \frac{i\log(cx^n)}{n}\right) dx & \text{f} \\ \frac{2bde^m nxx^m \sin\left(2ad+2bdn\log(x)+2bd\log(c)\right)}{4b^2d^2n^2+m^2+2m+1} + \frac{e^m mxx^m \cos\left(2ad+2bdn\log(x)+2bd\log(c)\right)}{4b^2d^2n^2+m^2+2m+1} + \frac{e^m xx^m \cos\left(2ad+2bdn\log(x)+2bd\log(c)\right)}{4b^2d^2n^2+m^2+2m+1} & \text{o} \end{cases}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*sin(d*(a+b*ln(c*x**n)))**4,x)
```

```
[Out] -Piecewise((log(x)*cos(2*a*d)/e, Eq(b, 0) & Eq(m, -1)), (Integral((e*x)**m*
cos(-2*a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, -I*(m + 1)/(2*
d*n))), (Integral((e*x)**m*cos(2*a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n)
, x), Eq(b, I*(m + 1)/(2*d*n))), (2*b*d*e**m*n*x*x**m*sin(2*a*d + 2*b*d*n*l
og(x) + 2*b*d*log(c))/(4*b**2*d**2*n**2 + m**2 + 2*m + 1) + e**m*m*x*x**m*c
os(2*a*d + 2*b*d*n*log(x) + 2*b*d*log(c))/(4*b**2*d**2*n**2 + m**2 + 2*m +
1) + e**m*x*x**m*cos(2*a*d + 2*b*d*n*log(x) + 2*b*d*log(c))/(4*b**2*d**2*n*
*2 + m**2 + 2*m + 1), True))/2 + Piecewise((log(x)*cos(4*a*d)/e, Eq(b, 0) &
 Eq(m, -1)), (Integral((e*x)**m*cos(-4*a*d + I*m*log(c*x**n)/n + I*log(c*x*
*n)/n), x), Eq(b, -I*(m + 1)/(4*d*n))), (Integral((e*x)**m*cos(4*a*d + I*m*
log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, I*(m + 1)/(4*d*n))), (4*b*d*e**
m*n*x*x**m*sin(4*a*d + 4*b*d*n*log(x) + 4*b*d*log(c))/(16*b**2*d**2*n**2 +
m**2 + 2*m + 1) + e**m*m*x*x**m*cos(4*a*d + 4*b*d*n*log(x) + 4*b*d*log(c))/
(16*b**2*d**2*n**2 + m**2 + 2*m + 1) + e**m*x*x**m*cos(4*a*d + 4*b*d*n*log(
x) + 4*b*d*log(c))/(16*b**2*d**2*n**2 + m**2 + 2*m + 1), True))/8 + 3*Piece
wise(((e*x)**(m + 1)/(m + 1), Ne(m, -1)), (log(e*x), True))/(8*e)
```

3.71 $\int (ex)^m \sin^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=256

$$\frac{(m+1)(ex)^{m+1}\sin^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(9b^2d^2n^2+(m+1)^2\right)}+\frac{6b^2d^2(m+1)n^2(ex)^{m+1}\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(b^2d^2n^2+(m+1)^2\right)\left(9b^2d^2n^2+(m+1)^2\right)}-\frac{3bdn(ex)^{m+1}\sin^2\left(a\right.}{}$$

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

Rubi [A] time = 0.12, antiderivative size = 256, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {4487, 4485}

$$\frac{(m+1)(ex)^{m+1}\sin^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(9b^2d^2n^2+(m+1)^2\right)}+\frac{6b^2d^2(m+1)n^2(ex)^{m+1}\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(b^2d^2n^2+(m+1)^2\right)\left(9b^2d^2n^2+(m+1)^2\right)}-\frac{6b^3d^3n^3(ex)^{m+1}\text{co}}{e\left(b^2d^2n^2+(m+1)\right.}$$

Antiderivative was successfully verified.

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

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

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
```

```
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int (ex)^m \sin^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = -\frac{3bdn(ex)^{1+m}\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left((1+m)^2+9b^2d^2n^2\right)} + \frac{(1+m}{}$$

$$= -\frac{6b^3d^3n^3(ex)^{1+m}\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left((1+m)^2+b^2d^2n^2\right)\left((1+m)^2+9b^2d^2n^2\right)} + \frac{6b^2d^2(1+m)n^2(ex)^{1+m}\,\mathrm{si}}{e\left((1+m)^2+b^2d^2n^2\right)\left(\right.}$$

Mathematica [A] time = 1.31, size = 326, normalized size = 1.27

$$\frac{1}{4}x(ex)^m\left(\frac{3\cos(bdn\log(x))\left((m+1)\sin\left(d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)-bdn\cos\left(d\left(a+b\log\left(cx^n\right)-bn\log(x\right.\right.\right.}{b^2d^2n^2+m^2+2m+1}\right.$$

Antiderivative was successfully verified.

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

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

fricas [A] time = 0.57, size = 293, normalized size = 1.14

$$-\frac{\left(\left(m^3+\left(b^2d^2m+b^2d^2\right)n^2+3\,m^2+3\,m+1\right)x\cos\left(bdn\log(x)+bd\log(c)+ad\right)^2-\left(m^3+7\left(b^2d^2m+b^2d^2\right)n^2+\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(((m^3 + (b^2*d^2*m + b^2*d^2)*n^2 + 3*m^2 + 3*m + 1)*x*cos(b*d*n*log(x) +
 b*d*log(c) + a*d)^2 - (m^3 + 7*(b^2*d^2*m + b^2*d^2)*n^2 + 3*m^2 + 3*m + 1
)*x)*e^(m*log(e) + m*log(x))*sin(b*d*n*log(x) + b*d*log(c) + a*d) - 3*((b^3
*d^3*n^3 + (b*d*m^2 + 2*b*d*m + b*d)*n)*x*cos(b*d*n*log(x) + b*d*log(c) + a
*d)^3 - (3*b^3*d^3*n^3 + (b*d*m^2 + 2*b*d*m + b*d)*n)*x*cos(b*d*n*log(x) +
b*d*log(c) + a*d))*e^(m*log(e) + m*log(x)))/(9*b^4*d^4*n^4 + m^4 + 4*m^3 +
10*(b^2*d^2*m^2 + 2*b^2*d^2*m + b^2*d^2)*n^2 + 6*m^2 + 4*m + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\sin^3 \left(d \left(a + b \ln \left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

mupad [B] time = 3.93, size = 161, normalized size = 0.63

$$\frac{x\,\mathrm{e}^{-a\,d\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,d\,1\mathrm{i}}}\,{\left(e\,x\right)}^m\,3\mathrm{i}}{8\,m+8-b\,d\,n\,8\mathrm{i}}+\frac{3\,x\,\mathrm{e}^{a\,d\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,d\,1\mathrm{i}}\,{\left(e\,x\right)}^m}{m\,8\mathrm{i}-8\,b\,d\,n+8\mathrm{i}}-\frac{x\,\mathrm{e}^{-a\,d\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,d\,3\mathrm{i}}}\,{\left(e\,x\right)}^m\,1\mathrm{i}}{8\,m+8-b\,d\,n\,24\mathrm{i}}-\frac{x\,\mathrm{e}^{a\,d\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,d\,3\mathrm{i}}\,{\left(e\,x\right)}^m}{m\,8\mathrm{i}-24\,b\,d\,n+8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*exp(-a*d*1i)/(c*x^n)^(b*d*1i)*(e*x)^m*3i)/(8*m - b*d*n*8i + 8) + (3*x*ex
p(a*d*1i)*(c*x^n)^(b*d*1i)*(e*x)^m)/(m*8i - 8*b*d*n + 8i) - (x*exp(-a*d*3i)
/(c*x^n)^(b*d*3i)*(e*x)^m*1i)/(8*m - b*d*n*24i + 8) - (x*exp(a*d*3i)*(c*x^n
)^(b*d*3i)*(e*x)^m)/(m*8i - 24*b*d*n + 8i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{3\left(\begin{cases}\frac{\log(x)\sin(ad)}{e} & \text{for } b = \\ -\int (ex)^m \sin\left(-ad + \frac{im\log(cx^n)}{n} + \frac{i\log(cx^n)}{n}\right)dx & \text{for } b = \\ \int (ex)^m \sin\left(ad + \frac{im\log(cx^n)}{n} + \frac{i\log(cx^n)}{n}\right)dx & \text{for } b = \\ -\frac{bde^m nxx^m \cos\left(ad+bdn\log(x)+bd\log(c)\right)}{b^2d^2n^2+m^2+2m+1} + \frac{e^m mxx^m \sin\left(ad+bdn\log(x)+bd\log(c)\right)}{b^2d^2n^2+m^2+2m+1} + \frac{e^m xx^m \sin\left(ad+bdn\log(x)+bd\log(c)\right)}{b^2d^2n^2+m^2+2m+1} & \text{otherw}\end{cases}\right.}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 3*Piecewise((log(x)*sin(a*d)/e, Eq(b, 0) & Eq(m, -1)), (-Integral((e*x)**m*
sin(-a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, -I*(m + 1)/(d*n)
)), (Integral((e*x)**m*sin(a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n), x),
Eq(b, I*(m + 1)/(d*n))), (-b*d*e**m*n*x*x**m*cos(a*d + b*d*n*log(x) + b*d*l
og(c))/(b**2*d**2*n**2 + m**2 + 2*m + 1) + e**m*m*x*x**m*sin(a*d + b*d*n*lo
g(x) + b*d*log(c))/(b**2*d**2*n**2 + m**2 + 2*m + 1) + e**m*x*x**m*sin(a*d
+ b*d*n*log(x) + b*d*log(c))/(b**2*d**2*n**2 + m**2 + 2*m + 1), True))/4 -
Piecewise((log(x)*sin(3*a*d)/e, Eq(b, 0) & Eq(m, -1)), (-Integral((e*x)**m*
sin(-3*a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, -I*(m + 1)/(3*
d*n))), (Integral((e*x)**m*sin(3*a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n)
, x), Eq(b, I*(m + 1)/(3*d*n))), (-3*b*d*e**m*n*x*x**m*cos(3*a*d + 3*b*d*n*
log(x) + 3*b*d*log(c))/(9*b**2*d**2*n**2 + m**2 + 2*m + 1) + e**m*m*x*x**m*
sin(3*a*d + 3*b*d*n*log(x) + 3*b*d*log(c))/(9*b**2*d**2*n**2 + m**2 + 2*m +
 1) + e**m*x*x**m*sin(3*a*d + 3*b*d*n*log(x) + 3*b*d*log(c))/(9*b**2*d**2*n
**2 + m**2 + 2*m + 1), True))/4
```

3.72 $\int (ex)^m \sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$

Optimal. Leaf size=154

$$\frac{(m+1)(ex)^{m+1}\sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(4b^2d^2n^2+(m+1)^2\right)}-\frac{2bdn(ex)^{m+1}\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(4b^2d^2n^2+(m+1)^2\right)}+\frac{\quad}{e(m+}$$

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

Rubi [A] time = 0.06, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {4487, 32}

$$\frac{(m+1)(ex)^{m+1}\sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(4b^2d^2n^2+(m+1)^2\right)}-\frac{2bdn(ex)^{m+1}\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left(4b^2d^2n^2+(m+1)^2\right)}+\frac{\quad}{e(m+}$$

Antiderivative was successfully verified.

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

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

Rule 32

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

Rule 4487

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] - Simp[(b*d*n*p*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]*Sin[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int (ex)^m \sin^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = -\frac{2bdn(ex)^{1+m}\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e\left((1+m)^2+4b^2d^2n^2\right)} + \frac{(1+m)}{}$$

$$= \frac{2b^2d^2n^2(ex)^{1+m}}{e(1+m)\left((1+m)^2+4b^2d^2n^2\right)} - \frac{2bdn(ex)^{1+m}\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\sin}{e\left((1+m)^2+4b^2d^2n\right.}$$

Mathematica [C] time = 0.30, size = 102, normalized size = 0.66

$$-\frac{x(ex)^m\left(2bd(m+1)n\sin\left(2d\left(a+b\log\left(cx^n\right)\right)\right)+(m+1)^2\cos\left(2d\left(a+b\log\left(cx^n\right)\right)\right)-4b^2d^2n^2-m^2-2m-1\right)}{2(m+1)(-2ibdn+m+1)(2ibdn+m+1)}$$

Antiderivative was successfully verified.

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

```
[Out] -1/2*(x*(e*x)^m*(-1 - 2*m - m^2 - 4*b^2*d^2*n^2 + (1 + m)^2*Cos[2*d*(a + b*
Log[c*x^n])] + 2*b*d*(1 + m)*n*Sin[2*d*(a + b*Log[c*x^n])]))/((1 + m)*(1 +
m - (2*I)*b*d*n)*(1 + m + (2*I)*b*d*n))
```

fricas [A] time = 0.65, size = 155, normalized size = 1.01

$$-\frac{2\left(bdm+bd\right)nx\cos\left(bdn\log(x)+bd\log(c)+ad\right)e^{\left(m\log(e)+m\log(x)\right)}\sin\left(bdn\log(x)+bd\log(c)+ad\right)+\left(\left(m^2+2\right.\right.}{m^3+4\left(b^2d^2m+b^2d^2\right)n^2+3m}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\sin^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^2,x)
[Out] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [B] time = 0.49, size = 2551, normalized size = 16.56

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^2,x, algorithm="maxima")
[Out] -1/4*(((((cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c))
+ (cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*cos(4*
b*d*log(c)) + cos(2*b*d*log(c))*cos(2*a*d) - ((cos(2*a*d)*sin(4*a*d) - cos(
4*a*d)*sin(2*a*d))*cos(2*b*d*log(c)) - (cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*
sin(2*a*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)) - sin(2*b*d*log(c))*sin(2*
a*d))*e^m*m^2 + 2*(((cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*cos(2*b
*d*log(c)) + (cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*sin(2*b*d*log(
c)))*cos(4*b*d*log(c)) + cos(2*b*d*log(c))*cos(2*a*d) - ((cos(2*a*d)*sin(4*
a*d) - cos(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c)) - (cos(4*a*d)*cos(2*a*d) +
sin(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)) - sin(2*b*d*log
(c))*sin(2*a*d))*e^m*m + (((cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*
cos(2*b*d*log(c)) + (cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*sin(2*b
*d*log(c)))*cos(4*b*d*log(c)) + cos(2*b*d*log(c))*cos(2*a*d) - ((cos(2*a*d)
*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c)) - (cos(4*a*d)*cos(2*
a*d) + sin(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)) - sin(2*
b*d*log(c))*sin(2*a*d))*e^m + 2*((b*d*cos(2*a*d)*sin(2*b*d*log(c)) + b*d*co
s(2*b*d*log(c))*sin(2*a*d) + ((b*d*cos(2*a*d)*sin(4*a*d) - b*d*cos(4*a*d)*s
in(2*a*d))*cos(2*b*d*log(c)) - (b*d*cos(4*a*d)*cos(2*a*d) + b*d*sin(4*a*d)*
sin(2*a*d))*sin(2*b*d*log(c)))*cos(4*b*d*log(c)) + ((b*d*cos(4*a*d)*cos(2*a
*d) + b*d*sin(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c)) + (b*d*cos(2*a*d)*sin(4*
a*d) - b*d*cos(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)))*e^m
*m + (b*d*cos(2*a*d)*sin(2*b*d*log(c)) + b*d*cos(2*b*d*log(c))*sin(2*a*d) +
 ((b*d*cos(2*a*d)*sin(4*a*d) - b*d*cos(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c))
 - (b*d*cos(4*a*d)*cos(2*a*d) + b*d*sin(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)
))*cos(4*b*d*log(c)) + ((b*d*cos(4*a*d)*cos(2*a*d) + b*d*sin(4*a*d)*sin(2*a
*d))*cos(2*b*d*log(c)) + (b*d*cos(2*a*d)*sin(4*a*d) - b*d*cos(4*a*d)*sin(2*
a*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)))*e^m)*n)*x*x^m*cos(2*b*d*log(x^n
```

```
)) - ((((cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c)) -
 (cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*cos(4*b
*d*log(c)) + ((cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*cos(2*b*d*log
(c)) + (cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*s
in(4*b*d*log(c)) + cos(2*a*d)*sin(2*b*d*log(c)) + cos(2*b*d*log(c))*sin(2*a
*d))*e^m*m^2 + 2*(((cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*cos(2*b*
d*log(c)) - (cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c
)))*cos(4*b*d*log(c)) + ((cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*co
s(2*b*d*log(c)) + (cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*sin(2*b*d
*log(c)))*sin(4*b*d*log(c)) + cos(2*a*d)*sin(2*b*d*log(c)) + cos(2*b*d*log(
c))*sin(2*a*d))*e^m*m + (((cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*c
os(2*b*d*log(c)) - (cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a*d))*sin(2*b*
d*log(c)))*cos(4*b*d*log(c)) + ((cos(4*a*d)*cos(2*a*d) + sin(4*a*d)*sin(2*a
*d))*cos(2*b*d*log(c)) + (cos(2*a*d)*sin(4*a*d) - cos(4*a*d)*sin(2*a*d))*si
n(2*b*d*log(c)))*sin(4*b*d*log(c)) + cos(2*a*d)*sin(2*b*d*log(c)) + cos(2*b
*d*log(c))*sin(2*a*d))*e^m - 2*((b*d*cos(2*b*d*log(c))*cos(2*a*d) - b*d*sin
(2*b*d*log(c))*sin(2*a*d) + ((b*d*cos(4*a*d)*cos(2*a*d) + b*d*sin(4*a*d)*si
n(2*a*d))*cos(2*b*d*log(c)) + (b*d*cos(2*a*d)*sin(4*a*d) - b*d*cos(4*a*d)*s
in(2*a*d))*sin(2*b*d*log(c)))*cos(4*b*d*log(c)) - ((b*d*cos(2*a*d)*sin(4*a*
d) - b*d*cos(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c)) - (b*d*cos(4*a*d)*cos(2*a
*d) + b*d*sin(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)))*e^m*
m + (b*d*cos(2*b*d*log(c))*cos(2*a*d) - b*d*sin(2*b*d*log(c))*sin(2*a*d) +
((b*d*cos(4*a*d)*cos(2*a*d) + b*d*sin(4*a*d)*sin(2*a*d))*cos(2*b*d*log(c))
+ (b*d*cos(2*a*d)*sin(4*a*d) - b*d*cos(4*a*d)*sin(2*a*d))*sin(2*b*d*log(c))
)*cos(4*b*d*log(c)) - ((b*d*cos(2*a*d)*sin(4*a*d) - b*d*cos(4*a*d)*sin(2*a*
d))*cos(2*b*d*log(c)) - (b*d*cos(4*a*d)*cos(2*a*d) + b*d*sin(4*a*d)*sin(2*a
*d))*sin(2*b*d*log(c)))*sin(4*b*d*log(c)))*e^m)*n)*x*x^m*sin(2*b*d*log(x^n)
) - 2*(((cos(2*a*d)^2 + sin(2*a*d)^2)*cos(2*b*d*log(c))^2 + (cos(2*a*d)^2 +
 sin(2*a*d)^2)*sin(2*b*d*log(c))^2)*e^m*m^2 + 4*((b^2*d^2*cos(2*a*d)^2 + b^
2*d^2*sin(2*a*d)^2)*cos(2*b*d*log(c))^2 + (b^2*d^2*cos(2*a*d)^2 + b^2*d^2*s
in(2*a*d)^2)*sin(2*b*d*log(c))^2)*e^m*n^2 + 2*((cos(2*a*d)^2 + sin(2*a*d)^2
)*cos(2*b*d*log(c))^2 + (cos(2*a*d)^2 + sin(2*a*d)^2)*sin(2*b*d*log(c))^2)*
e^m*m + ((cos(2*a*d)^2 + sin(2*a*d)^2)*cos(2*b*d*log(c))^2 + (cos(2*a*d)^2
+ sin(2*a*d)^2)*sin(2*b*d*log(c))^2)*e^m)*x*x^m)/(((cos(2*a*d)^2 + sin(2*a*
d)^2)*cos(2*b*d*log(c))^2 + (cos(2*a*d)^2 + sin(2*a*d)^2)*sin(2*b*d*log(c))
^2)*m^3 + 3*((cos(2*a*d)^2 + sin(2*a*d)^2)*cos(2*b*d*log(c))^2 + (cos(2*a*d
)^2 + sin(2*a*d)^2)*sin(2*b*d*log(c))^2)*m^2 + 4*((b^2*d^2*cos(2*a*d)^2 + b
^2*d^2*sin(2*a*d)^2)*cos(2*b*d*log(c))^2 + (b^2*d^2*cos(2*a*d)^2 + b^2*d^2*
sin(2*a*d)^2)*sin(2*b*d*log(c))^2 + ((b^2*d^2*cos(2*a*d)^2 + b^2*d^2*sin(2*
a*d)^2)*cos(2*b*d*log(c))^2 + (b^2*d^2*cos(2*a*d)^2 + b^2*d^2*sin(2*a*d)^2)
*sin(2*b*d*log(c))^2)*m)*n^2 + (cos(2*a*d)^2 + sin(2*a*d)^2)*cos(2*b*d*log(
c))^2 + (cos(2*a*d)^2 + sin(2*a*d)^2)*sin(2*b*d*log(c))^2 + 3*((cos(2*a*d)^
2 + sin(2*a*d)^2)*cos(2*b*d*log(c))^2 + (cos(2*a*d)^2 + sin(2*a*d)^2)*sin(2
*b*d*log(c))^2)*m)
```

mupad [B] time = 3.05, size = 95, normalized size = 0.62

$$\frac{x\,(e\,x)^m}{2\,m+2}-\frac{x\,\mathrm{e}^{a\,d\,2\mathrm{i}}\,(c\,x^n)^{b\,d\,2\mathrm{i}}\,(e\,x)^m}{4\,m+4+b\,d\,n\,8\mathrm{i}}-\frac{x\,\mathrm{e}^{-a\,d\,2\mathrm{i}}\,\frac{1}{(c\,x^n)^{b\,d\,2\mathrm{i}}}\,(e\,x)^m\,1\mathrm{i}}{m\,4\mathrm{i}+8\,b\,d\,n+4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*(e*x)^m)/(2*m + 2) - (x*exp(a*d*2i)*(c*x^n)^(b*d*2i)*(e*x)^m)/(4*m + b*d
*n*8i + 4) - (x*exp(-a*d*2i)/(c*x^n)^(b*d*2i)*(e*x)^m*1i)/(m*4i + 8*b*d*n +
 4i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-\frac{\begin{cases}\frac{\log(x)\cos(2ad)}{e}\\ \int (ex)^m\cos\left(-2ad+\frac{im\log(cx^n)}{n}+\frac{i\log(cx^n)}{n}\right)dx\\ \int (ex)^m\cos\left(2ad+\frac{im\log(cx^n)}{n}+\frac{i\log(cx^n)}{n}\right)dx\\ \frac{2bde^m nxx^m\sin\left(2ad+2bdn\log(x)+2bd\log(c)\right)}{4b^2d^2n^2+m^2+2m+1}+\frac{e^m mxx^m\cos\left(2ad+2bdn\log(x)+2bd\log(c)\right)}{4b^2d^2n^2+m^2+2m+1}+\frac{e^m xx^m\cos\left(2ad+2bdn\log(x)+2bd\log(c)\right)}{4b^2d^2n^2+m^2+2m+1}\end{cases}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -Piecewise((log(x)*cos(2*a*d)/e, Eq(b, 0) & Eq(m, -1)), (Integral((e*x)**m*
cos(-2*a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, -I*(m + 1)/(2*
d*n))), (Integral((e*x)**m*cos(2*a*d + I*m*log(c*x**n)/n + I*log(c*x**n)/n)
, x), Eq(b, I*(m + 1)/(2*d*n))), (2*b*d*e**m*n*x*x**m*sin(2*a*d + 2*b*d*n*l
og(x) + 2*b*d*log(c))/(4*b**2*d**2*n**2 + m**2 + 2*m + 1) + e**m*m*x*x**m*c
os(2*a*d + 2*b*d*n*log(x) + 2*b*d*log(c))/(4*b**2*d**2*n**2 + m**2 + 2*m +
1) + e**m*x*x**m*cos(2*a*d + 2*b*d*n*log(x) + 2*b*d*log(c))/(4*b**2*d**2*n*
*2 + m**2 + 2*m + 1), True))/2 + Piecewise(((e*x)**(m + 1)/(m + 1), Ne(m, -
1)), (log(e*x), True))/(2*e)
```

3.73 $\int (ex)^m \sin \left(d \left(a + b \log \left(cx^n\right)\right)\right) \, dx$

Optimal. Leaf size=92

$$\frac{(m+1)(ex)^{m+1} \sin \left(d \left(a + b \log \left(cx^n\right)\right)\right)}{e \left(b^2 d^2 n^2 + (m+1)^2\right)} - \frac{bdn(ex)^{m+1} \cos \left(d \left(a + b \log \left(cx^n\right)\right)\right)}{e \left(b^2 d^2 n^2 + (m+1)^2\right)}$$

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

Rubi [A] time = 0.02, antiderivative size = 92, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {4485}

$$\frac{(m+1)(ex)^{m+1} \sin \left(d \left(a + b \log \left(cx^n\right)\right)\right)}{e \left(b^2 d^2 n^2 + (m+1)^2\right)} - \frac{bdn(ex)^{m+1} \cos \left(d \left(a + b \log \left(cx^n\right)\right)\right)}{e \left(b^2 d^2 n^2 + (m+1)^2\right)}$$

Antiderivative was successfully verified.

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

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

Rule 4485

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] - Simp[(b*d*n*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int (ex)^m \sin \left(d \left(a + b \log \left(cx^n\right)\right)\right) \, dx = -\frac{bdn(ex)^{1+m} \cos \left(d \left(a + b \log \left(cx^n\right)\right)\right)}{e \left((1+m)^2 + b^2 d^2 n^2\right)} + \frac{(1+m)(ex)^{1+m} \sin \left(d \left(a + b \log \left(c\right.\right.\right.}{e \left((1+m)^2 + b^2 d^2 n^2\right)}$$

Mathematica [A] time = 0.17, size = 63, normalized size = 0.68

$$\frac{x(ex)^m \left((m+1) \sin \left(d \left(a + b \log \left(cx^n\right)\right)\right) - bdn \cos \left(d \left(a + b \log \left(cx^n\right)\right)\right)\right)}{b^2 d^2 n^2 + m^2 + 2m + 1}$$

Antiderivative was successfully verified.

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

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

fricas [A] time = 0.49, size = 86, normalized size = 0.93

$$-\frac{bdnx\cos\left(bdn\log(x)+bd\log(c)+ad\right)e^{\left(m\log(e)+m\log(x)\right)}-(m+1)xe^{\left(m\log(e)+m\log(x)\right)}\sin\left(bdn\log(x)+bd\log(c\right.}{b^2d^2n^2+m^2+2m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.80, size = 5760, normalized size = 62.61

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sg
n(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*t
an(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + b*d*n*x*abs(x)^m*e^(-1/2*
pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/
2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m
)^2*tan(1/2*a*d)^2 - b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n
 + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*
log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 - b*d*n*x*abs(x)^m*e^(-1/2
*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1
/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*
m)^2 + 4*b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*
d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))
^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d) - 4*b*d*n*x*abs(x)^m*e^(-1/
2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(
1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi
*m)*tan(1/2*a*d) - 4*b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n
 + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*
log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d) - 4*b*d*n*x*abs
(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b
```

```
*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x
) - 1/4*pi*m)^2*tan(1/2*a*d) - b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/
2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x))
+ 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d)^2 - b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n
*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*
log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d)^2 + 4*b*d*n*x*abs(x)^m*e^
(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*t
an(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*p
i*m)*tan(1/2*a*d)^2 - 4*b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b
*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*
b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d)^2 - b*d*n*x*a
bs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*
b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 - b*d*n*x*abs(x)^
m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d +
 m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + 2*m*x*abs(x)^m*e^(1/
2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(
1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi
*m)^2*tan(1/2*a*d) + 2*m*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n
- 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*l
og(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d) - 2*m*x*abs(x)
^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d +
 m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x)
- 1/4*pi*m)*tan(1/2*a*d)^2 + 2*m*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*p
i*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1
/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d)^2 + 2*m*
x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*
pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*s
gn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + 2*m*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x)
 + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs
(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^
2 + b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn
(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2 +
b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c)
 + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2 - 4*b
*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) -
 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*p
i*m*sgn(x) - 1/4*pi*m) + 4*b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*p
i*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1
/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) + b*d*n*x*abs(x)^m*e^(1
/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan
(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) +
 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1
/4*pi*m)^2 + 4*b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2
*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(ab
s(c)))*tan(1/2*a*d) + 4*b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b
```

```
*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*
b*d*log(abs(c)))*tan(1/2*a*d) - 4*b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) -
 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1
/4*pi*m)*tan(1/2*a*d) + 4*b*d*n*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi
*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m
)*tan(1/2*a*d) + 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*p
i*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(
c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d) + 2*x*abs(x)^m*e^(-1/
2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(
1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi
*m)^2*tan(1/2*a*d) + b*d*n*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n
 + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*a*d)^2 + b*d*n*x*abs(x)^m*e^
(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*
tan(1/2*a*d)^2 - 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*p
i*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(
c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d)^2 + 2*x*abs(x)^m*e^(-1/
2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(
1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi
*m)*tan(1/2*a*d)^2 + 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1
/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(
abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + 2*x*abs(x)^m*e^
(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*
tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*
pi*m)^2*tan(1/2*a*d)^2 + 2*m*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d
*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*
d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - 2*m*x*abs(x)^m*e^(-1/2*p
i*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2
*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)
 - 2*m*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c)
 - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4
*pi*m*sgn(x) - 1/4*pi*m)^2 - 2*m*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*p
i*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1
/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 - 2*m*x*abs(x)^m*e^(1
/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan
(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d) - 2*m*x*abs(x)
^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d
+ m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d) + 8*m*
x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*
pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*s
gn(x) - 1/4*pi*m)*tan(1/2*a*d) - 8*m*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1
/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x))
 + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d) - 2*m*
x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*
pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d) - 2*m*x*abs(x)^m
*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d +
```

m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d) - 2*m*x*abs(x)^m*e^(1/2*p
i*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2
*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/2*a*d)^2 - 2*m*x*abs(x)^m*e
^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)
*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/2*a*d)^2 + 2*m*x*ab
s(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b
*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d)^2 - 2*m*x*abs(x)^m*e^(
-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*t
an(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d)^2 - b*d*n*x*abs(x)^m*e^(1/2*pi*
b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m) - b*d*n*x
*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*
pi*b*d + m) + 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b
*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c))
)^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x)
+ 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(
x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - 2*x*abs(x)^m
*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m
)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/
4*pi*m)^2 - 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*
d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))
*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 - 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) -
1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)
) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d) - 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn
(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(
abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d) + 8*x*abs(x)^m*e^(1/2*pi*b*d*
n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n
*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2
*a*d) - 8*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sg
n(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))*tan
(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a*d) - 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sg
n(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(
x) - 1/4*pi*m)^2*tan(1/2*a*d) - 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*
pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi
*m)^2*tan(1/2*a*d) - 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1
/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(
abs(c)))*tan(1/2*a*d)^2 - 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d
*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*
d*log(abs(c)))*tan(1/2*a*d)^2 + 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*p
i*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*
m)*tan(1/2*a*d)^2 - 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1
/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*
a*d)^2 + 2*m*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*
sgn(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c))) +
2*m*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c)
+ 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c))) - 2*m*x*

```
abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi
*b*d + m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) + 2*m*x*abs(x)^m*e^(-1/2*pi*b*d*n
*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/4*pi*m*s
gn(x) - 1/4*pi*m) + 2*m*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n +
1/2*pi*b*d*sgn(c) - 1/2*pi*b*d + m)*tan(1/2*a*d) + 2*m*x*abs(x)^m*e^(-1/2*p
i*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2
*a*d) + 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn
(c) - 1/2*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c))) + 2*
x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2
*pi*b*d + m)*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c))) - 2*x*abs(x)^
m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*sgn(c) - 1/2*pi*b*d +
m)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) + 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x) +
 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/4*pi*m*sgn(x) - 1
/4*pi*m) + 2*x*abs(x)^m*e^(1/2*pi*b*d*n*sgn(x) - 1/2*pi*b*d*n + 1/2*pi*b*d*
sgn(c) - 1/2*pi*b*d + m)*tan(1/2*a*d) + 2*x*abs(x)^m*e^(-1/2*pi*b*d*n*sgn(x
) + 1/2*pi*b*d*n - 1/2*pi*b*d*sgn(c) + 1/2*pi*b*d + m)*tan(1/2*a*d))/(b^2*d
^2*n^2*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(
x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + b^2*d^2*n^2*tan(1/2*b*d*n*log(abs(x)) + 1
/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + b^2*d^2*n^2*tan(1
/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d)^2 + b^2*d^2*n^2*
tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + b^2*d^2*n^2*tan(1/2*b*d*
n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2 + b^2*d^2*n^2*tan(1/4*pi*m*sgn(x) -
1/4*pi*m)^2 + b^2*d^2*n^2*tan(1/2*a*d)^2 + m^2*tan(1/2*b*d*n*log(abs(x)) +
1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + 2
*m*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) -
 1/4*pi*m)^2*tan(1/2*a*d)^2 + b^2*d^2*n^2 + m^2*tan(1/2*b*d*n*log(abs(x)) +
 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + m^2*tan(1/2*b*d
*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d)^2 + m^2*tan(1/4*pi*m*s
gn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*lo
g(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + 2*m*tan(1/2
*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)
^2 + 2*m*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/2*a*d)^2
+ 2*m*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d)^2 + m^2*tan(1/2*b*d*n*
log(abs(x)) + 1/2*b*d*log(abs(c)))^2 + m^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^
2 + tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2*tan(1/4*pi*m*sgn(x)
- 1/4*pi*m)^2 + m^2*tan(1/2*a*d)^2 + tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*lo
g(abs(c)))^2*tan(1/2*a*d)^2 + tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a*d
)^2 + 2*m*tan(1/2*b*d*n*log(abs(x)) + 1/2*b*d*log(abs(c)))^2 + 2*m*tan(1/4*
pi*m*sgn(x) - 1/4*pi*m)^2 + 2*m*tan(1/2*a*d)^2 + m^2 + tan(1/2*b*d*n*log(ab
s(x)) + 1/2*b*d*log(abs(c)))^2 + tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + tan(1/
2*a*d)^2 + 2*m + 1)
```

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int (ex)^m \sin(d(a + b\ln(c x^n)))\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((e*x)^m*sin(d*(a+b*ln(c*x^n))),x)
```

maxima [B] time = 0.40, size = 1263, normalized size = 13.73

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(((((cos(a*d)*sin(2*a*d) - cos(2*a*d)*sin(a*d))*cos(b*d*log(c)) - (cos(
2*a*d)*cos(a*d) + sin(2*a*d)*sin(a*d))*sin(b*d*log(c)))*cos(2*b*d*log(c)) +
 ((cos(2*a*d)*cos(a*d) + sin(2*a*d)*sin(a*d))*cos(b*d*log(c)) + (cos(a*d)*s
in(2*a*d) - cos(2*a*d)*sin(a*d))*sin(b*d*log(c)))*sin(2*b*d*log(c)) + cos(a
*d)*sin(b*d*log(c)) + cos(b*d*log(c))*sin(a*d))*e^m*m - (b*d*cos(b*d*log(c)
)*cos(a*d) - b*d*sin(b*d*log(c))*sin(a*d) + ((b*d*cos(2*a*d)*cos(a*d) + b*d
*sin(2*a*d)*sin(a*d))*cos(b*d*log(c)) + (b*d*cos(a*d)*sin(2*a*d) - b*d*cos(
2*a*d)*sin(a*d))*sin(b*d*log(c)))*cos(2*b*d*log(c)) - ((b*d*cos(a*d)*sin(2*
a*d) - b*d*cos(2*a*d)*sin(a*d))*cos(b*d*log(c)) - (b*d*cos(2*a*d)*cos(a*d)
+ b*d*sin(2*a*d)*sin(a*d))*sin(b*d*log(c)))*sin(2*b*d*log(c)))*e^m*n + (((c
os(a*d)*sin(2*a*d) - cos(2*a*d)*sin(a*d))*cos(b*d*log(c)) - (cos(2*a*d)*cos
(a*d) + sin(2*a*d)*sin(a*d))*sin(b*d*log(c)))*cos(2*b*d*log(c)) + ((cos(2*a
*d)*cos(a*d) + sin(2*a*d)*sin(a*d))*cos(b*d*log(c)) + (cos(a*d)*sin(2*a*d)
- cos(2*a*d)*sin(a*d))*sin(b*d*log(c)))*sin(2*b*d*log(c)) + cos(a*d)*sin(b*
d*log(c)) + cos(b*d*log(c))*sin(a*d))*e^m)*x*x^m*cos(b*d*log(x^n)) + ((((co
s(2*a*d)*cos(a*d) + sin(2*a*d)*sin(a*d))*cos(b*d*log(c)) + (cos(a*d)*sin(2*
a*d) - cos(2*a*d)*sin(a*d))*sin(b*d*log(c)))*cos(2*b*d*log(c)) + cos(b*d*lo
g(c))*cos(a*d) - ((cos(a*d)*sin(2*a*d) - cos(2*a*d)*sin(a*d))*cos(b*d*log(c
)) - (cos(2*a*d)*cos(a*d) + sin(2*a*d)*sin(a*d))*sin(b*d*log(c)))*sin(2*b*d
*log(c)) - sin(b*d*log(c))*sin(a*d))*e^m*m + (b*d*cos(a*d)*sin(b*d*log(c))
+ b*d*cos(b*d*log(c))*sin(a*d) + ((b*d*cos(a*d)*sin(2*a*d) - b*d*cos(2*a*d)
*sin(a*d))*cos(b*d*log(c)) - (b*d*cos(2*a*d)*cos(a*d) + b*d*sin(2*a*d)*sin(
a*d))*sin(b*d*log(c)))*cos(2*b*d*log(c)) + ((b*d*cos(2*a*d)*cos(a*d) + b*d*
sin(2*a*d)*sin(a*d))*cos(b*d*log(c)) + (b*d*cos(a*d)*sin(2*a*d) - b*d*cos(2
*a*d)*sin(a*d))*sin(b*d*log(c)))*sin(2*b*d*log(c)))*e^m*n + (((cos(2*a*d)*c
os(a*d) + sin(2*a*d)*sin(a*d))*cos(b*d*log(c)) + (cos(a*d)*sin(2*a*d) - cos
(2*a*d)*sin(a*d))*sin(b*d*log(c)))*cos(2*b*d*log(c)) + cos(b*d*log(c))*cos(
a*d) - ((cos(a*d)*sin(2*a*d) - cos(2*a*d)*sin(a*d))*cos(b*d*log(c)) - (cos(
2*a*d)*cos(a*d) + sin(2*a*d)*sin(a*d))*sin(b*d*log(c)))*sin(2*b*d*log(c)) -
 sin(b*d*log(c))*sin(a*d))*e^m)*x*x^m*sin(b*d*log(x^n)))/(((cos(a*d)^2 + si
n(a*d)^2)*cos(b*d*log(c))^2 + (cos(a*d)^2 + sin(a*d)^2)*sin(b*d*log(c))^2)*
m^2 + ((b^2*d^2*cos(a*d)^2 + b^2*d^2*sin(a*d)^2)*cos(b*d*log(c))^2 + (b^2*d
```

```
^2*cos(a*d)^2 + b^2*d^2*sin(a*d)^2)*sin(b*d*log(c))^2)*n^2 + (cos(a*d)^2 +
sin(a*d)^2)*cos(b*d*log(c))^2 + (cos(a*d)^2 + sin(a*d)^2)*sin(b*d*log(c))^2
 + 2*((cos(a*d)^2 + sin(a*d)^2)*cos(b*d*log(c))^2 + (cos(a*d)^2 + sin(a*d)^
2)*sin(b*d*log(c))^2)*m)
```

mupad [B] time = 2.86, size = 80, normalized size = 0.87

$$\frac{x\,\mathrm{e}^{-a\,d\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,d\,1\mathrm{i}}}\,{\left(e\,x\right)}^m\,1\mathrm{i}}{2\,m+2-b\,d\,n\,2\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,d\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,d\,1\mathrm{i}}\,{\left(e\,x\right)}^m}{m\,2\mathrm{i}-2\,b\,d\,n+2\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sin\left(ad + bd\log\left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((e*x)**m*sin(a*d + b*d*log(c*x**n)), x)
```

3.74 $\int (ex)^m \sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$

Optimal. Leaf size=150

$$\frac{2(ex)^{m+1}\,{}_2F_1\left(-\frac{3}{2},-\frac{2im+3bdn+2i}{4bdn};-\frac{2im-bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(-3ibdn+2m+2)\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}}$$

```
[Out] 2*(e*x)^(1+m)*hypergeom([-3/2, 1/4*(-2*I-2*I*m-3*b*d*n)/b/d/n],[1/4*(-2*I-2
*I*m+b*d*n)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))*sin(d*(a+b*ln(c*x^n)))^(
3/2)/e/(2+2*m-3*I*b*d*n)/(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^(3/2)
```

Rubi [A] time = 0.13, antiderivative size = 145, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4493, 4491, 364}

$$\frac{2(ex)^{m+1}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bdn}-3\right);-\frac{2im-bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(-3ibdn+2m+2)\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(3/2),x]
```

```
[Out] (2*(e*x)^(1 + m)*Hypergeometric2F1[-3/2, (-3 - ((2*I)*(1 + m))/(b*d*n))/4,
-(2*I + (2*I)*m - b*d*n)/(4*b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)]*Sin[
d*(a + b*Log[c*x^n])]^(3/2))/(e*(2 + 2*m - (3*I)*b*d*n)*(1 - E^((2*I)*a*d)*
(c*x^n)^((2*I)*b*d))^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sin^{\frac{3}{2}}(d(a+b\log(x)))\,dx,x,cx^n\right)}{en}$$

$$= \frac{\left((ex)^{1+m}\left(cx^n\right)^{\frac{3ibd}{2}-\frac{1+m}{n}}\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{3ibd}{2}+\frac{1+m}{n}}\right.}{en\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}}$$

$$= \frac{2(ex)^{1+m}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i(1+m)}{bdn}\right);-\frac{2i+2im-bdn}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)\sin^{\frac{3}{2}}\left(d\left(\right.\right.}{e(2+2m-3ibdn)\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}}$$

Mathematica [A] time = 2.04, size = 235, normalized size = 1.57

$$\frac{2(ex)^m\left(x(ibdn+2m+2)\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)\left(2(m+1)\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)-3bdn\cos\left(d\left(a+b\log\left(c\right.\right.\right.\right.}{(ibdn+2m+2)(-3ibdn+2m+2)(3ibdn+2m+}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m*Sin[d*(a + b*Log[c*x^n])]^(3/2),x]
```

```
[Out] (2*(e*x)^m*(-3*b^2*d^2*(-1 + E^((2*I)*d*(a + b*Log[c*x^n])))*n^2*x*Hypergeo
metric2F1[1, -1/4*(2*I + (2*I)*m - 3*b*d*n)/(b*d*n), -1/4*(2*I + (2*I)*m -
5*b*d*n)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (2 + 2*m + I*b*d*n)*x*S
in[d*(a + b*Log[c*x^n])]*(-3*b*d*n*Cos[d*(a + b*Log[c*x^n])] + 2*(1 + m)*Si
n[d*(a + b*Log[c*x^n])])))/((2 + 2*m + I*b*d*n)*(2 + 2*m - (3*I)*b*d*n)*(2
+ 2*m + (3*I)*b*d*n)*Sqrt[Sin[d*(a + b*Log[c*x^n])]])
```

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((e*x)^m*sin(d*(a+b*log(c*x^n)))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >> Error detected within library code: integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sin\left(\left(b \log\left(cx^n\right) + a\right)d\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^(3/2),x, algorithm="giac")
[Out] integrate((e*x)^m*sin((b*log(c*x^n) + a)*d)^(3/2), x)
```

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\sin^{\frac{3}{2}}\left(d\left(a + b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^(3/2),x)
[Out] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sin\left(\left(b \log\left(cx^n\right) + a\right)d\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*sin(d*(a+b*log(c*x^n)))^(3/2),x, algorithm="maxima")
[Out] integrate((e*x)^m*sin((b*log(c*x^n) + a)*d)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sin\left(d\,\left(a + b\,\ln\left(c\,x^n\right)\right)\right)^{3/2}\,{\left(e\,x\right)}^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(d*(a + b*log(c*x^n)))^(3/2)*(e*x)^m,x)
[Out] int(sin(d*(a + b*log(c*x^n)))^(3/2)*(e*x)^m, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*sin(d*(a+b*ln(c*x**n)))**(3/2),x)
```

```
[Out] Timed out
```

3.75 $\int (ex)^m \sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}\,dx$

Optimal. Leaf size=149

$$\frac{2(ex)^{m+1}\,{}_2F_1\left(-\frac{1}{2},-\frac{2im+bdn+2i}{4bdn};-\frac{2im-3bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}{e(-ibdn+2m+2)\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}}$$

```
[Out] 2*(e*x)^(1+m)*hypergeom([-1/2, 1/4*(-2*I-2*I*m-b*d*n)/b/d/n],[1/4*(-2*I-2*I
*m+3*b*d*n)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))*sin(d*(a+b*ln(c*x^n)))^(
1/2)/e/(2+2*m-I*b*d*n)/(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^(1/2)
```

Rubi [A] time = 0.11, antiderivative size = 145, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4493, 4491, 364}

$$\frac{2(ex)^{m+1}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bdn}-1\right);-\frac{2im-3bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}{e(-ibdn+2m+2)\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}}$$

Antiderivative was successfully verified.

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

```
[Out] (2*(e*x)^(1 + m)*Hypergeometric2F1[-1/2, (-1 - ((2*I)*(1 + m))/(b*d*n))/4,
-(2*I + (2*I)*m - 3*b*d*n)/(4*b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)]*Sq
rt[Sin[d*(a + b*Log[c*x^n])]])/(e*(2 + 2*m - I*b*d*n)*Sqrt[1 - E^((2*I)*a*d
)*(c*x^n)^((2*I)*b*d)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sqrt{\sin(d(a+b\log(x)))}\,dx,x,cx^n\right)}{en}$$

$$=\frac{\left((ex)^{1+m}\left(cx^n\right)^{\frac{ibd}{2}-\frac{1+m}{n}}\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ibd}{2}+\frac{1+m}{n}}\cdots\right.}{en\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}}$$

$$=\frac{2(ex)^{1+m}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{2i(1+m)}{bdn}\right);-\frac{2i+2im-3bdn}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)\sqrt{\sin\left(d\cdots\right.}}{e(2+2m-ibdn)\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}}$$

Mathematica [B] time = 5.61, size = 488, normalized size = 3.28

$$2x(ex)^m\left(\frac{\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}\sin\left(d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)}{2(m+1)\sin\left(d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)+bdn\cos\left(d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)}-\frac{bdnx^{-ibdn}\cdots}{\cdots}\right.$$

Warning: Unable to verify antiderivative.

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

```
[Out] 2*x*(e*x)^m*(-((b*d*E^(I*d*(a - b*n*Log[x] + b*Log[c*x^n]))*n*Sqrt[2 - 2*E^
((2*I)*a*d)*(c*x^n)^((2*I)*b*d)]*((2*I + (2*I)*m + b*d*n)*x^((2*I)*b*d*n)*H
ypergeometric2F1[1/2, ((-1/2*I)*(1 + m + ((3*I)/2)*b*d*n))/(b*d*n), -1/4*(2
*I + (2*I)*m - 7*b*d*n)/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)] + (-2*I
 - (2*I)*m + 3*b*d*n)*Hypergeometric2F1[1/2, -1/4*(2*I + (2*I)*m + b*d*n)/(
b*d*n), -1/4*(2*I + (2*I)*m - 3*b*d*n)/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I
)*b*d)]))/((2 + 2*m - I*b*d*n)*(2 + 2*m + (3*I)*b*d*n)*(2*I + (2*I)*m + b*d
*n + E^((2*I)*d*(a - b*n*Log[x] + b*Log[c*x^n]))*(-2*I - (2*I)*m + b*d*n))*
x^(I*b*d*n)*Sqrt[((-I)*(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))/(E^(I*a*d)
*(c*x^n)^(I*b*d))])) + (Sqrt[Sin[d*(a + b*Log[c*x^n])]]*Sin[d*(a - b*n*Log[
x] + b*Log[c*x^n])])/(b*d*n*Cos[d*(a - b*n*Log[x] + b*Log[c*x^n])] + 2*(1 +
 m)*Sin[d*(a - b*n*Log[x] + b*Log[c*x^n])]))
```

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((e*x)^m*sin(d*(a+b*log(c*x^n)))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sqrt{\sin\left(\left(b\log\left(cx^n\right) + a\right)d\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m*sqrt(sin((b*log(c*x^n) + a)*d)), x)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\sqrt{\sin}\,\left(d\left(a + b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^(1/2),x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sqrt{\sin\left(\left(b\log\left(cx^n\right) + a\right)d\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m*sqrt(sin((b*log(c*x^n) + a)*d)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{\sin\left(d\,\left(a + b\,\ln\left(c\,x^n\right)\right)\right)}\,\left(e\,x\right)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(d*(a + b*log(c*x^n)))^(1/2)*(e*x)^m,x)
[Out] int(sin(d*(a + b*log(c*x^n)))^(1/2)*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sqrt{\sin \left(ad + bd \log \left(cx^n\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*sin(d*(a+b*ln(c*x**n)))**(1/2),x)
[Out] Integral((e*x)**m*sqrt(sin(a*d + b*d*log(c*x**n))), x)
```

3.76 $\int \frac{(ex)^m}{\sqrt{\sin\left(d\left(a+b\log(cx^n)\right)\right)}}\,dx$

Optimal. Leaf size=150

$$\frac{2(ex)^{m+1}\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}\;{}_2F_1\left(\frac{1}{2},-\frac{2im-bdn+2i}{4bdn};-\frac{2im-5bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(ibdn+2m+2)\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}$$

```
[Out] 2*(e*x)^(1+m)*hypergeom([1/2, 1/4*(-2*I-2*I*m+b*d*n)/b/d/n],[1/4*(-2*I-2*I*
m+5*b*d*n)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))*(1-exp(2*I*a*d)*(c*x^n)^(
2*I*b*d))^(1/2)/e/(2+2*m+I*b*d*n)/sin(d*(a+b*ln(c*x^n)))^(1/2)
```

Rubi [A] time = 0.11, antiderivative size = 150, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4493, 4491, 364}

$$\frac{2(ex)^{m+1}\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}\;{}_2F_1\left(\frac{1}{2},-\frac{2im-bdn+2i}{4bdn};-\frac{2im-5bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(ibdn+2m+2)\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}$$

Antiderivative was successfully verified.

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

```
[Out] (2*(e*x)^(1 + m)*Sqrt[1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)]*Hypergeometric
2F1[1/2, -(2*I + (2*I)*m - b*d*n)/(4*b*d*n), -(2*I + (2*I)*m - 5*b*d*n)/(4*
b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)])/(e*(2 + 2*m + I*b*d*n)*Sqrt[Sin
[d*(a + b*Log[c*x^n])]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{(ex)^m}{\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int\frac{x^{-1+\frac{1+m}{n}}}{\sqrt{\sin(d(a+b\log(x)))}}\,dx,x,cx^n\right)}{en}$$

$$=\frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1}{2}ibd-\frac{1+m}{n}}\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}\right)\text{Subst}\left(\int\frac{x^{-1+\frac{ibd}{2}+\frac{1+m}{n}}}{\sqrt{1-e^{2iad}x^{2ibd}}}\,dx,x,cx^n\right)}{en\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}$$

$$=\frac{2(ex)^{1+m}\sqrt{1-e^{2iad}\left(cx^n\right)^{2ibd}}\ {}_2F_1\left(\frac{1}{2},-\frac{2i+2im-bdn}{4bdn};-\frac{2i+2im-5bdn}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(2+2m+ibdn)\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}$$

Mathematica [A] time = 0.53, size = 131, normalized size = 0.87

$$-\frac{2x(ex)^m\left(-1+e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,-\frac{2im-3bdn+2i}{4bdn};-\frac{2im-5bdn+2i}{4bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)}{(ibdn+2m+2)\sqrt{\sin\left(d\left(a+b\log\left(cx^n\right)\right)\right)}}$$

Warning: Unable to verify antiderivative.

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

```
[Out] (-2*(-1 + E^((2*I)*d*(a + b*Log[c*x^n])))*x*(e*x)^m*Hypergeometric2F1[1, -1
/4*(2*I + (2*I)*m - 3*b*d*n)/(b*d*n), -1/4*(2*I + (2*I)*m - 5*b*d*n)/(b*d*n
), E^((2*I)*d*(a + b*Log[c*x^n]))])/((2 + 2*m + I*b*d*n)*Sqrt[Sin[d*(a + b*
Log[c*x^n])]])
```

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((e*x)^m/sin(d*(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)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sqrt{\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m/sqrt(sin((b*log(c*x^n) + a)*d)), x)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sqrt{\sin\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a+b*ln(c*x^n)))^(1/2),x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sqrt{\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m/sqrt(sin((b*log(c*x^n) + a)*d)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(e\,x)^m}{\sqrt{\sin\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^(1/2),x)
```

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sqrt{\sin\left(ad + bd\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m/sin(d*(a+b*ln(c*x**n)))**(1/2),x)
[Out] Integral((e*x)**m/sqrt(sin(a*d + b*d*log(c*x**n))), x)
```

3.77 $\int \frac{(ex)^m}{\sin^{\frac{3}{2}}(d(a+b\log(cx^n)))}\,dx$

Optimal. Leaf size=150

$$\frac{2(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},-\frac{2im-3bdn+2i}{4bdn};-\frac{2im-7bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(3ibdn+2m+2)\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

```
[Out] 2*(e*x)^(1+m)*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^(3/2)*hypergeom([3/2, 1/4*
(-2*I-2*I*m+3*b*d*n)/b/d/n],[1/4*(-2*I-2*I*m+7*b*d*n)/b/d/n],exp(2*I*a*d)*(
c*x^n)^(2*I*b*d))/e/(2+2*m+3*I*b*d*n)/sin(d*(a+b*ln(c*x^n)))^(3/2)
```

Rubi [A] time = 0.11, antiderivative size = 145, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4493, 4491, 364}

$$\frac{2(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(m+1)}{bdn}\right);-\frac{2im-7bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(3ibdn+2m+2)\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m/Sin[d*(a + b*Log[c*x^n])]^(3/2),x]
```

```
[Out] (2*(e*x)^(1 + m)*(1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^(3/2)*Hypergeometr
ic2F1[3/2, (3 - ((2*I)*(1 + m))/(b*d*n))/4, -(2*I + (2*I)*m - 7*b*d*n)/(4*b
*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)])/(e*(2 + 2*m + (3*I)*b*d*n)*Sin[d
*(a + b*Log[c*x^n])]^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{(ex)^m}{\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\sin^{\frac{3}{2}}(d(a+b\log(x)))}\,dx, x, cx^n\right)}{en}$$

$$= \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{3}{2}ibd-\frac{1+m}{n}}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{3ibd}{2}+\frac{1+m}{n}}}{\left(1-e^{2iad}x^{2ibd}\right)^{3/2}}\,dx, x, cx\right.}{en\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

$$= \frac{2(ex)^{1+m}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(1+m)}{bdn}\right);-\frac{2i+2im-7bdn}{4bdn};e^{2iad}\left(cx^n\right.\right.}{e(2+2m+3ibdn)\sin^{\frac{3}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

Mathematica [B] time = 5.16, size = 544, normalized size = 3.63

$$\frac{(ex)^m\left(b^2d^2n^2+4m^2+8m+4\right)x^{1+ibdn}\sqrt{2-2e^{2iad}\left(cx^n\right)^{2ibd}}\;{}_2F_1\left(\frac{1}{2},-\frac{i\left(m+\frac{3}{2}ibdn+1\right)}{2bdn};-\frac{2im-7bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)+}{bdn(3bdn-2im-2i)\sqrt{-ie^{-iad}\left(cx^n\right)^{-ibd}\left(-1+\right.}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m/Sin[d*(a + b*Log[c*x^n])]^(3/2),x]
```

```
[Out] ((4 + 8*m + 4*m^2 + b^2*d^2*n^2)*x^(1 + I*b*d*n)*(e*x)^m*Sqrt[2 - 2*E^((2*I
)*a*d)*(c*x^n)^((2*I)*b*d)]*Hypergeometric2F1[1/2, ((-1/2*I)*(1 + m + ((3*I
)/2)*b*d*n))/(b*d*n), -1/4*(2*I + (2*I)*m - 7*b*d*n)/(b*d*n), E^((2*I)*a*d)
*(c*x^n)^((2*I)*b*d)] + ((-2*I - (2*I)*m + 3*b*d*n)*x^(1 - I*b*d*n)*(e*x)^m
*(-2*x^(I*b*d*n)*Sqrt[((-I)*(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))/(E^(I
*a*d)*(c*x^n)^(I*b*d))]*(b*d*n*Cos[b*d*n*Log[x]] - 2*(1 + m)*Sin[b*d*n*Log[
x]]) + (-2*I - (2*I)*m + b*d*n)*Sqrt[2 - 2*E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d
)]*Hypergeometric2F1[1/2, -1/4*(2*I + (2*I)*m + b*d*n)/(b*d*n), -1/4*(2*I +
```

```
 (2*I)*m - 3*b*d*n)/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)]*Sqrt[Sin[d*
(a + b*Log[c*x^n])]]))/Sqrt[Sin[d*(a + b*Log[c*x^n])]])/(b*d*n*(-2*I - (2*I
)*m + 3*b*d*n)*Sqrt[((-I)*(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))/(E^(I*a
*d)*(c*x^n)^(I*b*d))]*(b*d*n*Cos[d*(a - b*n*Log[x] + b*Log[c*x^n])] + 2*(1
+ m)*Sin[d*(a - b*n*Log[x] + b*Log[c*x^n])]))
```

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((e*x)^m/sin(d*(a+b*log(c*x^n)))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/sin(d*(a+b*log(c*x^n)))^(3/2),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/sin((b*log(c*x^n) + a)*d)^(3/2), x)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a+b*ln(c*x^n)))^(3/2),x)
```

```
[Out] int((e*x)^m/sin(d*(a+b*ln(c*x^n)))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/sin(d*(a+b*log(c*x^n)))^(3/2),x, algorithm="maxima")
[Out] integrate((e*x)^m/sin((b*log(c*x^n) + a)*d)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(e\,x)^m}{\sin\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^(3/2),x)
[Out] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin^{\frac{3}{2}}\left(ad+bd\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m/sin(d*(a+b*ln(c*x**n)))**(3/2),x)
[Out] Integral((e*x)**m/sin(a*d + b*d*log(c*x**n))**(3/2), x)
```

3.78 $\int \frac{(ex)^m}{\sin^{\frac{5}{2}}\left(d\left(a+b\log(cx^n)\right)\right)}\,dx$

Optimal. Leaf size=150

$$\frac{2(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{5/2}{}_2F_1\left(\frac{5}{2},-\frac{2im-5bdn+2i}{4bdn};-\frac{2im-9bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(5ibdn+2m+2)\sin^{\frac{5}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

```
[Out] 2*(e*x)^(1+m)*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^(5/2)*hypergeom([5/2, 1/4*
(-2*I-2*I*m+5*b*d*n)/b/d/n],[1/4*(-2*I-2*I*m+9*b*d*n)/b/d/n],exp(2*I*a*d)*(
c*x^n)^(2*I*b*d))/e/(2+2*m+5*I*b*d*n)/sin(d*(a+b*ln(c*x^n)))^(5/2)
```

Rubi [A] time = 0.11, antiderivative size = 145, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4493, 4491, 364}

$$\frac{2(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(m+1)}{bdn}\right);-\frac{2im-9bdn+2i}{4bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(5ibdn+2m+2)\sin^{\frac{5}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m/Sin[d*(a + b*Log[c*x^n])]^(5/2),x]
```

```
[Out] (2*(e*x)^(1 + m)*(1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^(5/2)*Hypergeometr
ic2F1[5/2, (5 - ((2*I)*(1 + m))/(b*d*n))/4, -(2*I + (2*I)*m - 9*b*d*n)/(4*b
*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)])/(e*(2 + 2*m + (5*I)*b*d*n)*Sin[d
*(a + b*Log[c*x^n])]^(5/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{(ex)^m}{\sin^{\frac{5}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\sin^{\frac{5}{2}}(d(a+b\log(x)))}\,dx, x, cx^n\right)}{en}$$

$$= \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{5}{2}ibd-\frac{1+m}{n}}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{5/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ibd}{2}+\frac{1+m}{n}}}{\left(1-e^{2iad}x^{2ibd}\right)^{5/2}}\,dx, x, cx\right.}{en\sin^{\frac{5}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

$$= \frac{2(ex)^{1+m}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(1+m)}{bdn}\right);-\frac{2i+2im-9bdn}{4bdn};e^{2iad}\left(cx^n\right.\right.}{e(2+2m+5ibdn)\sin^{\frac{5}{2}}\left(d\left(a+b\log\left(cx^n\right)\right)\right)}$$

Mathematica [A] time = 2.44, size = 214, normalized size = 1.43

$$\frac{2x(ex)^m\left(-(-ibdn+2m+2)\left(-1+e^{2id\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,-\frac{2im-3bdn+2i}{4bdn};-\frac{2im-5bdn+2i}{4bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-bdn\cot\right.}{3b^2d^2n^2\sqrt{}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m/Sin[d*(a + b*Log[c*x^n])]^(5/2),x]
```

```
[Out] (2*x*(e*x)^m*(-2 - 2*m - b*d*n*Cot[d*(a - b*n*Log[x] + b*Log[c*x^n])] - (-1
 + E^((2*I)*d*(a + b*Log[c*x^n])))*(2 + 2*m - I*b*d*n)*Hypergeometric2F1[1,
 -1/4*(2*I + (2*I)*m - 3*b*d*n)/(b*d*n), -1/4*(2*I + (2*I)*m - 5*b*d*n)/(b*
d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + b*d*n*Csc[d*(a + b*Log[c*x^n])]*Csc
[d*(a - b*n*Log[x] + b*Log[c*x^n])]*Sin[b*d*n*Log[x]]))/(3*b^2*d^2*n^2*Sqrt
[Sin[d*(a + b*Log[c*x^n])]])
```

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((e*x)^m/sin(d*(a+b*log(c*x^n)))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/sin(d*(a+b*log(c*x^n)))^(5/2),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m/sin((b*log(c*x^n) + a)*d)^(5/2), x)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a+b*ln(c*x^n)))^(5/2),x)
```

```
[Out] int((e*x)^m/sin(d*(a+b*ln(c*x^n)))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{(ex)^m}{\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m/sin(d*(a+b*log(c*x^n)))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m/sin((b*log(c*x^n) + a)*d)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(e\,x)^m}{\sin\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^(5/2), x)
```

sympy [**F(-1)**] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m/sin(d*(a+b*ln(c*x**n)))**(5/2),x)
```

```
[Out] Timed out
```

3.79 $\int (ex)^m \sin^p \left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=144

$$\frac{(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\,{}_2F_1\left(-p,-\frac{im+bdnp+i}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}-p+2\right);e^{2iad}\left(cx^n\right)^{2ibd}\right)\sin^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(-ibdnp+m+1)}$$

```
[Out] (e*x)^(1+m)*hypergeom([-p, 1/2*(-I-I*m-b*d*n*p)/b/d/n],[1-1/2*I*(1+m)/b/d/n
-1/2*p],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))*sin(d*(a+b*ln(c*x^n)))^p/e/(1+m-I*b
*d*n*p)/((1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p)
```

Rubi [A] time = 0.12, antiderivative size = 144, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4493, 4491, 364}

$$\frac{(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\,{}_2F_1\left(-p,-\frac{im+bdnp+i}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}-p+2\right);e^{2iad}\left(cx^n\right)^{2ibd}\right)\sin^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(-ibdnp+m+1)}$$

Antiderivative was successfully verified.

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

```
[Out] ((e*x)^(1 + m)*Hypergeometric2F1[-p, -(I + I*m + b*d*n*p)/(2*b*d*n), (2 - (
I*(1 + m))/(b*d*n) - p)/2, E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)]*Sin[d*(a + b*
Log[c*x^n])]^p)/(e*(1 + m - I*b*d*n*p)*(1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*
d))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \sin^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sin^p(d(a+b\log(x)))\,dx,x,cx^n\right)}{en}$$

$$=\frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}+ibdp}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\sin^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\right)\text{S}}{en}$$

$$=\frac{(ex)^{1+m}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\,{}_2F_1\left(-p,-\frac{i+im+bdnp}{2bdn};\frac{1}{2}\left(2-\frac{i(1+m)}{bdn}-p\right);e^{2ia}\right.}{e(1+m-ibdnp)}$$

Mathematica [A] time = 1.00, size = 122, normalized size = 0.85

$$-\frac{x(ex)^m\left(-1+e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\sin^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,{}_2F_1\left(1,\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);-\frac{i(m+1)}{2bdn}-\frac{p}{2}+1;e^{2id\left(a+b\log(\right.}\right.}{-ibdnp+m+1}$$

Warning: Unable to verify antiderivative.

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

```
[Out] -((((-1 + E^((2*I)*d*(a + b*Log[c*x^n])))*x*(e*x)^m*Hypergeometric2F1[1, (2
- (I*(1 + m))/(b*d*n) + p)/2, 1 - ((I/2)*(1 + m))/(b*d*n) - p/2, E^((2*I)*d
*(a + b*Log[c*x^n]))]*Sin[d*(a + b*Log[c*x^n])]^p)/(1 + m - I*b*d*n*p))
```

fricas [F] time = 0.72, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m\sin\left(bd\log\left(cx^n\right)+ad\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((e*x)^m*sin(b*d*log(c*x^n) + a*d)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m\sin\left(\left(b\log\left(cx^n\right)+a\right)d\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m*sin((b*log(c*x^n) + a)*d)^p, x)
```

maple [F] time = 0.18, size = 0, normalized size = 0.00

$$\int (ex)^m (\sin^p (d (a + b \ln (c x^n)))) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^p,x)
```

```
[Out] int((e*x)^m*sin(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sin \left(\left(b \log (cx^n) + a \right) d \right)^p \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m*sin((b*log(c*x^n) + a)*d)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sin (d \ (a + b \ \ln (c x^n)))^p (e x)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(sin(d*(a + b*log(c*x^n)))^p*(e*x)^m, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.80 $\int x^2 \sin^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=114

$$\frac{x^3\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{bnp+3i}{2bn};\frac{1}{2}\left(-p-\frac{3i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{3-ibnp}$$

```
[Out] x^3*hypergeom([-p, 1/2*(-3*I-b*n*p)/b/n],[1-3/2*I/b/n-1/2*p],exp(2*I*a)*(c*
x^n)^(2*I*b))*sin(a+b*ln(c*x^n))^p/(3-I*b*n*p)/((1-exp(2*I*a)*(c*x^n)^(2*I*
b))^p)
```

Rubi [A] time = 0.10, antiderivative size = 114, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4493, 4491, 364}

$$\frac{x^3\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{bnp+3i}{2bn};\frac{1}{2}\left(-p-\frac{3i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{3-ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sin[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x^3*Hypergeometric2F1[-p, -(3*I + b*n*p)/(2*b*n), (2 - (3*I)/(b*n) - p)/2,
 E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^p)/((3 - I*b*n*p)*(1
- E^((2*I)*a)*(c*x^n)^((2*I)*b))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \sin^p\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}}\sin^p(a+b\log(x))\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x^3\left(cx^n\right)^{-\frac{3}{n}+ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\sin^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}-ibp}\left(1\right.\right.}{n}$$

$$= \frac{x^3\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\ {}_2F_1\left(-p,-\frac{3i+bnp}{2bn};\frac{1}{2}\left(2-\frac{3i}{bn}-p\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\right.}{3-ibnp}$$

Mathematica [A] time = 0.68, size = 100, normalized size = 0.88

$$\frac{x^3\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\ {}_2F_1\left(1,\frac{1}{2}\left(p-\frac{3i}{bn}+2\right);-\frac{p}{2}-\frac{3i}{2bn}+1;e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{-3+ibnp}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*Sin[a + b*Log[c*x^n]]^p,x]
```

```
[Out] ((-1 + E^((2*I)*(a + b*Log[c*x^n])))*x^3*Hypergeometric2F1[1, (2 - (3*I)/(b
*n) + p)/2, 1 - ((3*I)/2)/(b*n) - p/2, E^((2*I)*(a + b*Log[c*x^n]))]*Sin[a
+ b*Log[c*x^n]]^p)/(-3 + I*b*n*p)
```

fricas [F] time = 0.62, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\sin\left(b\log\left(cx^n\right)+a\right)^p, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^2*sin(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2\sin\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^{2} \left(\sin^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a+b*ln(c*x^n))^p,x)
[Out] int(x^2*sin(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \sin\left(b\log\left(cx^{n}\right)+a\right)^{p} dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^{2} \sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{p} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sin(a + b*log(c*x^n))^p,x)
[Out] int(x^2*sin(a + b*log(c*x^n))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \sin^{p}\left(a+b\log\left(cx^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sin(a+b*ln(c*x**n))**p,x)
[Out] Integral(x**2*sin(a + b*log(c*x**n))**p, x)
```

3.81 $\int x \sin^p\left(a + b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=114

$$\frac{x^2\left(1 - e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(-p - \frac{2i}{bn}\right), -p; \frac{1}{2}\left(-p - \frac{2i}{bn} + 2\right); e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a + b\log\left(cx^n\right)\right)}{2 - ibnp}$$

```
[Out] x^2*hypergeom([-p, -I/b/n-1/2*p],[1-I/b/n-1/2*p],exp(2*I*a)*(c*x^n)^(2*I*b)
)*sin(a+b*ln(c*x^n))^p/(2-I*b*n*p)/((1-exp(2*I*a)*(c*x^n)^(2*I*b))^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 = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4493, 4491, 364}

$$\frac{x^2\left(1 - e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(-p - \frac{2i}{bn}\right), -p; \frac{1}{2}\left(-p - \frac{2i}{bn} + 2\right); e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a + b\log\left(cx^n\right)\right)}{2 - ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sin[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x^2*Hypergeometric2F1[((-2*I)/(b*n) - p)/2, -p, (2 - (2*I)/(b*n) - p)/2, E
^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^p)/((2 - I*b*n*p)*(1 -
E^((2*I)*a)*(c*x^n)^((2*I)*b))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sin^p\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sin^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^2\left(cx^n\right)^{-\frac{2}{n}+ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\sin^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}-ibp}\left(1\right.\right.}{n}$$

$$= \frac{x^2\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}{}_2F_1\left(\frac{1}{2}\left(-\frac{2i}{bn}-p\right),-p;\frac{1}{2}\left(2-\frac{2i}{bn}-p\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a\right.}{2-ibnp}$$

Mathematica [A] time = 0.61, size = 98, normalized size = 0.86

$$\frac{x^2\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,\frac{p}{2}-\frac{i}{bn}+1;-\frac{p}{2}-\frac{i}{bn}+1;e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{-2+ibnp}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sin[a + b*Log[c*x^n]]^p,x]
```

```
[Out] ((-1 + E^((2*I)*(a + b*Log[c*x^n])))*x^2*Hypergeometric2F1[1, 1 - I/(b*n) +
 p/2, 1 - I/(b*n) - p/2, E^((2*I)*(a + b*Log[c*x^n]))]*Sin[a + b*Log[c*x^n]
]^p)/(-2 + I*b*n*p)
```

fricas [F] time = 0.48, size = 0, normalized size = 0.00

$$\text{integral}\left(x\sin\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x*sin(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sin\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int x\left(\sin^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a+b*ln(c*x^n))^p,x)
[Out] int(x*sin(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sin\left(b\log\left(cx^{n}\right)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\,\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sin(a + b*log(c*x^n))^p,x)
[Out] int(x*sin(a + b*log(c*x^n))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sin^{p}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sin(a+b*ln(c*x**n))**p,x)
[Out] Integral(x*sin(a + b*log(c*x**n))**p, x)
```

3.82 $\int \sin^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=112

$$\frac{x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{bnp+i}{2bn};\frac{1}{2}\left(-p-\frac{i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{1-ibnp}$$

```
[Out] x*hypergeom([-p, 1/2*(-I-b*n*p)/b/n],[1-1/2*I/b/n-1/2*p],exp(2*I*a)*(c*x^n)
^(2*I*b))*sin(a+b*ln(c*x^n))^p/(1-I*b*n*p)/((1-exp(2*I*a)*(c*x^n)^(2*I*b))^
p)
```

Rubi [A] time = 0.07, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4483, 4491, 364}

$$\frac{x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{bnp+i}{2bn};\frac{1}{2}\left(-p-\frac{i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{1-ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x*Hypergeometric2F1[-p, -(I + b*n*p)/(2*b*n), (2 - I/(b*n) - p)/2, E^((2*I
)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^p)/((1 - I*b*n*p)*(1 - E^((2*
I)*a)*(c*x^n)^((2*I)*b))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4483

```
Int[Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sin[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
```

```
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sin^p\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\mathrm{Subst}\left(\int x^{-1+\frac{1}{n}}\sin^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{1}{n}+ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\sin^p\left(a+b\log\left(cx^n\right)\right)\right)\mathrm{Subst}\left(\int x^{-1+\frac{1}{n}-ibp}\left(1-e^{2\right.}\right.}{n}$$

$$= \frac{x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{i+bnp}{2bn};\frac{1}{2}\left(2-\frac{i}{bn}-p\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(\right.\right.}{1-ibnp}$$

Mathematica [A] time = 0.56, size = 98, normalized size = 0.88

$$\frac{x\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{1}{2}\left(p-\frac{i}{bn}+2\right);-\frac{p}{2}-\frac{i}{2bn}+1;e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{-1+ibnp}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^p,x]
```

```
[Out] ((-1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Hypergeometric2F1[1, (2 - I/(b*n) +
p)/2, 1 - (I/2)/(b*n) - p/2, E^((2*I)*(a + b*Log[c*x^n]))]*Sin[a + b*Log[c*
x^n]]^p)/(-1 + I*b*n*p)
```

fricas [F] time = 0.59, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(\sin\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sin(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int \sin^{p}\left(a + b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^p,x)
[Out] int(sin(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin\left(b\log\left(cx^{n}\right) + a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sin\left(a + b\,\ln\left(c\,x^{n}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^p,x)
[Out] int(sin(a + b*log(c*x^n))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sin^{p}\left(a + b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**p,x)
[Out] Integral(sin(a + b*log(c*x**n))**p, x)
```

3.83 $\int \frac{\sin^p(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=86

$$\frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin^{p+1}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{1}{2},\frac{p+1}{2};\frac{p+3}{2};\sin^2\left(a+b\log\left(cx^n\right)\right)\right)}{bn(p+1)\sqrt{\cos^2\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] cos(a+b*ln(c*x^n))*hypergeom([1/2, 1/2+1/2*p],[3/2+1/2*p],sin(a+b*ln(c*x^n)
)^2)*sin(a+b*ln(c*x^n))^(1+p)/b/n/(1+p)/(cos(a+b*ln(c*x^n))^2)^(1/2)
```

Rubi [A] time = 0.06, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {2643}

$$\frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin^{p+1}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{1}{2},\frac{p+1}{2};\frac{p+3}{2};\sin^2\left(a+b\log\left(cx^n\right)\right)\right)}{bn(p+1)\sqrt{\cos^2\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^p/x,x]
```

```
[Out] (Cos[a + b*Log[c*x^n]]*Hypergeometric2F1[1/2, (1 + p)/2, (3 + p)/2, Sin[a +
 b*Log[c*x^n]]^2]*Sin[a + b*Log[c*x^n]]^(1 + p))/(b*n*(1 + p)*Sqrt[Cos[a +
b*Log[c*x^n]]^2])
```

Rule 2643

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Sin[c + d*x])^(n + 1)*Hypergeometric2F1[1/2, (n + 1)/2, (n + 3)/2, Sin[c
+ d*x]^2])/(b*d*(n + 1)*Sqrt[Cos[c + d*x]^2]), x] /; FreeQ[{b, c, d, n}, x]
 &&  !IntegerQ[2*n]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^p\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sin^p(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= \frac{\cos\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{1}{2},\frac{1+p}{2};\frac{3+p}{2};\sin^2\left(a+b\log\left(cx^n\right)\right)\right)\sin^{1+p}\left(a+b\log\left(cx^n\right)\right)}{bn(1+p)\sqrt{\cos^2\left(a+b\log\left(cx^n\right)\right)}}\end{aligned}$$

Mathematica [A] time = 0.15, size = 86, normalized size = 1.00

$$\frac{\sec\left(a+b\log\left(cx^n\right)\right)\sqrt{\cos^2\left(a+b\log\left(cx^n\right)\right)}\sin^{p+1}\left(a+b\log\left(cx^n\right)\right){}_2F_1\left(\frac{1}{2},\frac{p+1}{2};\frac{p+3}{2};\sin^2\left(a+b\log\left(cx^n\right)\right)\right)}{bn(p+1)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^p/x,x]
```

```
[Out] (Sqrt[Cos[a + b*Log[c*x^n]]^2]*Hypergeometric2F1[1/2, (1 + p)/2, (3 + p)/2,
 Sin[a + b*Log[c*x^n]]^2]*Sec[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]]^(1 +
p))/(b*n*(1 + p))
```

fricas [F] time = 1.06, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sin\left(b\log\left(cx^n\right)+a\right)^p}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sin(b*log(c*x^n) + a)^p/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\sin\left(b\log\left(cx^n\right)+a\right)^p}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^p/x, x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int\frac{\sin^{p}\left(a+b\ln\left(c\,x^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^p/x,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^p/x,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right) + a\right)^p}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^p/x, x)
```

mupad [B] time = 2.72, size = 77, normalized size = 0.90

$$-\frac{\cos\left(a + b\,\ln\left(c\,x^n\right)\right)\,\sin\left(a + b\,\ln\left(c\,x^n\right)\right)^{p+1}\,{}_2F_1\left(\frac{1}{2}, \frac{1}{2} - \frac{p}{2};\ \frac{3}{2};\ \cos\left(a + b\,\ln\left(c\,x^n\right)\right)^2\right)}{b\,n\,\left(\sin\left(a + b\,\ln\left(c\,x^n\right)\right)^2\right)^{\frac{p}{2}+\frac{1}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(cos(a + b*log(c*x^n))*sin(a + b*log(c*x^n))^(p + 1)*hypergeom([1/2, 1/2 -
 p/2], 3/2, cos(a + b*log(c*x^n))^2))/(b*n*(sin(a + b*log(c*x^n))^2)^(p/2 +
 1/2))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin^p\left(a + b\log\left(cx^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(sin(a + b*log(c*x**n))**p/x, x)
```

3.84 $\int \frac{\sin^p(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=115

$$-\frac{\left(1-e^{2ia}(cx^n)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(\frac{i}{bn}-p\right),-p;\frac{1}{2}\left(-p+\frac{i}{bn}+2\right);e^{2ia}(cx^n)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{x(1+ibnp)}$$

```
[Out] -hypergeom([-p, 1/2*I/b/n-1/2*p],[1+1/2*I/b/n-1/2*p],exp(2*I*a)*(c*x^n)^(2*
I*b))*sin(a+b*ln(c*x^n))^p/(1+I*b*n*p)/x/((1-exp(2*I*a)*(c*x^n)^(2*I*b))^p)
```

Rubi [A] time = 0.09, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4493, 4491, 364}

$$-\frac{\left(1-e^{2ia}(cx^n)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(\frac{i}{bn}-p\right),-p;\frac{1}{2}\left(-p+\frac{i}{bn}+2\right);e^{2ia}(cx^n)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{x(1+ibnp)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^p/x^2,x]
```

```
[Out] -((Hypergeometric2F1[(I/(b*n) - p)/2, -p, (2 + I/(b*n) - p)/2, E^((2*I)*a)*
(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^p)/((1 + I*b*n*p)*x*(1 - E^((2*I)*
a)*(c*x^n)^((2*I)*b))^p))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^p\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\,\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sin^p(a+b\log(x))\,dx, x, cx^n\right)}{nx}$$

$$= \frac{\left(\left(cx^n\right)^{\frac{1}{n}+ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\sin^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{1}{n}-ibp}\left(1-e^{2ia}x\right.\right.}{nx}$$

$$= -\frac{\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(\frac{i}{bn}-p\right),-p;\frac{1}{2}\left(2+\frac{i}{bn}-p\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\,\mathrm{l}\right.}{(1+ibnp)x}$$

Mathematica [A] time = 0.64, size = 102, normalized size = 0.89

$$-\frac{i\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{1}{2}\left(p+\frac{i}{bn}+2\right);-\frac{p}{2}+\frac{i}{2bn}+1;e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{x(bnp-i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^p/x^2,x]
```

```
[Out] ((-I)*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*Hypergeometric2F1[1, (2 + I/(b*n)
 + p)/2, 1 + (I/2)/(b*n) - p/2, E^((2*I)*(a + b*Log[c*x^n]))]*Sin[a + b*Log
[c*x^n]]^p)/((-I + b*n*p)*x)
```

fricas [F] time = 0.53, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sin\left(b\log\left(cx^n\right)+a\right)^p}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sin(b*log(c*x^n) + a)^p/x^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^p}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^p/x^2, x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{\sin^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^p/x^2,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^p/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^{n}\right)+a\right)^{p}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^p/x^2, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{p}}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(sin(a + b*log(c*x^n))^p/x^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin^{p}\left(a+b\log\left(cx^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(sin(a + b*log(c*x**n))**p/x**2, x)
```

3.85 $\int \frac{\sin^p(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=115

$$-\frac{\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(\frac{2i}{bn}-p\right),-p;\frac{1}{2}\left(-p+\frac{2i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{x^2(2+ibnp)}$$

```
[Out] -hypergeom([-p, I/b/n-1/2*p],[1+I/b/n-1/2*p],exp(2*I*a)*(c*x^n)^(2*I*b))*si
n(a+b*ln(c*x^n))^p/(2+I*b*n*p)/x^2/((1-exp(2*I*a)*(c*x^n)^(2*I*b))^p)
```

Rubi [A] time = 0.09, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4493, 4491, 364}

$$-\frac{\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(\frac{2i}{bn}-p\right),-p;\frac{1}{2}\left(-p+\frac{2i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{x^2(2+ibnp)}$$

Antiderivative was successfully verified.

```
[In] Int[Sin[a + b*Log[c*x^n]]^p/x^3,x]
```

```
[Out] -((Hypergeometric2F1[((2*I)/(b*n) - p)/2, -p, (2 + (2*I)/(b*n) - p)/2, E^((
2*I)*a)*(c*x^n)^((2*I)*b)]*Sin[a + b*Log[c*x^n]]^p)/((2 + I*b*n*p)*x^2*(1 -
 E^((2*I)*a)*(c*x^n)^((2*I)*b))^p))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4491

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :
> Dist[(Sin[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4493

```
Int[((e_.)*(x_))^(m_.)*Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sin[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sin^p\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{(cx^n)^{2/n}\,\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sin^p(a+b\log(x))\,dx, x, cx^n\right)}{nx^2}$$

$$= \frac{\left((cx^n)^{\frac{2}{n}+ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\sin^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{2}{n}-ibp}\left(1-e^{2ia}\right.\right.}{nx^2}$$

$$= -\frac{\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(\frac{2i}{bn}-p\right),-p;\frac{1}{2}\left(2+\frac{2i}{bn}-p\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sin^p\left(a+b\right.}{(2+ibnp)x^2}$$

Mathematica [A] time = 0.64, size = 100, normalized size = 0.87

$$-\frac{i\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right){}_2F_1\left(1,\frac{p}{2}+\frac{i}{bn}+1;-\frac{p}{2}+\frac{i}{bn}+1;e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sin^p\left(a+b\log\left(cx^n\right)\right)}{x^2(bnp-2i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sin[a + b*Log[c*x^n]]^p/x^3,x]
```

```
[Out] ((-I)*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*Hypergeometric2F1[1, 1 + I/(b*n)
+ p/2, 1 + I/(b*n) - p/2, E^((2*I)*(a + b*Log[c*x^n]))]*Sin[a + b*Log[c*x^n
]]^p)/((-2*I + b*n*p)*x^2)
```

fricas [F] time = 0.71, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sin\left(b\log\left(cx^n\right)+a\right)^p}{x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sin(b*log(c*x^n) + a)^p/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^n\right)+a\right)^p}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^p/x^3, x)
```

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int \frac{\sin^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a+b*ln(c*x^n))^p/x^3,x)
```

```
[Out] int(sin(a+b*ln(c*x^n))^p/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin\left(b\log\left(cx^{n}\right)+a\right)^{p}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sin(b*log(c*x^n) + a)^p/x^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{p}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sin(a + b*log(c*x^n))^p/x^3,x)
```

```
[Out] int(sin(a + b*log(c*x^n))^p/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sin^{p}\left(a+b\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sin(a+b*ln(c*x**n))**p/x**3,x)
```

```
[Out] Integral(sin(a + b*log(c*x**n))**p/x**3, x)
```

3.86 $\int x^2 \cos\left(a + b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=56

$$\frac{bnx^3\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}+\frac{3x^3\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}$$

```
[Out] 3*x^3*cos(a+b*ln(c*x^n))/(b^2*n^2+9)+b*n*x^3*sin(a+b*ln(c*x^n))/(b^2*n^2+9)
```

Rubi [A] time = 0.02, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4486}

$$\frac{bnx^3\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}+\frac{3x^3\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+9}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (3*x^3*Cos[a + b*Log[c*x^n]])/(9 + b^2*n^2) + (b*n*x^3*Sin[a + b*Log[c*x^n]
])/(9 + b^2*n^2)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2\cos\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{3x^3\cos\left(a+b\log\left(cx^n\right)\right)}{9+b^2n^2}+\frac{bnx^3\sin\left(a+b\log\left(cx^n\right)\right)}{9+b^2n^2}$$

Mathematica [A] time = 0.09, size = 43, normalized size = 0.77

$$\frac{x^3\left(bn\sin\left(a+b\log\left(cx^n\right)\right)+3\cos\left(a+b\log\left(cx^n\right)\right)\right)}{b^2n^2+9}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (x^3*(3*Cos[a + b*Log[c*x^n]] + b*n*Sin[a + b*Log[c*x^n]]))/(9 + b^2*n^2)
```

fricas [A] time = 0.64, size = 48, normalized size = 0.86

$$\frac{bnx^3 \sin\left(bn\log(x) + b\log(c) + a\right) + 3\,x^3 \cos\left(bn\log(x) + b\log(c) + a\right)}{b^2n^2 + 9}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b*n*x^3*sin(b*n*log(x) + b*log(c) + a) + 3*x^3*cos(b*n*log(x) + b*log(c) +
 a))/(b^2*n^2 + 9)
```

giac [B] time = 0.43, size = 923, normalized size = 16.48

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(2*b*n*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*p
i*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 2*b*n*x^3*
e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*
n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 2*b*n*x^3*e^(1/2*pi*b*n*s
gn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
1/2*b*log(abs(c)))*tan(1/2*a)^2 + 2*b*n*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*
b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c
)))*tan(1/2*a)^2 - 3*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c
) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 -
 3*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan
(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - 2*b*n*x^3*e^(1/2
*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(a
bs(x)) + 1/2*b*log(abs(c))) - 2*b*n*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n
- 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))
- 2*b*n*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)
*tan(1/2*a) - 2*b*n*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c
) + 1/2*pi*b)*tan(1/2*a) + 3*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi
*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + 3*x^
3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*
b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + 12*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*
pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(ab
s(c)))*tan(1/2*a) + 12*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sg
n(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) +
```

```
3*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1
/2*a)^2 + 3*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*
pi*b)*tan(1/2*a)^2 - 3*x^3*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn
(c) - 1/2*pi*b) - 3*x^3*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c
) + 1/2*pi*b))/(b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(
1/2*a)^2 + b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + b^2*n^2
*tan(1/2*a)^2 + b^2*n^2 + 9*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*
tan(1/2*a)^2 + 9*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + 9*tan(1/2
*a)^2 + 9)
```

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int x^2 \cos\left(a + b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cos(a+b*ln(c*x^n)),x)
```

```
[Out] int(x^2*cos(a+b*ln(c*x^n)),x)
```

maxima [B] time = 0.37, size = 218, normalized size = 3.89

$$\frac{\left(\left(b\cos\left(b\log(c)\right)\sin\left(2\,b\log(c)\right) - b\cos\left(2\,b\log(c)\right)\sin\left(b\log(c)\right) + b\sin\left(b\log(c)\right)\right)n + 3\,\cos\left(2\,b\log(c)\right)\cos\left(\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(((b*cos(b*log(c))*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)) +
b*sin(b*log(c)))*n + 3*cos(2*b*log(c))*cos(b*log(c)) + 3*sin(2*b*log(c))*si
n(b*log(c)) + 3*cos(b*log(c)))*x^3*cos(b*log(x^n) + a) + ((b*cos(2*b*log(c)
)*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)) + b*cos(b*log(c)))*n - 3*
cos(b*log(c))*sin(2*b*log(c)) + 3*cos(2*b*log(c))*sin(b*log(c)) - 3*sin(b*l
og(c)))*x^3*sin(b*log(x^n) + a))/((b^2*cos(b*log(c))^2 + b^2*sin(b*log(c))^
2)*n^2 + 9*cos(b*log(c))^2 + 9*sin(b*log(c))^2)
```

mupad [B] time = 2.45, size = 43, normalized size = 0.77

$$\frac{x^3\,\left(3\,\cos\left(a+b\,\ln\left(c\,x^n\right)\right)+b\,n\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}{b^2\,n^2+9}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x^3*(3*cos(a + b*log(c*x^n)) + b*n*sin(a + b*log(c*x^n))))/(b^2*n^2 + 9)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x^2 \cos\left(a - \frac{3i\log(cx^n)}{n}\right)dx & \text{for } b = -\frac{3i}{n} \\ \int x^2 \cos\left(a + \frac{3i\log(cx^n)}{n}\right)dx & \text{for } b = \frac{3i}{n} \\ \frac{bnx^3 \sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+9} + \frac{3x^3\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+9} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x**2*cos(a - 3*I*log(c*x**n)/n), x), Eq(b, -3*I/n)), (I
ntegral(x**2*cos(a + 3*I*log(c*x**n)/n), x), Eq(b, 3*I/n)), (b*n*x**3*sin(a
 + b*n*log(x) + b*log(c))/(b**2*n**2 + 9) + 3*x**3*cos(a + b*n*log(x) + b*l
og(c))/(b**2*n**2 + 9), True))
```

3.87 $\int x \cos\left(a + b \log\left(cx^n\right)\right) dx$

Optimal. Leaf size=56

$$\frac{bnx^2 \sin\left(a + b \log\left(cx^n\right)\right)}{b^2n^2 + 4} + \frac{2x^2 \cos\left(a + b \log\left(cx^n\right)\right)}{b^2n^2 + 4}$$

```
[Out] 2*x^2*cos(a+b*ln(c*x^n))/(b^2*n^2+4)+b*n*x^2*sin(a+b*ln(c*x^n))/(b^2*n^2+4)
```

Rubi [A] time = 0.01, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {4486}

$$\frac{bnx^2 \sin\left(a + b \log\left(cx^n\right)\right)}{b^2n^2 + 4} + \frac{2x^2 \cos\left(a + b \log\left(cx^n\right)\right)}{b^2n^2 + 4}$$

Antiderivative was successfully verified.

```
[In] Int[x*Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (2*x^2*Cos[a + b*Log[c*x^n]])/(4 + b^2*n^2) + (b*n*x^2*Sin[a + b*Log[c*x^n]
])/(4 + b^2*n^2)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x \cos\left(a + b \log\left(cx^n\right)\right) dx = \frac{2x^2 \cos\left(a + b \log\left(cx^n\right)\right)}{4 + b^2n^2} + \frac{bnx^2 \sin\left(a + b \log\left(cx^n\right)\right)}{4 + b^2n^2}$$

Mathematica [A] time = 0.08, size = 43, normalized size = 0.77

$$\frac{x^2 \left(bn \sin\left(a + b \log\left(cx^n\right)\right) + 2 \cos\left(a + b \log\left(cx^n\right)\right)\right)}{b^2n^2 + 4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (x^2*(2*Cos[a + b*Log[c*x^n]] + b*n*Sin[a + b*Log[c*x^n]]))/(4 + b^2*n^2)
```

fricas [A] time = 0.80, size = 48, normalized size = 0.86

$$\frac{bnx^2 \sin\left(bn\log(x) + b\log(c) + a\right) + 2\,x^2\cos\left(bn\log(x) + b\log(c) + a\right)}{b^2n^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b*n*x^2*sin(b*n*log(x) + b*log(c) + a) + 2*x^2*cos(b*n*log(x) + b*log(c) +
 a))/(b^2*n^2 + 4)
```

giac [B] time = 0.37, size = 915, normalized size = 16.34

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(b*n*x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*t
an(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + b*n*x^2*e^(-1/2*
pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(ab
s(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + b*n*x^2*e^(1/2*pi*b*n*sgn(x) - 1/
2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(
abs(c)))*tan(1/2*a)^2 + b*n*x^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi
*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*
a)^2 - x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*
tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - x^2*e^(-1/2*p
i*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs
(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - b*n*x^2*e^(1/2*pi*b*n*sgn(x) - 1
/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log
(abs(c))) - b*n*x^2*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) +
1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c))) - b*n*x^2*e^(1/2*pi*
b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a) - b*n*x^2*
e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)
 + x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(
1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + x^2*e^(-1/2*pi*b*n*sgn(x) + 1/
2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(
abs(c)))^2 + 4*x^2*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/
2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) + 4*x^2*e^(
-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*l
og(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) + x^2*e^(1/2*pi*b*n*sgn(x) - 1/2
```

```
*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a)^2 + x^2*e^(-1/2*pi*b*n*sgn
(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 - x^2*e^(1/2*pi
*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b) - x^2*e^(-1/2*pi*b*n
*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b))/(b^2*n^2*tan(1/2*b*n*lo
g(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + b^2*n^2*tan(1/2*b*n*log(abs
(x)) + 1/2*b*log(abs(c)))^2 + b^2*n^2*tan(1/2*a)^2 + b^2*n^2 + 4*tan(1/2*b*
n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + 4*tan(1/2*b*n*log(abs(x
)) + 1/2*b*log(abs(c)))^2 + 4*tan(1/2*a)^2 + 4)
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int x\cos\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cos(a+b*ln(c*x^n)),x)
```

```
[Out] int(x*cos(a+b*ln(c*x^n)),x)
```

maxima [B] time = 0.36, size = 218, normalized size = 3.89

$$\frac{\left(\left(b\cos\left(b\log(c)\right)\sin\left(2\,b\log(c)\right)-b\cos\left(2\,b\log(c)\right)\sin\left(b\log(c)\right)+b\sin\left(b\log(c)\right)\right)n+2\,\cos\left(2\,b\log(c)\right)\cos\left(\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(((b*cos(b*log(c))*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)) +
b*sin(b*log(c)))*n + 2*cos(2*b*log(c))*cos(b*log(c)) + 2*sin(2*b*log(c))*si
n(b*log(c)) + 2*cos(b*log(c)))*x^2*cos(b*log(x^n) + a) + ((b*cos(2*b*log(c)
)*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)) + b*cos(b*log(c)))*n - 2*
cos(b*log(c))*sin(2*b*log(c)) + 2*cos(2*b*log(c))*sin(b*log(c)) - 2*sin(b*l
og(c)))*x^2*sin(b*log(x^n) + a))/((b^2*cos(b*log(c))^2 + b^2*sin(b*log(c))^
2)*n^2 + 4*cos(b*log(c))^2 + 4*sin(b*log(c))^2)
```

mupad [B] time = 2.43, size = 43, normalized size = 0.77

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

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x^2*(2*cos(a + b*log(c*x^n)) + b*n*sin(a + b*log(c*x^n))))/(b^2*n^2 + 4)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x\cos\left(a-\frac{2i\log\left(cx^{n}\right)}{n}\right)dx & \text{for } b=-\frac{2i}{n} \\ \int x\cos\left(a+\frac{2i\log\left(cx^{n}\right)}{n}\right)dx & \text{for } b=\frac{2i}{n} \\ \frac{bnx^{2}\sin\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{b^{2}n^{2}+4}+\frac{2x^{2}\cos\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{b^{2}n^{2}+4} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x*cos(a - 2*I*log(c*x**n)/n), x), Eq(b, -2*I/n)), (Inte
gral(x*cos(a + 2*I*log(c*x**n)/n), x), Eq(b, 2*I/n)), (b*n*x**2*sin(a + b*n
*log(x) + b*log(c))/(b**2*n**2 + 4) + 2*x**2*cos(a + b*n*log(x) + b*log(c))
/(b**2*n**2 + 4), True))
```

3.88 $\int \cos\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=51

$$\frac{bnx\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}+\frac{x\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}$$

```
[Out] x*cos(a+b*ln(c*x^n))/(b^2*n^2+1)+b*n*x*sin(a+b*ln(c*x^n))/(b^2*n^2+1)
```

Rubi [A] time = 0.01, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {4476}

$$\frac{bnx\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}+\frac{x\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+1}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (x*Cos[a + b*Log[c*x^n]])/(1 + b^2*n^2) + (b*n*x*Sin[a + b*Log[c*x^n]])/(1
+ b^2*n^2)
```

Rule 4476

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Simp[(x*
Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] + Simp[(b*d*n*x*Sin[d*(a +
 b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[
b^2*d^2*n^2 + 1, 0]
```

Rubi steps

$$\int \cos\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x\cos\left(a+b\log\left(cx^n\right)\right)}{1+b^2n^2}+\frac{bnx\sin\left(a+b\log\left(cx^n\right)\right)}{1+b^2n^2}$$

Mathematica [A] time = 0.05, size = 39, normalized size = 0.76

$$\frac{x\left(bn\sin\left(a+b\log\left(cx^n\right)\right)+\cos\left(a+b\log\left(cx^n\right)\right)\right)}{b^2n^2+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (x*(Cos[a + b*Log[c*x^n]] + b*n*Sin[a + b*Log[c*x^n]]))/(1 + b^2*n^2)
```

fricas [A] time = 0.83, size = 43, normalized size = 0.84

$$\frac{bnx\sin\left(bn\log(x)+b\log(c)+a\right)+x\cos\left(bn\log(x)+b\log(c)+a\right)}{b^2n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b*n*x*sin(b*n*log(x) + b*log(c) + a) + x*cos(b*n*log(x) + b*log(c) + a))/(
b^2*n^2 + 1)
```

giac [B] time = 0.28, size = 878, normalized size = 17.22

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(2*b*n*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*
b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 2*b*n*x*e^(-
1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*lo
g(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a) + 2*b*n*x*e^(1/2*pi*b*n*sgn(x)
- 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*
log(abs(c)))*tan(1/2*a)^2 + 2*b*n*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/
2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(
1/2*a)^2 - x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b
)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - x*e^(-1/2*p
i*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs
(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - 2*b*n*x*e^(1/2*pi*b*n*sgn(x) - 1
/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log
(abs(c))) - 2*b*n*x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) +
1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c))) - 2*b*n*x*e^(1/2*pi*
b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a) - 2*b*n*x*
e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)
 + x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/
2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi
*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(
c)))^2 + 4*x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b
)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) + 4*x*e^(-1/2*pi*
b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x
)) + 1/2*b*log(abs(c)))*tan(1/2*a) + x*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n +
```

```
1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a)^2 + x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi
*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 - x*e^(1/2*pi*b*n*sgn(x) -
1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b) - x*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi
*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b))/(b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*
b*log(abs(c)))^2*tan(1/2*a)^2 + b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log
(abs(c)))^2 + b^2*n^2*tan(1/2*a)^2 + b^2*n^2 + tan(1/2*b*n*log(abs(x)) + 1/
2*b*log(abs(c)))^2*tan(1/2*a)^2 + tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c
)))^2 + tan(1/2*a)^2 + 1)
```

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int \cos\left(a + b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n)),x)
```

```
[Out] int(cos(a+b*ln(c*x^n)),x)
```

maxima [B] time = 0.36, size = 205, normalized size = 4.02

$$\frac{\left(\left(b\cos\left(b\log(c)\right)\sin\left(2\,b\log(c)\right) - b\cos\left(2\,b\log(c)\right)\sin\left(b\log(c)\right) + b\sin\left(b\log(c)\right)\right)n + \cos\left(2\,b\log(c)\right)\cos\left(b\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 2.35, size = 39, normalized size = 0.76

$$\frac{x\,\left(\cos\left(a+b\,\ln\left(c\,x^n\right)\right)+b\,n\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}{b^2\,n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*(cos(a + b*log(c*x^n)) + b*n*sin(a + b*log(c*x^n))))/(b^2*n^2 + 1)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \cos\left(a - \frac{i\log(cx^n)}{n}\right)dx & \text{for } b = -\frac{i}{n} \\ \int \cos\left(a + \frac{i\log(cx^n)}{n}\right)dx & \text{for } b = \frac{i}{n} \\ \frac{bnx\sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+1} + \frac{x\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+1} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(cos(a - I*log(c*x**n)/n), x), Eq(b, -I/n)), (Integral(c
os(a + I*log(c*x**n)/n), x), Eq(b, I/n)), (b*n*x*sin(a + b*n*log(x) + b*log
(c))/(b**2*n**2 + 1) + x*cos(a + b*n*log(x) + b*log(c))/(b**2*n**2 + 1), Tr
ue))
```

3.89 $\int \frac{\cos(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=18

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] sin(a+b*ln(c*x^n))/b/n
```

Rubi [A] time = 0.01, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {2637}

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]/x,x]
```

```
[Out] Sin[a + b*Log[c*x^n]]/(b*n)
```

Rule 2637

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\cos\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\operatorname{Subst}\left(\int \cos(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= \frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}\end{aligned}$$

Mathematica [B] time = 0.03, size = 37, normalized size = 2.06

$$\frac{\sin(a)\cos\left(b\log\left(cx^n\right)\right)}{bn}+\frac{\cos(a)\sin\left(b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]/x,x]
```

```
[Out] (Cos[b*Log[c*x^n]]*Sin[a])/(b*n) + (Cos[a]*Sin[b*Log[c*x^n]])/(b*n)
```

fricas [A] time = 0.57, size = 19, normalized size = 1.06

$$\frac{\sin\left(bn\log(x) + b\log(c) + a\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] sin(b*n*log(x) + b*log(c) + a)/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right) + a\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cos(b*log(c*x^n) + a)/x, x)
```

maple [A] time = 0.01, size = 19, normalized size = 1.06

$$\frac{\sin\left(a + b\ln\left(c\,x^n\right)\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))/x,x)
```

```
[Out] sin(a+b*ln(c*x^n))/b/n
```

maxima [A] time = 0.32, size = 18, normalized size = 1.00

$$\frac{\sin\left(b\log\left(cx^n\right) + a\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] sin(b*log(c*x^n) + a)/(b*n)
```

mupad [B] time = 2.28, size = 18, normalized size = 1.00

$$\frac{\sin\left(a + b\,\ln\left(c\,x^n\right)\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] sin(a + b*log(c*x^n))/(b*n)
```

sympy [A] time = 0.89, size = 37, normalized size = 2.06

$$\begin{cases} \log(x)\cos(a) & \text{for } b = 0 \wedge (b = 0 \vee n = 0) \\ \log(x)\cos\left(a + b\log(c)\right) & \text{for } n = 0 \\ \frac{\sin\left(a+bn\log(x)+b\log(c)\right)}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*cos(a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cos(a
+ b*log(c)), Eq(n, 0)), (sin(a + b*n*log(x) + b*log(c))/(b*n), True))
```

3.90 $\int \frac{\cos(a+b\log(cx^n))}{x^2} dx$

Optimal. Leaf size=56

$$\frac{bn\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}$$

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

Rubi [A] time = 0.02, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4486}

$$\frac{bn\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]/x^2,x]
```

```
[Out] -(Cos[a + b*Log[c*x^n]]/((1 + b^2*n^2)*x)) + (b*n*Sin[a + b*Log[c*x^n]])/((
1 + b^2*n^2)*x)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\cos\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx=-\frac{\cos\left(a+b\log\left(cx^n\right)\right)}{\left(1+b^2n^2\right)x}+\frac{bn\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+b^2n^2\right)x}$$

Mathematica [A] time = 0.07, size = 41, normalized size = 0.73

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

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]/x^2,x]
```

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

fricas [A] time = 0.98, size = 45, normalized size = 0.80

$$\frac{bn\sin\left(bn\log(x)+b\log(c)+a\right)-\cos\left(bn\log(x)+b\log(c)+a\right)}{\left(b^2n^2+1\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\cos\left(b\log\left(cx^n\right)+a\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cos(b*log(c*x^n) + a)/x^2, x)
```

maple [F] time = 0.02, size = 0, normalized size = 0.00

$$\int\frac{\cos\left(a+b\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))/x^2,x)
```

```
[Out] int(cos(a+b*ln(c*x^n))/x^2,x)
```

maxima [B] time = 0.37, size = 208, normalized size = 3.71

$$\frac{\left(\left(b\cos\left(b\log(c)\right)\sin\left(2\,b\log(c)\right)-b\cos\left(2\,b\log(c)\right)\sin\left(b\log(c)\right)+b\sin\left(b\log(c)\right)\right)n-\cos\left(2\,b\log(c)\right)\cos\left(b\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{\cos\left(a + b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(cos(a + b*log(c*x^n))/x^2, x)
```

sympy [A] time = 7.20, size = 286, normalized size = 5.11

$$\begin{cases} -\frac{i\log(x)\sin\left(-a+i\log(x)+\frac{i\log(c)}{n}\right)}{2x} + \frac{\log(x)\cos\left(-a+i\log(x)+\frac{i\log(c)}{n}\right)}{2x} - \frac{i\sin\left(-a+i\log(x)+\frac{i\log(c)}{n}\right)}{2x} - \frac{i\log(c)\sin\left(-a+i\log(x)+\frac{i\log(c)}{n}\right)}{2nx} + \\ -\frac{i\log(x)\sin\left(a+i\log(x)+\frac{i\log(c)}{n}\right)}{2x} + \frac{\log(x)\cos\left(a+i\log(x)+\frac{i\log(c)}{n}\right)}{2x} - \frac{\cos\left(a+i\log(x)+\frac{i\log(c)}{n}\right)}{2x} - \frac{i\log(c)\sin\left(a+i\log(x)+\frac{i\log(c)}{n}\right)}{2nx} + \\ \frac{bn\sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2x+x} - \frac{\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2x+x} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((-I*log(x)*sin(-a + I*log(x) + I*log(c)/n)/(2*x) + log(x)*cos(-a
+ I*log(x) + I*log(c)/n)/(2*x) - I*sin(-a + I*log(x) + I*log(c)/n)/(2*x) -
I*log(c)*sin(-a + I*log(x) + I*log(c)/n)/(2*n*x) + log(c)*cos(-a + I*log(x)
 + I*log(c)/n)/(2*n*x), Eq(b, -I/n)), (-I*log(x)*sin(a + I*log(x) + I*log(c
)/n)/(2*x) + log(x)*cos(a + I*log(x) + I*log(c)/n)/(2*x) - cos(a + I*log(x)
 + I*log(c)/n)/(2*x) - I*log(c)*sin(a + I*log(x) + I*log(c)/n)/(2*n*x) + lo
g(c)*cos(a + I*log(x) + I*log(c)/n)/(2*n*x), Eq(b, I/n)), (b*n*sin(a + b*n*
log(x) + b*log(c))/(b**2*n**2*x + x) - cos(a + b*n*log(x) + b*log(c))/(b**2
*n**2*x + x), True))
```

3.91 $\int x^2 \cos^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=97

$$\frac{3x^3\cos^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}+\frac{2bnx^3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}+\frac{2b^2n^2x^3}{3\left(4b^2n^2+9\right)}$$

```
[Out] 2/3*b^2*n^2*x^3/(4*b^2*n^2+9)+3*x^3*cos(a+b*ln(c*x^n))^2/(4*b^2*n^2+9)+2*b*
n*x^3*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/(4*b^2*n^2+9)
```

Rubi [A] time = 0.03, antiderivative size = 97, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 30}

$$\frac{3x^3\cos^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}+\frac{2bnx^3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+9}+\frac{2b^2n^2x^3}{3\left(4b^2n^2+9\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (2*b^2*n^2*x^3)/(3*(9 + 4*b^2*n^2)) + (3*x^3*Cos[a + b*Log[c*x^n]]^2)/(9 +
4*b^2*n^2) + (2*b*n*x^3*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(9 + 4
*b^2*n^2)
```

Rule 30

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

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2 \cos^2\left(a + b\log\left(cx^n\right)\right)\,dx = \frac{3x^3\cos^2\left(a + b\log\left(cx^n\right)\right)}{9 + 4b^2n^2} + \frac{2bnx^3\cos\left(a + b\log\left(cx^n\right)\right)\sin\left(a + b\log\left(cx^n\right)\right)}{9 + 4b^2n^2} +$$
$$= \frac{2b^2n^2x^3}{3\left(9 + 4b^2n^2\right)} + \frac{3x^3\cos^2\left(a + b\log\left(cx^n\right)\right)}{9 + 4b^2n^2} + \frac{2bnx^3\cos\left(a + b\log\left(cx^n\right)\right)\sin\left(a\right.}{9 + 4b^2n^2}$$

Mathematica [A] time = 0.17, size = 61, normalized size = 0.63

$$\frac{x^3\left(6bn\sin\left(2\left(a + b\log\left(cx^n\right)\right)\right) + 9\cos\left(2\left(a + b\log\left(cx^n\right)\right)\right) + 4b^2n^2 + 9\right)}{6\left(4b^2n^2 + 9\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^3*(9 + 4*b^2*n^2 + 9*Cos[2*(a + b*Log[c*x^n])] + 6*b*n*Sin[2*(a + b*Log[
c*x^n])]))/(6*(9 + 4*b^2*n^2))
```

fricas [A] time = 0.68, size = 76, normalized size = 0.78

$$\frac{2\,b^2n^2x^3 + 6\,bnx^3\cos\left(bn\log(x) + b\log(c) + a\right)\sin\left(bn\log(x) + b\log(c) + a\right) + 9\,x^3\cos\left(bn\log(x) + b\log(c) + \right.}{3\left(4\,b^2n^2 + 9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [B] time = 0.53, size = 833, normalized size = 8.59

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/6*x^3 - 1/4*(4*b*n*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*ta
n(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 4*b*n*x^3*e^(-pi*b*n*sgn(x) +
 pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)
 + 4*b*n*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(ab
```

```
s(x)) + b*log(abs(c)))*tan(a)^2 + 4*b*n*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi
*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a)^2 - 3*x^3*e^(
pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(ab
s(c)))^2*tan(a)^2 - 3*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*
tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 - 4*b*n*x^3*e^(pi*b*n*sgn(x
) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 4*b
*n*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x))
 + b*log(abs(c))) - 4*b*n*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*
b)*tan(a) - 4*b*n*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(
a) + 3*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(
x)) + b*log(abs(c)))^2 + 3*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + p
i*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + 12*x^3*e^(pi*b*n*sgn(x) - pi*
b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a) + 12*
x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) +
b*log(abs(c)))*tan(a) + 3*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*
b)*tan(a)^2 + 3*x^3*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a)
^2 - 3*x^3*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b) - 3*x^3*e^(-pi*b
*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b))/(4*b^2*n^2*tan(b*n*log(abs(x)) +
b*log(abs(c)))^2*tan(a)^2 + 4*b^2*n^2*tan(b*n*log(abs(x)) + b*log(abs(c)))^
2 + 4*b^2*n^2*tan(a)^2 + 4*b^2*n^2 + 9*tan(b*n*log(abs(x)) + b*log(abs(c)))
^2*tan(a)^2 + 9*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + 9*tan(a)^2 + 9)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^{2} \left(\cos^{2}\left(a + b\ln\left(c\,x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cos(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(x^2*cos(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.38, size = 301, normalized size = 3.10

$$\frac{3\left(2\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right) - b\cos\left(4\,b\log(c)\right)\sin\left(2\,b\log(c)\right) + b\sin\left(2\,b\log(c)\right)\right)n + 3\,\cos\left(4\,b\log\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/12*(3*(2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*l
og(c)) + b*sin(2*b*log(c)))*n + 3*cos(4*b*log(c))*cos(2*b*log(c)) + 3*sin(4
*b*log(c))*sin(2*b*log(c)) + 3*cos(2*b*log(c)))*x^3*cos(2*b*log(x^n) + 2*a)
```

```
 + 3*(2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(
c)) + b*cos(2*b*log(c)))*n - 3*cos(2*b*log(c))*sin(4*b*log(c)) + 3*cos(4*b*
log(c))*sin(2*b*log(c)) - 3*sin(2*b*log(c)))*x^3*sin(2*b*log(x^n) + 2*a) +
2*(4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + 9*cos(2*b*log(c)
)^2 + 9*sin(2*b*log(c))^2)*x^3)/(4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log
(c))^2)*n^2 + 9*cos(2*b*log(c))^2 + 9*sin(2*b*log(c))^2)
```

mupad [B] time = 2.70, size = 66, normalized size = 0.68

$$\frac{x^3}{6}+\frac{x^3\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n+12\mathrm{i}}+\frac{x^3\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}{12+b\,n\,8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^3/6 + (x^3*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 12i) + (x^3*exp(a*2i)*(
c*x^n)^(b*2i))/(b*n*8i + 12)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x^2\cos^2\left(a-\frac{3i\log\left(cx^n\right)}{2n}\right)dx \\ \int x^2\cos^2\left(a+\frac{3i\log\left(cx^n\right)}{2n}\right)dx \\ \frac{2b^2n^2x^3\sin^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{12b^2n^2+27}+\frac{2b^2n^2x^3\cos^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{12b^2n^2+27}+\frac{6bnx^3\sin\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)\cos\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{12b^2n^2+27}+ \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x**2*cos(a - 3*I*log(c*x**n)/(2*n))**2, x), Eq(b, -3*I/
(2*n))), (Integral(x**2*cos(a + 3*I*log(c*x**n)/(2*n))**2, x), Eq(b, 3*I/(2
*n))), (2*b**2*n**2*x**3*sin(a + b*n*log(x) + b*log(c))**2/(12*b**2*n**2 +
27) + 2*b**2*n**2*x**3*cos(a + b*n*log(x) + b*log(c))**2/(12*b**2*n**2 + 27
) + 6*b*n*x**3*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b*log(c)
)/(12*b**2*n**2 + 27) + 9*x**3*cos(a + b*n*log(x) + b*log(c))**2/(12*b**2*n
**2 + 27), True))
```

3.92 $\int x \cos^2\left(a + b \log\left(cx^n\right)\right) dx$

Optimal. Leaf size=98

$$\frac{x^2 \cos^2\left(a + b \log\left(cx^n\right)\right)}{2\left(b^2n^2 + 1\right)} + \frac{bnx^2 \sin\left(a + b \log\left(cx^n\right)\right) \cos\left(a + b \log\left(cx^n\right)\right)}{2\left(b^2n^2 + 1\right)} + \frac{b^2n^2x^2}{4\left(b^2n^2 + 1\right)}$$

```
[Out] 1/4*b^2*n^2*x^2/(b^2*n^2+1)+1/2*x^2*cos(a+b*ln(c*x^n))^2/(b^2*n^2+1)+1/2*b*
n*x^2*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/(b^2*n^2+1)
```

Rubi [A] time = 0.02, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {4488, 30}

$$\frac{x^2 \cos^2\left(a + b \log\left(cx^n\right)\right)}{2\left(b^2n^2 + 1\right)} + \frac{bnx^2 \sin\left(a + b \log\left(cx^n\right)\right) \cos\left(a + b \log\left(cx^n\right)\right)}{2\left(b^2n^2 + 1\right)} + \frac{b^2n^2x^2}{4\left(b^2n^2 + 1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x*Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (b^2*n^2*x^2)/(4*(1 + b^2*n^2)) + (x^2*Cos[a + b*Log[c*x^n]]^2)/(2*(1 + b^2
*n^2)) + (b*n*x^2*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(2*(1 + b^2*
n^2))
```

Rule 30

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

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x\cos^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x^2\cos^2\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)}+\frac{bnx^2\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)}+\frac{\left(b^2\right.}{2\left(\right.}$$
$$=\frac{b^2n^2x^2}{4\left(1+b^2n^2\right)}+\frac{x^2\cos^2\left(a+b\log\left(cx^n\right)\right)}{2\left(1+b^2n^2\right)}+\frac{bnx^2\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\,\mathrm{lo}\right.}{2\left(1+b^2n^2\right)}$$

Mathematica [A] time = 0.11, size = 54, normalized size = 0.55

$$\frac{x^2\left(bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+b^2n^2+1\right)}{4b^2n^2+4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^2*(1 + b^2*n^2 + Cos[2*(a + b*Log[c*x^n])] + b*n*Sin[2*(a + b*Log[c*x^n]
)]))/(4 + 4*b^2*n^2)
```

fricas [A] time = 0.44, size = 74, normalized size = 0.76

$$\frac{b^2n^2x^2+2\,bnx^2\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+2\,x^2\cos\left(bn\log(x)+b\log(c)+a\right.}{4\left(b^2n^2+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*(b^2*n^2*x^2 + 2*b*n*x^2*cos(b*n*log(x) + b*log(c) + a)*sin(b*n*log(x)
+ b*log(c) + a) + 2*x^2*cos(b*n*log(x) + b*log(c) + a)^2)/(b^2*n^2 + 1)
```

giac [B] time = 0.51, size = 820, normalized size = 8.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*x^2 - 1/8*(2*b*n*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*ta
n(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 2*b*n*x^2*e^(-pi*b*n*sgn(x) +
 pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)
 + 2*b*n*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(ab
```

```
s(x)) + b*log(abs(c)))*tan(a)^2 + 2*b*n*x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi
*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a)^2 - x^2*e^(pi
*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(
c)))^2*tan(a)^2 - x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(
b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 - 2*b*n*x^2*e^(pi*b*n*sgn(x) -
pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 2*b*n*x
^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b
*log(abs(c))) - 2*b*n*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*t
an(a) - 2*b*n*x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a) +
 x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) +
b*log(abs(c)))^2 + x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan
(b*n*log(abs(x)) + b*log(abs(c)))^2 + 4*x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*
b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a) + 4*x^2*e^(-pi
*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(
c)))*tan(a) + x^2*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(a)^2
+ x^2*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a)^2 - x^2*e^(pi
*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b) - x^2*e^(-pi*b*n*sgn(x) + pi*b*n
 - pi*b*sgn(c) + pi*b))/(b^2*n^2*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan
(a)^2 + b^2*n^2*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + b^2*n^2*tan(a)^2 +
 b^2*n^2 + tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 + tan(b*n*log(ab
s(x)) + b*log(abs(c)))^2 + tan(a)^2 + 1)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int x\left(\cos^2\left(a+b\ln\left(c\,x^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cos(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(x*cos(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.37, size = 282, normalized size = 2.88

$$\frac{\left(\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right)-b\cos\left(4\,b\log(c)\right)\sin\left(2\,b\log(c)\right)+b\sin\left(2\,b\log(c)\right)\right)n+\cos\left(4\,b\log(c)\right)\cos\ldots}{\ldots}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*(((b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)
) + b*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c)
)*sin(2*b*log(c)) + cos(2*b*log(c)))*x^2*cos(2*b*log(x^n) + 2*a) + ((b*cos(
```

```
4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)) + b*cos(2*b
*log(c)))*n - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*log
(c)) - sin(2*b*log(c)))*x^2*sin(2*b*log(x^n) + 2*a) + 2*((b^2*cos(2*b*log(c
))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*
x^2)/((b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))
^2 + sin(2*b*log(c))^2)
```

mupad [B] time = 2.63, size = 66, normalized size = 0.67

$$\frac{x^2}{4}+\frac{x^2\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n+8\mathrm{i}}+\frac{x^2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}{8+b\,n\,8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x^2/4 + (x^2*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 8i) + (x^2*exp(a*2i)*(c
*x^n)^(b*2i))/(b*n*8i + 8)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int x\cos^2\left(a-\frac{i\log\left(cx^n\right)}{n}\right)dx \\ \int x\cos^2\left(a+\frac{i\log\left(cx^n\right)}{n}\right)dx \\ \frac{b^2n^2x^2\sin^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{4b^2n^2+4}+\frac{b^2n^2x^2\cos^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{4b^2n^2+4}+\frac{2bnx^2\sin\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)\cos\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{4b^2n^2+4}+\frac{2 \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(x*cos(a - I*log(c*x**n)/n)**2, x), Eq(b, -I/n)), (Integ
ral(x*cos(a + I*log(c*x**n)/n)**2, x), Eq(b, I/n)), (b**2*n**2*x**2*sin(a +
 b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 4) + b**2*n**2*x**2*cos(a + b*n*l
og(x) + b*log(c))**2/(4*b**2*n**2 + 4) + 2*b*n*x**2*sin(a + b*n*log(x) + b*
log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*n**2 + 4) + 2*x**2*cos(a + b
*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 4), True))
```

3.93 $\int \cos^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=88

$$\frac{x\cos^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{2bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{2b^2n^2x}{4b^2n^2+1}$$

```
[Out] 2*b^2*n^2*x/(4*b^2*n^2+1)+x*cos(a+b*ln(c*x^n))^2/(4*b^2*n^2+1)+2*b*n*x*cos(
a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/(4*b^2*n^2+1)
```

Rubi [A] time = 0.02, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {4478, 8}

$$\frac{x\cos^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{2bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+1}+\frac{2b^2n^2x}{4b^2n^2+1}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (2*b^2*n^2*x)/(1 + 4*b^2*n^2) + (x*Cos[a + b*Log[c*x^n]]^2)/(1 + 4*b^2*n^2)
 + (2*b*n*x*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(1 + 4*b^2*n^2)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 4478

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

Rubi steps

$$\int \cos^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{x\cos^2\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{2bnx\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{\left(2b^2\right.}{1\,\cdot}$$

$$=\frac{2b^2n^2x}{1+4b^2n^2}+\frac{x\cos^2\left(a+b\log\left(cx^n\right)\right)}{1+4b^2n^2}+\frac{2bnx\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(\right.\right.}{1+4b^2n^2}$$

Mathematica [A] time = 0.08, size = 54, normalized size = 0.61

$$\frac{x\left(2bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+4b^2n^2+1\right)}{8b^2n^2+2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x*(1 + 4*b^2*n^2 + Cos[2*(a + b*Log[c*x^n])] + 2*b*n*Sin[2*(a + b*Log[c*x^
n])]))/(2 + 8*b^2*n^2)
```

fricas [A] time = 0.72, size = 68, normalized size = 0.77

$$\frac{2\,b^2n^2x+2\,bnx\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+x\cos\left(bn\log(x)+b\log(c)+a\right)^2}{4\,b^2n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (2*b^2*n^2*x + 2*b*n*x*cos(b*n*log(x) + b*log(c) + a)*sin(b*n*log(x) + b*lo
g(c) + a) + x*cos(b*n*log(x) + b*log(c) + a)^2)/(4*b^2*n^2 + 1)
```

giac [B] time = 0.42, size = 786, normalized size = 8.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x - 1/4*(4*b*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*
n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 4*b*n*x*e^(-pi*b*n*sgn(x) + pi*b*
n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a) + 4*b
*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) +
b*log(abs(c)))*tan(a)^2 + 4*b*n*x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c)
+ pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a)^2 - x*e^(pi*b*n*sgn(x)
- pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a
)^2 - x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)
) + b*log(abs(c)))^2*tan(a)^2 - 4*b*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sg
n(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 4*b*n*x*e^(-pi*b*n*sgn(
x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c))) - 4*
b*n*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(a) - 4*b*n*x*e^(-
pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(a) + x*e^(pi*b*n*sgn(x) -
pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + x*e^(
```

```
-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(a
bs(c)))^2 + 4*x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(b*n*log
(abs(x)) + b*log(abs(c)))*tan(a) + 4*x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sg
n(c) + pi*b)*tan(b*n*log(abs(x)) + b*log(abs(c)))*tan(a) + x*e^(pi*b*n*sgn(
x) - pi*b*n + pi*b*sgn(c) - pi*b)*tan(a)^2 + x*e^(-pi*b*n*sgn(x) + pi*b*n -
 pi*b*sgn(c) + pi*b)*tan(a)^2 - x*e^(pi*b*n*sgn(x) - pi*b*n + pi*b*sgn(c) -
 pi*b) - x*e^(-pi*b*n*sgn(x) + pi*b*n - pi*b*sgn(c) + pi*b))/(4*b^2*n^2*tan
(b*n*log(abs(x)) + b*log(abs(c)))^2*tan(a)^2 + 4*b^2*n^2*tan(b*n*log(abs(x)
) + b*log(abs(c)))^2 + 4*b^2*n^2*tan(a)^2 + 4*b^2*n^2 + tan(b*n*log(abs(x))
 + b*log(abs(c)))^2*tan(a)^2 + tan(b*n*log(abs(x)) + b*log(abs(c)))^2 + tan
(a)^2 + 1)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int \cos^2\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.37, size = 280, normalized size = 3.18

$$\frac{\left(2\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right)-b\cos\left(4\,b\log(c)\right)\sin\left(2\,b\log(c)\right)+b\sin\left(2\,b\log(c)\right)\right)n+\cos\left(4\,b\log(c)\right)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*((2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(
c)) + b*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(
c))*sin(2*b*log(c)) + cos(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) + (2*(b*co
s(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)) + b*cos(2
*b*log(c)))*n - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*l
og(c)) - sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) + 2*(4*(b^2*cos(2*b*log
(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2 + sin(2*b*log(c))^2
)*x)/(4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c
))^2 + sin(2*b*log(c))^2)
```

mupad [B] time = 2.53, size = 56, normalized size = 0.64

$$\frac{x\,\left(2\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^2+4\,b^2\,n^2+2\,b\,n\,\sin\left(2\,a+2\,b\,\ln\left(c\,x^n\right)\right)\right)}{8\,b^2\,n^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*(2*cos(a + b*log(c*x^n))^2 + 4*b^2*n^2 + 2*b*n*sin(2*a + 2*b*log(c*x^n))
))/(8*b^2*n^2 + 2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \cos^2\left(a - \frac{i\log(cx^n)}{2n}\right) dx \\ \int \cos^2\left(a + \frac{i\log(cx^n)}{2n}\right) dx \\ \frac{2b^2n^2x\sin^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+1} + \frac{2b^2n^2x\cos^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+1} + \frac{2bnx\sin\left(a+bn\log(x)+b\log(c)\right)\cos\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2+1} + \frac{x\,c}{} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(cos(a - I*log(c*x**n)/(2*n))**2, x), Eq(b, -I/(2*n))),
(Integral(cos(a + I*log(c*x**n)/(2*n))**2, x), Eq(b, I/(2*n))), (2*b**2*n**
2*x*sin(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 1) + 2*b**2*n**2*x*cos
(a + b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 1) + 2*b*n*x*sin(a + b*n*log(
x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*n**2 + 1) + x*cos(a +
 b*n*log(x) + b*log(c))**2/(4*b**2*n**2 + 1), True))
```

3.94 $\int \frac{\cos^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=39

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{2bn}+\frac{\log(x)}{2}$$

```
[Out] 1/2*ln(x)+1/2*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/b/n
```

Rubi [A] time = 0.03, antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2635, 8}

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{2bn}+\frac{\log(x)}{2}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^2/x,x]
```

```
[Out] Log[x]/2 + (Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(2*b*n)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rubi steps

$$\begin{aligned}
\int \frac{\cos^2\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \cos^2(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= \frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2bn}+\frac{\text{Subst}\left(\int 1\,dx,x,\log\left(cx^n\right)\right)}{2n}\\
&= \frac{\log(x)}{2}+\frac{\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{2bn}
\end{aligned}$$

Mathematica [A] time = 0.07, size = 36, normalized size = 0.92

$$\frac{2\left(a+b\log\left(cx^n\right)\right)+\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)}{4bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^2/x,x]
```

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

fricas [A] time = 0.64, size = 39, normalized size = 1.00

$$\frac{bn\log(x)+\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)}{2\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(b*n*log(x) + cos(b*n*log(x) + b*log(c) + a)*sin(b*n*log(x) + b*log(c)
+ a))/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\cos\left(b\log\left(cx^n\right)+a\right)^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cos(b*log(c*x^n) + a)^2/x, x)
```

maple [A] time = 0.03, size = 52, normalized size = 1.33

$$\frac{\cos\left(a+b\ln\left(c\,x^n\right)\right)\sin\left(a+b\ln\left(c\,x^n\right)\right)}{2bn}+\frac{\ln\left(c\,x^n\right)}{2n}+\frac{a}{2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^2/x,x)
```

```
[Out] 1/2*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/b/n+1/2/n*ln(c*x^n)+1/2/b/n*a
```

maxima [A] time = 0.35, size = 53, normalized size = 1.36

$$\frac{2\,bn\log(x)+\cos\left(2\,b\log\left(x^n\right)+2\,a\right)\sin\left(2\,b\log(c)\right)+\cos\left(2\,b\log(c)\right)\sin\left(2\,b\log\left(x^n\right)+2\,a\right)}{4\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*(2*b*n*log(x) + cos(2*b*log(x^n) + 2*a)*sin(2*b*log(c)) + cos(2*b*log(c
))*sin(2*b*log(x^n) + 2*a))/(b*n)
```

mupad [B] time = 2.44, size = 32, normalized size = 0.82

$$\frac{\ln(x^n)}{2\,n}+\frac{\sin(2\,a+2\,b\,\ln(c\,x^n))}{4\,b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [A] time = 3.03, size = 56, normalized size = 1.44

$$\frac{\begin{cases} \log(x)\cos(2a) & \text{for}\ b=0 \wedge (b=0 \vee n=0) \\ \log(x)\cos\left(2a+2b\log(c)\right) & \text{for}\ n=0 \\ \frac{\sin\left(2a+2bn\log(x)+2b\log(c)\right)}{2bn} & \text{otherwise} \end{cases}}{2}+\frac{\log(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*cos(2*a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cos(
2*a + 2*b*log(c)), Eq(n, 0)), (sin(2*a + 2*b*n*log(x) + 2*b*log(c))/(2*b*n)
, True))/2 + log(x)/2
```

3.95 $\int \frac{\cos^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=95

$$-\frac{\cos^2\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}+\frac{2bn\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}-\frac{2b^2n^2}{x\left(4b^2n^2+1\right)}$$

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

Rubi [A] time = 0.03, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 30}

$$-\frac{\cos^2\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}+\frac{2bn\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(4b^2n^2+1\right)}-\frac{2b^2n^2}{x\left(4b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^2/x^2,x]
```

```
[Out] (-2*b^2*n^2)/((1 + 4*b^2*n^2)*x) - Cos[a + b*Log[c*x^n]]^2/((1 + 4*b^2*n^2)
*x) + (2*b*n*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/((1 + 4*b^2*n^2)*
x)
```

Rule 30

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

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\cos^2\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{\cos^2\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x} + \frac{2bn\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x} + \frac{\left(2b^2n\right.}{1+}$$

$$= -\frac{2b^2n^2}{\left(1+4b^2n^2\right)x} - \frac{\cos^2\left(a+b\log\left(cx^n\right)\right)}{\left(1+4b^2n^2\right)x} + \frac{2bn\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\right.}{\left(1+4b^2n^2\right)x}$$

Mathematica [A] time = 0.14, size = 57, normalized size = 0.60

$$-\frac{-2bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+4b^2n^2+1}{2\left(4b^2n^2x+x\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^2/x^2,x]
```

```
[Out] -1/2*(1 + 4*b^2*n^2 + Cos[2*(a + b*Log[c*x^n])] - 2*b*n*Sin[2*(a + b*Log[c*
x^n])])/(x + 4*b^2*n^2*x)
```

fricas [A] time = 0.47, size = 68, normalized size = 0.72

$$-\frac{2\,b^2n^2-2\,bn\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+\cos\left(bn\log(x)+b\log(c)+a\right)^2}{\left(4\,b^2n^2+1\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right)+a\right)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cos(b*log(c*x^n) + a)^2/x^2, x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{\cos^2(a + b\ln(c\,x^n))}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^2/x^2,x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^2/x^2,x)
```

maxima [B] time = 0.37, size = 285, normalized size = 3.00

$$-\frac{8\left(b^2\cos\left(2\,b\log(c)\right)^2 + b^2\sin\left(2\,b\log(c)\right)^2\right)n^2 + 2\,\cos\left(2\,b\log(c)\right)^2 - \left(2\left(b\cos\left(2\,b\log(c)\right)\sin\left(4\,b\log(c)\right) - b\,c\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/4*(8*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + 2*cos(2*b*log
(c))^2 - (2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*
log(c)) + b*sin(2*b*log(c)))*n - cos(4*b*log(c))*cos(2*b*log(c)) - sin(4*b*
log(c))*sin(2*b*log(c)) - cos(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*sin(
2*b*log(c))^2 - (2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*s
in(2*b*log(c)) + b*cos(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - c
os(4*b*log(c))*sin(2*b*log(c)) + sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))/
((4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + cos(2*b*log(c))^2
 + sin(2*b*log(c))^2)*x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\cos\left(a + b\,\ln\left(c\,x^n\right)\right)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(cos(a + b*log(c*x^n))^2/x^2, x)
```

sympy [A] time = 16.17, size = 413, normalized size = 4.35

$$\begin{cases} -\frac{i\log(x)\sin\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x}+\frac{\log(x)\cos\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x}-\frac{i\sin\left(-2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x}-\frac{1}{2x}-\frac{i\log(c)\sin\left(-2a+i\log(x)+\right.}{4nx} \\ -\frac{i\log(x)\sin\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x}+\frac{\log(x)\cos\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x}-\frac{\cos\left(2a+i\log(x)+\frac{i\log(c)}{n}\right)}{4x}-\frac{1}{2x}-\frac{i\log(c)\sin\left(2a+i\log(x)+\frac{i\log(c)}{n}\right.}{4nx} \\ -\frac{2b^2n^2\sin^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2x+x}-\frac{2b^2n^2\cos^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2x+x}+\frac{2bn\sin\left(a+bn\log(x)+b\log(c)\right)\cos\left(a+bn\log(x)+b\log(c)\right)}{4b^2n^2x+x}-\frac{\mathrm{co}}{} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((-I*log(x)*sin(-2*a + I*log(x) + I*log(c)/n)/(4*x) + log(x)*cos(-
2*a + I*log(x) + I*log(c)/n)/(4*x) - I*sin(-2*a + I*log(x) + I*log(c)/n)/(4
*x) - 1/(2*x) - I*log(c)*sin(-2*a + I*log(x) + I*log(c)/n)/(4*n*x) + log(c)
*cos(-2*a + I*log(x) + I*log(c)/n)/(4*n*x), Eq(b, -I/(2*n))), (-I*log(x)*si
n(2*a + I*log(x) + I*log(c)/n)/(4*x) + log(x)*cos(2*a + I*log(x) + I*log(c)
/n)/(4*x) - cos(2*a + I*log(x) + I*log(c)/n)/(4*x) - 1/(2*x) - I*log(c)*sin
(2*a + I*log(x) + I*log(c)/n)/(4*n*x) + log(c)*cos(2*a + I*log(x) + I*log(c
)/n)/(4*n*x), Eq(b, I/(2*n))), (-2*b**2*n**2*sin(a + b*n*log(x) + b*log(c))
**2/(4*b**2*n**2*x + x) - 2*b**2*n**2*cos(a + b*n*log(x) + b*log(c))**2/(4*
b**2*n**2*x + x) + 2*b*n*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x)
+ b*log(c))/(4*b**2*n**2*x + x) - cos(a + b*n*log(x) + b*log(c))**2/(4*b**2
*n**2*x + x), True))
```

3.96 $\int x^2 \cos^3\left(a + b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=160

$$\frac{x^3\cos^3\left(a+b\log\left(cx^n\right)\right)}{3\left(b^2n^2+1\right)}+\frac{bnx^3\sin\left(a+b\log\left(cx^n\right)\right)\cos^2\left(a+b\log\left(cx^n\right)\right)}{3\left(b^2n^2+1\right)}+\frac{2b^2n^2x^3\cos\left(a+b\log\left(cx^n\right)\right)}{b^4n^4+10b^2n^2+9}+\frac{2b^3n^3 \ldots}{3(\ldots}$$

```
[Out] 2*b^2*n^2*x^3*cos(a+b*ln(c*x^n))/(b^4*n^4+10*b^2*n^2+9)+1/3*x^3*cos(a+b*ln(
c*x^n))^3/(b^2*n^2+1)+2/3*b^3*n^3*x^3*sin(a+b*ln(c*x^n))/(b^4*n^4+10*b^2*n^
2+9)+1/3*b*n*x^3*cos(a+b*ln(c*x^n))^2*sin(a+b*ln(c*x^n))/(b^2*n^2+1)
```

Rubi [A] time = 0.05, antiderivative size = 160, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 4486}

$$\frac{2b^3n^3x^3\sin\left(a+b\log\left(cx^n\right)\right)}{3\left(b^4n^4+10b^2n^2+9\right)}+\frac{x^3\cos^3\left(a+b\log\left(cx^n\right)\right)}{3\left(b^2n^2+1\right)}+\frac{2b^2n^2x^3\cos\left(a+b\log\left(cx^n\right)\right)}{b^4n^4+10b^2n^2+9}+\frac{bnx^3\sin\left(a+b\log\left(cx^n\right) \ldots}{3\left(b^2n^2 \ldots}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (2*b^2*n^2*x^3*Cos[a + b*Log[c*x^n]])/(9 + 10*b^2*n^2 + b^4*n^4) + (x^3*Cos
[a + b*Log[c*x^n]]^3)/(3*(1 + b^2*n^2)) + (2*b^3*n^3*x^3*Sin[a + b*Log[c*x^
n]])/(3*(9 + 10*b^2*n^2 + b^4*n^4)) + (b*n*x^3*Cos[a + b*Log[c*x^n]]^2*Sin[
a + b*Log[c*x^n]])/(3*(1 + b^2*n^2))
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^2\cos^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{x^3\cos^3\left(a+b\log\left(cx^n\right)\right)}{3\left(1+b^2n^2\right)}+\frac{bnx^3\cos^2\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{3\left(1+b^2n^2\right)}+$$

$$=\frac{2b^2n^2x^3\cos\left(a+b\log\left(cx^n\right)\right)}{9+10b^2n^2+b^4n^4}+\frac{x^3\cos^3\left(a+b\log\left(cx^n\right)\right)}{3\left(1+b^2n^2\right)}+\frac{2b^3n^3x^3\sin\left(a+b\right.}{3\left(9+10b^2n^2\right.}$$

Mathematica [A] time = 0.56, size = 120, normalized size = 0.75

$$\frac{x^3\left(27\left(b^2n^2+1\right)\cos\left(a+b\log\left(cx^n\right)\right)+\left(b^2n^2+9\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)+2bn\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2\right.\right.}{12\left(b^4n^4+10b^2n^2+9\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^3*(27*(1 + b^2*n^2)*Cos[a + b*Log[c*x^n]] + (9 + b^2*n^2)*Cos[3*(a + b*L
og[c*x^n])] + 2*b*n*(9 + 5*b^2*n^2 + (9 + b^2*n^2)*Cos[2*(a + b*Log[c*x^n])
])*Sin[a + b*Log[c*x^n]]))/(12*(9 + 10*b^2*n^2 + b^4*n^4))
```

fricas [A] time = 0.45, size = 127, normalized size = 0.79

$$\frac{6\,b^2n^2x^3\cos\left(bn\log(x)+b\log(c)+a\right)+\left(b^2n^2+9\right)x^3\cos\left(bn\log(x)+b\log(c)+a\right)^3+\left(2\,b^3n^3x^3+\left(b^3n^3+9\,b\right.\right.}{3\left(b^4n^4+10\,b^2n^2+9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cos(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] 1/3*(6*b^2*n^2*x^3*cos(b*n*log(x) + b*log(c) + a) + (b^2*n^2 + 9)*x^3*cos(b
*n*log(x) + b*log(c) + a)^3 + (2*b^3*n^3*x^3 + (b^3*n^3 + 9*b*n)*x^3*cos(b*
n*log(x) + b*log(c) + a)^2)*sin(b*n*log(x) + b*log(c) + a))/(b^4*n^4 + 10*b
^2*n^2 + 9)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cos(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int x^2 \left(\cos^3 \left(a + b \ln \left(c x^n\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cos(a+b*ln(c*x^n))^3,x)

[Out] int(x^2*cos(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.41, size = 1007, normalized size = 6.29

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cos(a+b*log(c*x^n))^3,x, algorithm="maxima")

[Out] 1/24*(((b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(3*b*l
og(c)) + b^3*sin(3*b*log(c)))*n^3 + (b^2*cos(6*b*log(c))*cos(3*b*log(c)) +
b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*n^2 + 9*(b*cos(3
*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*
log(c)))*n + 9*cos(6*b*log(c))*cos(3*b*log(c)) + 9*sin(6*b*log(c))*sin(3*b*
log(c)) + 9*cos(3*b*log(c)))*x^3*cos(3*b*log(x^n) + 3*a) + 9*((b^3*cos(3*b*
log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c)) + b^3*cos(2*b
*log(c))*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(c)))*n^3 + 3*(b^
2*cos(4*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos(2*b*log(c)) + b
^2*sin(4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*sin(2*b*log(c)))*n
^2 + (b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c))
 + b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n
 + 3*cos(4*b*log(c))*cos(3*b*log(c)) + 3*cos(3*b*log(c))*cos(2*b*log(c)) +
3*sin(4*b*log(c))*sin(3*b*log(c)) + 3*sin(3*b*log(c))*sin(2*b*log(c)))*x^3*
cos(b*log(x^n) + a) + ((b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*l
og(c))*sin(3*b*log(c)) + b^3*cos(3*b*log(c)))*n^3 - (b^2*cos(3*b*log(c))*si
n(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*
n^2 + 9*(b*cos(6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(
c)) + b*cos(3*b*log(c)))*n - 9*cos(3*b*log(c))*sin(6*b*log(c)) + 9*cos(6*b*
log(c))*sin(3*b*log(c)) - 9*sin(3*b*log(c)))*x^3*sin(3*b*log(x^n) + 3*a) +
9*((b^3*cos(4*b*log(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c
)) + b^3*sin(4*b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(
c)))*n^3 - 3*(b^2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin
(3*b*log(c)) + b^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*si
n(2*b*log(c)))*n^2 + (b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))
*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*si
```

```
n(2*b*log(c)))*n - 3*cos(3*b*log(c))*sin(4*b*log(c)) + 3*cos(4*b*log(c))*si
n(3*b*log(c)) - 3*cos(2*b*log(c))*sin(3*b*log(c)) + 3*cos(3*b*log(c))*sin(2
*b*log(c)))*x^3*sin(b*log(x^n) + a))/((b^4*cos(3*b*log(c))^2 + b^4*sin(3*b*
log(c))^2)*n^4 + 10*(b^2*cos(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2)*n^2 + 9
*cos(3*b*log(c))^2 + 9*sin(3*b*log(c))^2)
```

mupad [B] time = 3.06, size = 122, normalized size = 0.76

$$\frac{x^3\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}\,3\mathrm{i}}{8\,b\,n+24\mathrm{i}}+\frac{3\,x^3\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{24+b\,n\,8\mathrm{i}}+\frac{x^3\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}\,1\mathrm{i}}{24\,b\,n+24\mathrm{i}}+\frac{x^3\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}{24+b\,n\,24\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cos(a + b*log(c*x^n))^3,x)
```

```
[Out] (x^3*exp(-a*1i)/(c*x^n)^(b*1i)*3i)/(8*b*n + 24i) + (3*x^3*exp(a*1i)*(c*x^n)
^(b*1i))/(b*n*8i + 24) + (x^3*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(24*b*n + 24i)
+ (x^3*exp(a*3i)*(c*x^n)^(b*3i))/(b*n*24i + 24)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*cos(a+b*ln(c*x**n))**3,x)
```

```
[Out] Timed out
```

3.97 $\int x \cos^3\left(a + b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=158

$$\frac{2x^2\cos^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+4}+\frac{3bnx^2\sin\left(a+b\log\left(cx^n\right)\right)\cos^2\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+4}+\frac{12b^2n^2x^2\cos\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+40b^2n^2+16}+\frac{6b\cdots}{\cdots}$$

```
[Out] 12*b^2*n^2*x^2*cos(a+b*ln(c*x^n))/(9*b^4*n^4+40*b^2*n^2+16)+2*x^2*cos(a+b*l
n(c*x^n))^3/(9*b^2*n^2+4)+6*b^3*n^3*x^2*sin(a+b*ln(c*x^n))/(9*b^4*n^4+40*b^
2*n^2+16)+3*b*n*x^2*cos(a+b*ln(c*x^n))^2*sin(a+b*ln(c*x^n))/(9*b^2*n^2+4)
```

Rubi [A] time = 0.05, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {4488, 4486}

$$\frac{6b^3n^3x^2\sin\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+40b^2n^2+16}+\frac{2x^2\cos^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+4}+\frac{12b^2n^2x^2\cos\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+40b^2n^2+16}+\frac{3bnx^2\sin\left(a+b\log\left(c\cdots\right.\right.}{9b^2\cdots}$$

Antiderivative was successfully verified.

```
[In] Int[x*Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (12*b^2*n^2*x^2*Cos[a + b*Log[c*x^n]])/(16 + 40*b^2*n^2 + 9*b^4*n^4) + (2*x
^2*Cos[a + b*Log[c*x^n]]^3)/(4 + 9*b^2*n^2) + (6*b^3*n^3*x^2*Sin[a + b*Log[
c*x^n]])/(16 + 40*b^2*n^2 + 9*b^4*n^4) + (3*b*n*x^2*Cos[a + b*Log[c*x^n]]^2
*Sin[a + b*Log[c*x^n]])/(4 + 9*b^2*n^2)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x\cos^3\left(a+b\log\left(cx^n\right)\right)dx=\frac{2x^2\cos^3\left(a+b\log\left(cx^n\right)\right)}{4+9b^2n^2}+\frac{3bnx^2\cos^2\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{4+9b^2n^2}+$$
$$=\frac{12b^2n^2x^2\cos\left(a+b\log\left(cx^n\right)\right)}{16+40b^2n^2+9b^4n^4}+\frac{2x^2\cos^3\left(a+b\log\left(cx^n\right)\right)}{4+9b^2n^2}+\frac{6b^3n^3x^2\sin\left(a+\right.}{16+40b^2n^2}$$

Mathematica [A] time = 0.50, size = 123, normalized size = 0.78

$$\frac{x^2\left(6\left(9b^2n^2+4\right)\cos\left(a+b\log\left(cx^n\right)\right)+2\left(b^2n^2+4\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)+6bn\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2\right.\right.}{4\left(9b^4n^4+40b^2n^2+16\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^2*(6*(4 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] + 2*(4 + b^2*n^2)*Cos[3*(a +
b*Log[c*x^n])] + 6*b*n*(4 + 5*b^2*n^2 + (4 + b^2*n^2)*Cos[2*(a + b*Log[c*x^
n])])*Sin[a + b*Log[c*x^n]]))/(4*(16 + 40*b^2*n^2 + 9*b^4*n^4))
```

fricas [A] time = 0.51, size = 129, normalized size = 0.82

$$\frac{12\,b^2n^2x^2\cos\left(bn\log(x)+b\log(c)+a\right)+2\left(b^2n^2+4\right)x^2\cos\left(bn\log(x)+b\log(c)+a\right)^3+3\left(2\,b^3n^3x^2+\left(b^3n^3\right.\right.}{9\,b^4n^4+40\,b^2n^2+16}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (12*b^2*n^2*x^2*cos(b*n*log(x) + b*log(c) + a) + 2*(b^2*n^2 + 4)*x^2*cos(b*
n*log(x) + b*log(c) + a)^3 + 3*(2*b^3*n^3*x^2 + (b^3*n^3 + 4*b*n)*x^2*cos(b
*n*log(x) + b*log(c) + a)^2)*sin(b*n*log(x) + b*log(c) + a))/(9*b^4*n^4 + 4
0*b^2*n^2 + 16)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x\left(\cos^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cos(a+b*ln(c*x^n))^3,x)
```

```
[Out] int(x*cos(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.42, size = 1015, normalized size = 6.42

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(3*b*
log(c)) + b^3*sin(3*b*log(c)))*n^3 + 2*(b^2*cos(6*b*log(c))*cos(3*b*log(c))
 + b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*n^2 + 12*(b*c
os(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*sin(
3*b*log(c)))*n + 8*cos(6*b*log(c))*cos(3*b*log(c)) + 8*sin(6*b*log(c))*sin(
3*b*log(c)) + 8*cos(3*b*log(c)))*x^2*cos(3*b*log(x^n) + 3*a) + 3*(9*(b^3*co
s(3*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c)) + b^3*c
os(2*b*log(c))*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(c)))*n^3 +
 18*(b^2*cos(4*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos(2*b*log(
c)) + b^2*sin(4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*sin(2*b*log
(c)))*n^2 + 4*(b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*
b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*l
og(c)))*n + 8*cos(4*b*log(c))*cos(3*b*log(c)) + 8*cos(3*b*log(c))*cos(2*b*l
og(c)) + 8*sin(4*b*log(c))*sin(3*b*log(c)) + 8*sin(3*b*log(c))*sin(2*b*log(
c)))*x^2*cos(b*log(x^n) + a) + (3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^
3*sin(6*b*log(c))*sin(3*b*log(c)) + b^3*cos(3*b*log(c)))*n^3 - 2*(b^2*cos(3
*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(
3*b*log(c)))*n^2 + 12*(b*cos(6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c)
)*sin(3*b*log(c)) + b*cos(3*b*log(c)))*n - 8*cos(3*b*log(c))*sin(6*b*log(c)
) + 8*cos(6*b*log(c))*sin(3*b*log(c)) - 8*sin(3*b*log(c)))*x^2*sin(3*b*log(
x^n) + 3*a) + 3*(9*(b^3*cos(4*b*log(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c
))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(
c))*sin(2*b*log(c)))*n^3 - 18*(b^2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*co
s(4*b*log(c))*sin(3*b*log(c)) + b^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*c
os(3*b*log(c))*sin(2*b*log(c)))*n^2 + 4*(b*cos(4*b*log(c))*cos(3*b*log(c))
+ b*cos(3*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b
*sin(3*b*log(c))*sin(2*b*log(c)))*n - 8*cos(3*b*log(c))*sin(4*b*log(c)) + 8
```

```
*cos(4*b*log(c))*sin(3*b*log(c)) - 8*cos(2*b*log(c))*sin(3*b*log(c)) + 8*co
s(3*b*log(c))*sin(2*b*log(c)))*x^2*sin(b*log(x^n) + a))/(9*(b^4*cos(3*b*log
(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 40*(b^2*cos(3*b*log(c))^2 + b^2*sin(3
*b*log(c))^2)*n^2 + 16*cos(3*b*log(c))^2 + 16*sin(3*b*log(c))^2)
```

mupad [**B**] time = 2.95, size = 122, normalized size = 0.77

$$\frac{x^2\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}\,3\mathrm{i}}{8\,b\,n+16\mathrm{i}}+\frac{3\,x^2\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{16+b\,n\,8\mathrm{i}}+\frac{x^2\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}\,1\mathrm{i}}{24\,b\,n+16\mathrm{i}}+\frac{x^2\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}{16+b\,n\,24\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x^2*exp(-a*1i)/(c*x^n)^(b*1i)*3i)/(8*b*n + 16i) + (3*x^2*exp(a*1i)*(c*x^n)
^(b*1i))/(b*n*8i + 16) + (x^2*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(24*b*n + 16i)
+ (x^2*exp(a*3i)*(c*x^n)^(b*3i))/(b*n*24i + 16)
```

sympy [**F(-1)**] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.98 $\int \cos^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=149

$$\frac{x\cos^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+1}+\frac{3bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos^2\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+1}+\frac{6b^2n^2x\cos\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+10b^2n^2+1}+\frac{6b^3n^3x\,\mathrm{s}}{9b^4}$$

```
[Out] 6*b^2*n^2*x*cos(a+b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)+x*cos(a+b*ln(c*x^n)
)^3/(9*b^2*n^2+1)+6*b^3*n^3*x*sin(a+b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)+3
*b*n*x*cos(a+b*ln(c*x^n))^2*sin(a+b*ln(c*x^n))/(9*b^2*n^2+1)
```

Rubi [A] time = 0.04, antiderivative size = 149, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {4478, 4476}

$$\frac{6b^3n^3x\sin\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+10b^2n^2+1}+\frac{x\cos^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+1}+\frac{6b^2n^2x\cos\left(a+b\log\left(cx^n\right)\right)}{9b^4n^4+10b^2n^2+1}+\frac{3bnx\sin\left(a+b\log\left(cx^n\right)\right)\mathrm{c}}{9b^2n^2+}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (6*b^2*n^2*x*Cos[a + b*Log[c*x^n]])/(1 + 10*b^2*n^2 + 9*b^4*n^4) + (x*Cos[a
 + b*Log[c*x^n]]^3)/(1 + 9*b^2*n^2) + (6*b^3*n^3*x*Sin[a + b*Log[c*x^n]])/(
1 + 10*b^2*n^2 + 9*b^4*n^4) + (3*b*n*x*Cos[a + b*Log[c*x^n]]^2*Sin[a + b*Lo
g[c*x^n]])/(1 + 9*b^2*n^2)
```

Rule 4476

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Simp[(x*
Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] + Simp[(b*d*n*x*Sin[d*(a +
 b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[
b^2*d^2*n^2 + 1, 0]
```

Rule 4478

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

Rubi steps

$$\int \cos^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{x\cos^3\left(a+b\log\left(cx^n\right)\right)}{1+9b^2n^2} + \frac{3bnx\cos^2\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+9b^2n^2} + \frac{(6b$$
$$= \frac{6b^2n^2x\cos\left(a+b\log\left(cx^n\right)\right)}{1+10b^2n^2+9b^4n^4} + \frac{x\cos^3\left(a+b\log\left(cx^n\right)\right)}{1+9b^2n^2} + \frac{6b^3n^3x\sin\left(a+b\log\left(c\right.\right.}{1+10b^2n^2+9b^4n^4}$$

Mathematica [A] time = 0.42, size = 117, normalized size = 0.79

$$\frac{x\left(3\left(9b^2n^2+1\right)\cos\left(a+b\log\left(cx^n\right)\right)+\left(b^2n^2+1\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)+6bn\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2+\right.\right.}{36b^4n^4+40b^2n^2+4}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x*(3*(1 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] + (1 + b^2*n^2)*Cos[3*(a + b*Lo
g[c*x^n])] + 6*b*n*(1 + 5*b^2*n^2 + (1 + b^2*n^2)*Cos[2*(a + b*Log[c*x^n])]
)*Sin[a + b*Log[c*x^n]]))/(4 + 40*b^2*n^2 + 36*b^4*n^4)
```

fricas [A] time = 0.43, size = 119, normalized size = 0.80

$$\frac{6\,b^2n^2x\cos\left(bn\log(x)+b\log(c)+a\right)+\left(b^2n^2+1\right)x\cos\left(bn\log(x)+b\log(c)+a\right)^3+3\left(2\,b^3n^3x+\left(b^3n^3+bn\right)\right.}{9\,b^4n^4+10\,b^2n^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (6*b^2*n^2*x*cos(b*n*log(x) + b*log(c) + a) + (b^2*n^2 + 1)*x*cos(b*n*log(x
) + b*log(c) + a)^3 + 3*(2*b^3*n^3*x + (b^3*n^3 + b*n)*x*cos(b*n*log(x) + b
*log(c) + a)^2)*sin(b*n*log(x) + b*log(c) + a))/(9*b^4*n^4 + 10*b^2*n^2 + 1
)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \cos^3(a + b\ln(c x^n))\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^3,x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.41, size = 989, normalized size = 6.64

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(3*b*
log(c)) + b^3*sin(3*b*log(c)))*n^3 + (b^2*cos(6*b*log(c))*cos(3*b*log(c)) +
 b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*n^2 + 3*(b*cos(
3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*sin(3*b
*log(c)))*n + cos(6*b*log(c))*cos(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*log
(c)) + cos(3*b*log(c)))*x*cos(3*b*log(x^n) + 3*a) + 3*(9*(b^3*cos(3*b*log(c
))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c)) + b^3*cos(2*b*log(
c))*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(c)))*n^3 + 9*(b^2*cos
(4*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos(2*b*log(c)) + b^2*si
n(4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*sin(2*b*log(c)))*n^2 +
(b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)) + b*
cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n + co
s(4*b*log(c))*cos(3*b*log(c)) + cos(3*b*log(c))*cos(2*b*log(c)) + sin(4*b*l
og(c))*sin(3*b*log(c)) + sin(3*b*log(c))*sin(2*b*log(c)))*x*cos(b*log(x^n)
+ a) + (3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*
b*log(c)) + b^3*cos(3*b*log(c)))*n^3 - (b^2*cos(3*b*log(c))*sin(6*b*log(c))
 - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 3*(b*co
s(6*b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3
*b*log(c)))*n - cos(3*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(3*b*l
og(c)) - sin(3*b*log(c)))*x*sin(3*b*log(x^n) + 3*a) + 3*(9*(b^3*cos(4*b*log
(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*lo
g(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 - 9*(b^2*c
os(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c)) + b^2*
cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(c)))*n^2
+ (b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log(c)) +
b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n -
cos(3*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(3*b*log(c)) - cos(2*b
```

```
*log(c))*sin(3*b*log(c)) + cos(3*b*log(c))*sin(2*b*log(c)))*x*sin(b*log(x^n
) + a))/(9*(b^4*cos(3*b*log(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 10*(b^2*co
s(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2)*n^2 + cos(3*b*log(c))^2 + sin(3*b*
log(c))^2)
```

mupad [B] time = 2.82, size = 114, normalized size = 0.77

$$\frac{x\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}\,3\mathrm{i}}{8\,b\,n+8\mathrm{i}}+\frac{3\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{8+b\,n\,8\mathrm{i}}+\frac{x\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}\,1\mathrm{i}}{24\,b\,n+8\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}{8+b\,n\,24\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*exp(-a*1i)/(c*x^n)^(b*1i)*3i)/(8*b*n + 8i) + (3*x*exp(a*1i)*(c*x^n)^(b*1
i))/(b*n*8i + 8) + (x*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(24*b*n + 8i) + (x*exp(
a*3i)*(c*x^n)^(b*3i))/(b*n*24i + 8)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \cos^3\left(a - \frac{i\log(cx^n)}{n}\right) dx \\ \int \cos^3\left(a - \frac{i\log(cx^n)}{3n}\right) dx \\ \int \cos^3\left(a + \frac{i\log(cx^n)}{3n}\right) dx \\ \int \cos^3\left(a + \frac{i\log(cx^n)}{n}\right) dx \\ \frac{6b^3n^3x\sin^3\left(a+bn\log(x)+b\log(c)\right)}{9b^4n^4+10b^2n^2+1} + \frac{9b^3n^3x\sin\left(a+bn\log(x)+b\log(c)\right)\cos^2\left(a+bn\log(x)+b\log(c)\right)}{9b^4n^4+10b^2n^2+1} + \frac{6b^2n^2x\sin^2\left(a+bn\log(x)+b\log(c)\right)\cos}{9b^4n^4+10b^2n^2} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((Integral(cos(a - I*log(c*x**n)/n)**3, x), Eq(b, -I/n)), (Integra
l(cos(a - I*log(c*x**n)/(3*n))**3, x), Eq(b, -I/(3*n))), (Integral(cos(a +
I*log(c*x**n)/(3*n))**3, x), Eq(b, I/(3*n))), (Integral(cos(a + I*log(c*x**
n)/n)**3, x), Eq(b, I/n)), (6*b**3*n**3*x*sin(a + b*n*log(x) + b*log(c))**3
/(9*b**4*n**4 + 10*b**2*n**2 + 1) + 9*b**3*n**3*x*sin(a + b*n*log(x) + b*lo
g(c))*cos(a + b*n*log(x) + b*log(c))**2/(9*b**4*n**4 + 10*b**2*n**2 + 1) +
6*b**2*n**2*x*sin(a + b*n*log(x) + b*log(c))**2*cos(a + b*n*log(x) + b*log(
c))/(9*b**4*n**4 + 10*b**2*n**2 + 1) + 7*b**2*n**2*x*cos(a + b*n*log(x) + b
*log(c))**3/(9*b**4*n**4 + 10*b**2*n**2 + 1) + 3*b*n*x*sin(a + b*n*log(x) +
```

```
 b*log(c))*cos(a + b*n*log(x) + b*log(c))**2/(9*b**4*n**4 + 10*b**2*n**2 +
1) + x*cos(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4 + 10*b**2*n**2 + 1),
True))
```

3.99 $\int \frac{\cos^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=42

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

```
[Out] sin(a+b*ln(c*x^n))/b/n-1/3*sin(a+b*ln(c*x^n))^3/b/n
```

Rubi [A] time = 0.03, antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {2633}

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] Sin[a + b*Log[c*x^n]]/(b*n) - Sin[a + b*Log[c*x^n]]^3/(3*b*n)
```

Rule 2633

```
Int[sin[(c_.) + (d_.)*(x_)]^(n_), x_Symbol] :> -Dist[d^(-1), Subst[Int[Expa
nd[(1 - x^2)^((n - 1)/2), x], x], x, Cos[c + d*x]], x] /; FreeQ[{c, d}, x]
&& IGtQ[(n - 1)/2, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\operatorname{Subst}\left(\int \cos^3(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= -\frac{\operatorname{Subst}\left(\int \left(1-x^2\right)\,dx,x,-\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}\\
&= \frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{3bn}
\end{aligned}$$

Mathematica [A] time = 0.06, size = 42, normalized size = 1.00

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\sin^3\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] Sin[a + b*Log[c*x^n]]/(b*n) - Sin[a + b*Log[c*x^n]]^3/(3*b*n)
```

fricas [A] time = 0.62, size = 36, normalized size = 0.86

$$\frac{\left(\cos\left(bn\log(x) + b\log(c) + a\right)^2 + 2\right)\sin\left(bn\log(x) + b\log(c) + a\right)}{3\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*(cos(b*n*log(x) + b*log(c) + a)^2 + 2)*sin(b*n*log(x) + b*log(c) + a)/(
b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right) + a\right)^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cos(b*log(c*x^n) + a)^3/x, x)
```

maple [A] time = 0.03, size = 35, normalized size = 0.83

$$\frac{\left(2 + \cos^2\left(a + b\ln\left(c\,x^n\right)\right)\right)\sin\left(a + b\ln\left(c\,x^n\right)\right)}{3nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^3/x,x)
```

```
[Out] 1/3/n/b*(2+cos(a+b*ln(c*x^n))^2)*sin(a+b*ln(c*x^n))
```

maxima [B] time = 0.37, size = 232, normalized size = 5.52

$$\left(\cos\left(3\,b\log(c)\right)\sin\left(6\,b\log(c)\right) - \cos\left(6\,b\log(c)\right)\sin\left(3\,b\log(c)\right) + \sin\left(3\,b\log(c)\right)\right)\cos\left(3\,b\log\left(x^n\right) + 3\,a\right) + 9\,($$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/24*((cos(3*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(3*b*log(c)) +
sin(3*b*log(c)))*cos(3*b*log(x^n) + 3*a) + 9*(cos(3*b*log(c))*sin(4*b*log(c
)) - cos(4*b*log(c))*sin(3*b*log(c)) + cos(2*b*log(c))*sin(3*b*log(c)) - co
s(3*b*log(c))*sin(2*b*log(c)))*cos(b*log(x^n) + a) + (cos(6*b*log(c))*cos(3
*b*log(c)) + sin(6*b*log(c))*sin(3*b*log(c)) + cos(3*b*log(c)))*sin(3*b*log
(x^n) + 3*a) + 9*(cos(4*b*log(c))*cos(3*b*log(c)) + cos(3*b*log(c))*cos(2*b
*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)) + sin(3*b*log(c))*sin(2*b*log(c)
))*sin(b*log(x^n) + a))/(b*n)
```

mupad [B] time = 2.35, size = 37, normalized size = 0.88

$$\frac{3\ \sin\left(a+b\ \ln\left(c\,x^n\right)\right)-\sin\left(a+b\ \ln\left(c\,x^n\right)\right)^3}{3\,b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*sin(a + b*log(c*x^n)) - sin(a + b*log(c*x^n))^3)/(3*b*n)
```

sympy [A] time = 10.75, size = 82, normalized size = 1.95

$$\begin{cases} \log\left(x\right)\cos^{3}\left(a\right) & \text{for}\: b = 0 \wedge \left(b = 0 \vee n = 0\right) \\ \log\left(x\right)\cos^{3}\left(a + b\log\left(c\right)\right) & \text{for}\: n = 0 \\ \frac{2\sin^{3}\left(a + bn\log\left(x\right) + b\log\left(c\right)\right)}{3bn} + \frac{\sin\left(a + bn\log\left(x\right) + b\log\left(c\right)\right)\cos^{2}\left(a + bn\log\left(x\right) + b\log\left(c\right)\right)}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*cos(a)**3, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cos
(a + b*log(c))**3, Eq(n, 0)), (2*sin(a + b*n*log(x) + b*log(c))**3/(3*b*n)
+ sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))**2/(b*n), T
rue))
```

3.100 $\int \frac{\cos^3(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=158

$$-\frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^2n^2+1\right)}+\frac{3bn\sin\left(a+b\log\left(cx^n\right)\right)\cos^2\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^2n^2+1\right)}-\frac{6b^2n^2\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^4n^4+10b^2n^2+1\right)}+\frac{6b^3n^3\sin\left(\right.}{x\left(9b^4n^4\right.}$$

```
[Out] -6*b^2*n^2*cos(a+b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)/x-cos(a+b*ln(c*x^n))
^3/(9*b^2*n^2+1)/x+6*b^3*n^3*sin(a+b*ln(c*x^n))/(9*b^4*n^4+10*b^2*n^2+1)/x+
3*b*n*cos(a+b*ln(c*x^n))^2*sin(a+b*ln(c*x^n))/(9*b^2*n^2+1)/x
```

Rubi [A] time = 0.05, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 4486}

$$\frac{6b^3n^3\sin\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^4n^4+10b^2n^2+1\right)}-\frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^2n^2+1\right)}-\frac{6b^2n^2\cos\left(a+b\log\left(cx^n\right)\right)}{x\left(9b^4n^4+10b^2n^2+1\right)}+\frac{3bn\sin\left(a+b\log\left(cx^n\right)\right)\cos^2\left(a\right.}{x\left(9b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^3/x^2,x]
```

```
[Out] (-6*b^2*n^2*Cos[a + b*Log[c*x^n]])/((1 + 10*b^2*n^2 + 9*b^4*n^4)*x) - Cos[a
 + b*Log[c*x^n]]^3/((1 + 9*b^2*n^2)*x) + (6*b^3*n^3*Sin[a + b*Log[c*x^n]])/
((1 + 10*b^2*n^2 + 9*b^4*n^4)*x) + (3*b*n*Cos[a + b*Log[c*x^n]]^2*Sin[a + b
*Log[c*x^n]])/((1 + 9*b^2*n^2)*x)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
```

```
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{\left(1+9b^2n^2\right)x} + \frac{3bn\cos^2\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{\left(1+9b^2n^2\right)x} + \frac{\left(6b^2\right.}{}$$
$$= -\frac{6b^2n^2\cos\left(a+b\log\left(cx^n\right)\right)}{\left(1+10b^2n^2+9b^4n^4\right)x} - \frac{\cos^3\left(a+b\log\left(cx^n\right)\right)}{\left(1+9b^2n^2\right)x} + \frac{6b^3n^3\sin\left(a+b\log\left(cx^n\right.\right.}{\left(1+10b^2n^2+9b^4n^4\right)x}$$

Mathematica [A] time = 0.48, size = 122, normalized size = 0.77

$$-\frac{3\left(9b^2n^2+1\right)\cos\left(a+b\log\left(cx^n\right)\right)+\left(b^2n^2+1\right)\cos\left(3\left(a+b\log\left(cx^n\right)\right)\right)-6bn\sin\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2+1\right.\right.}{4x\left(9b^4n^4+10b^2n^2+1\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^3/x^2,x]
```

```
[Out] -1/4*(3*(1 + 9*b^2*n^2)*Cos[a + b*Log[c*x^n]] + (1 + b^2*n^2)*Cos[3*(a + b*
Log[c*x^n])] - 6*b*n*(1 + 5*b^2*n^2 + (1 + b^2*n^2)*Cos[2*(a + b*Log[c*x^n]
)])*Sin[a + b*Log[c*x^n]])/((1 + 10*b^2*n^2 + 9*b^4*n^4)*x)
```

fricas [A] time = 0.54, size = 119, normalized size = 0.75

$$-\frac{6\,b^2n^2\cos\left(bn\log(x)+b\log(c)+a\right)+\left(b^2n^2+1\right)\cos\left(bn\log(x)+b\log(c)+a\right)^3-3\left(2\,b^3n^3+\left(b^3n^3+bn\right)\mathrm{cc}\right.}{\left(9\,b^4n^4+10\,b^2n^2+1\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(6*b^2*n^2*cos(b*n*log(x) + b*log(c) + a) + (b^2*n^2 + 1)*cos(b*n*log(x) +
 b*log(c) + a)^3 - 3*(2*b^3*n^3 + (b^3*n^3 + b*n)*cos(b*n*log(x) + b*log(c)
 + a)^2)*sin(b*n*log(x) + b*log(c) + a))/((9*b^4*n^4 + 10*b^2*n^2 + 1)*x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right)+a\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^3/x^2,x, algorithm="giac")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^3/x^2, x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int \frac{\cos^3 (a + b \ln (c x^n))}{x^2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^3/x^2,x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^3/x^2,x)
```

maxima [B] time = 0.42, size = 994, normalized size = 6.29

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*((3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(3*b*
log(c)) + b^3*sin(3*b*log(c)))*n^3 - (b^2*cos(6*b*log(c))*cos(3*b*log(c)) +
 b^2*sin(6*b*log(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*n^2 + 3*(b*cos(
3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*sin(3*b
*log(c)))*n - cos(6*b*log(c))*cos(3*b*log(c)) - sin(6*b*log(c))*sin(3*b*log
(c)) - cos(3*b*log(c)))*cos(3*b*log(x^n) + 3*a) + 3*(9*(b^3*cos(3*b*log(c))
*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(3*b*log(c)) + b^3*cos(2*b*log(c)
)*sin(3*b*log(c)) - b^3*cos(3*b*log(c))*sin(2*b*log(c)))*n^3 - 9*(b^2*cos(4
*b*log(c))*cos(3*b*log(c)) + b^2*cos(3*b*log(c))*cos(2*b*log(c)) + b^2*sin(
4*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c))*sin(2*b*log(c)))*n^2 + (b
*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)) + b*co
s(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n - cos(
4*b*log(c))*cos(3*b*log(c)) - cos(3*b*log(c))*cos(2*b*log(c)) - sin(4*b*log
(c))*sin(3*b*log(c)) - sin(3*b*log(c))*sin(2*b*log(c)))*cos(b*log(x^n) + a)
 + (3*(b^3*cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*lo
g(c)) + b^3*cos(3*b*log(c)))*n^3 + (b^2*cos(3*b*log(c))*sin(6*b*log(c)) - b
^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)))*n^2 + 3*(b*cos(6*
b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3*b*l
og(c)))*n + cos(3*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(3*b*log(c
)) + sin(3*b*log(c)))*sin(3*b*log(x^n) + 3*a) + 3*(9*(b^3*cos(4*b*log(c))*c
os(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*
sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))*n^3 + 9*(b^2*cos(3*b
```

```
*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c)) + b^2*cos(2*
b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(c)))*n^2 + (b*c
os(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log(c)) + b*sin(
4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n + cos(3*
b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b*log(c)) + cos(2*b*log(c
))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*sin(b*log(x^n) + a))/
((9*(b^4*cos(3*b*log(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 10*(b^2*cos(3*b*l
og(c))^2 + b^2*sin(3*b*log(c))^2)*n^2 + cos(3*b*log(c))^2 + sin(3*b*log(c))
^2)*x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\cos \left(a+b\ \ln \left(c\,x^n\right)\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^3/x^2,x)
```

```
[Out] int(cos(a + b*log(c*x^n))^3/x^2, x)
```

sympy [B] time = 81.74, size = 1022, normalized size = 6.47

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**3/x**2,x)
```

```
[Out] Piecewise((-3*I*log(x)*sin(-a + I*log(x) + I*log(c)/n)/(8*x) + 3*log(x)*cos
(-a + I*log(x) + I*log(c)/n)/(8*x) - 3*I*sin(-3*a + 3*I*log(x) + 3*I*log(c)
/n)/(32*x) - 3*I*sin(-a + I*log(x) + I*log(c)/n)/(8*x) + cos(-3*a + 3*I*log
(x) + 3*I*log(c)/n)/(32*x) - 3*I*log(c)*sin(-a + I*log(x) + I*log(c)/n)/(8*
n*x) + 3*log(c)*cos(-a + I*log(x) + I*log(c)/n)/(8*n*x), Eq(b, -I/n)), (-I*
log(x)*sin(-3*a + I*log(x) + I*log(c)/n)/(8*x) + log(x)*cos(-3*a + I*log(x)
 + I*log(c)/n)/(8*x) - I*sin(-3*a + I*log(x) + I*log(c)/n)/(8*x) + 9*I*sin(
-a + I*log(x)/3 + I*log(c)/(3*n))/(32*x) - 27*cos(-a + I*log(x)/3 + I*log(c
)/(3*n))/(32*x) - I*log(c)*sin(-3*a + I*log(x) + I*log(c)/n)/(8*n*x) + log(
c)*cos(-3*a + I*log(x) + I*log(c)/n)/(8*n*x), Eq(b, -I/(3*n))), (-I*log(x)*
sin(3*a + I*log(x) + I*log(c)/n)/(8*x) + log(x)*cos(3*a + I*log(x) + I*log(
c)/n)/(8*x) + 9*I*sin(a + I*log(x)/3 + I*log(c)/(3*n))/(32*x) - I*sin(3*a +
 I*log(x) + I*log(c)/n)/(8*x) - 27*cos(a + I*log(x)/3 + I*log(c)/(3*n))/(32
*x) - I*log(c)*sin(3*a + I*log(x) + I*log(c)/n)/(8*n*x) + log(c)*cos(3*a +
I*log(x) + I*log(c)/n)/(8*n*x), Eq(b, I/(3*n))), (-3*I*log(x)*sin(a + I*log
(x) + I*log(c)/n)/(8*x) + 3*log(x)*cos(a + I*log(x) + I*log(c)/n)/(8*x) - 3
*I*sin(3*a + 3*I*log(x) + 3*I*log(c)/n)/(32*x) - 3*cos(a + I*log(x) + I*log
```

```
(c)/n)/(8*x) + cos(3*a + 3*I*log(x) + 3*I*log(c)/n)/(32*x) - 3*I*log(c)*sin
(a + I*log(x) + I*log(c)/n)/(8*n*x) + 3*log(c)*cos(a + I*log(x) + I*log(c)/
n)/(8*n*x), Eq(b, I/n)), (6*b**3*n**3*sin(a + b*n*log(x) + b*log(c))**3/(9*
b**4*n**4*x + 10*b**2*n**2*x + x) + 9*b**3*n**3*sin(a + b*n*log(x) + b*log(
c))*cos(a + b*n*log(x) + b*log(c))**2/(9*b**4*n**4*x + 10*b**2*n**2*x + x)
- 6*b**2*n**2*sin(a + b*n*log(x) + b*log(c))**2*cos(a + b*n*log(x) + b*log(
c))/(9*b**4*n**4*x + 10*b**2*n**2*x + x) - 7*b**2*n**2*cos(a + b*n*log(x) +
 b*log(c))**3/(9*b**4*n**4*x + 10*b**2*n**2*x + x) + 3*b*n*sin(a + b*n*log(
x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))**2/(9*b**4*n**4*x + 10*b**2*n
**2*x + x) - cos(a + b*n*log(x) + b*log(c))**3/(9*b**4*n**4*x + 10*b**2*n**
2*x + x), True))
```

3.101 $\int \cos^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=191

$$\frac{x\cos^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}+\frac{4bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos^3\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}+\frac{12b^2n^2x\cos^2\left(a+b\log\left(cx^n\right)\right)}{64b^4n^4+20b^2n^2+1}+\frac{24b^3}{}$$

```
[Out] 24*b^4*n^4*x/(64*b^4*n^4+20*b^2*n^2+1)+12*b^2*n^2*x*cos(a+b*ln(c*x^n))^2/(6
4*b^4*n^4+20*b^2*n^2+1)+x*cos(a+b*ln(c*x^n))^4/(16*b^2*n^2+1)+24*b^3*n^3*x*
cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/(64*b^4*n^4+20*b^2*n^2+1)+4*b*n*x*cos
(a+b*ln(c*x^n))^3*sin(a+b*ln(c*x^n))/(16*b^2*n^2+1)
```

Rubi [A] time = 0.04, antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.154, Rules used = {4478, 8}

$$\frac{12b^2n^2x\cos^2\left(a+b\log\left(cx^n\right)\right)}{64b^4n^4+20b^2n^2+1}+\frac{x\cos^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}+\frac{4bnx\sin\left(a+b\log\left(cx^n\right)\right)\cos^3\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+1}+\frac{24b^3}{}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (24*b^4*n^4*x)/(1 + 20*b^2*n^2 + 64*b^4*n^4) + (12*b^2*n^2*x*Cos[a + b*Log[
c*x^n]]^2)/(1 + 20*b^2*n^2 + 64*b^4*n^4) + (x*Cos[a + b*Log[c*x^n]]^4)/(1 +
 16*b^2*n^2) + (24*b^3*n^3*x*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(
1 + 20*b^2*n^2 + 64*b^4*n^4) + (4*b*n*x*Cos[a + b*Log[c*x^n]]^3*Sin[a + b*L
og[c*x^n]])/(1 + 16*b^2*n^2)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 4478

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

Rubi steps

$$\int \cos^4\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{x\cos^4\left(a+b\log\left(cx^n\right)\right)}{1+16b^2n^2} + \frac{4bnx\cos^3\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{1+16b^2n^2} + \frac{(12b^2 \ldots}{}$$
$$= \frac{12b^2n^2x\cos^2\left(a+b\log\left(cx^n\right)\right)}{1+20b^2n^2+64b^4n^4} + \frac{x\cos^4\left(a+b\log\left(cx^n\right)\right)}{1+16b^2n^2} + \frac{24b^3n^3x\cos\left(a+b\log \ldots\right.}{1+20b^2 \ldots}$$
$$= \frac{24b^4n^4x}{1+20b^2n^2+64b^4n^4} + \frac{12b^2n^2x\cos^2\left(a+b\log\left(cx^n\right)\right)}{1+20b^2n^2+64b^4n^4} + \frac{x\cos^4\left(a+b\log\left(cx^n\right)\right)}{1+16b^2n^2} \ldots$$

Mathematica [A] time = 0.44, size = 167, normalized size = 0.87

$$\frac{x\left(128b^3n^3\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+16b^3n^3\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)+\left(64b^2n^2+4\right)\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+ \ldots}{8\left(64b^4 \ldots\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x*(3 + 60*b^2*n^2 + 192*b^4*n^4 + (4 + 64*b^2*n^2)*Cos[2*(a + b*Log[c*x^n]
)] + (1 + 4*b^2*n^2)*Cos[4*(a + b*Log[c*x^n])] + 8*b*n*Sin[2*(a + b*Log[c*x
^n])] + 128*b^3*n^3*Sin[2*(a + b*Log[c*x^n])] + 4*b*n*Sin[4*(a + b*Log[c*x^
n])] + 16*b^3*n^3*Sin[4*(a + b*Log[c*x^n])]))/(8*(1 + 20*b^2*n^2 + 64*b^4*n
^4))
```

fricas [A] time = 0.48, size = 144, normalized size = 0.75

$$\frac{24\,b^4n^4x+12\,b^2n^2x\cos\left(bn\log(x)+b\log(c)+a\right)^2+\left(4\,b^2n^2+1\right)x\cos\left(bn\log(x)+b\log(c)+a\right)^4+4\left(6\,b^3n^3x \ldots\right.}{64\,b^4n^4+20 \ldots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] (24*b^4*n^4*x + 12*b^2*n^2*x*cos(b*n*log(x) + b*log(c) + a)^2 + (4*b^2*n^2
+ 1)*x*cos(b*n*log(x) + b*log(c) + a)^4 + 4*(6*b^3*n^3*x*cos(b*n*log(x) + b
*log(c) + a) + (4*b^3*n^3 + b*n)*x*cos(b*n*log(x) + b*log(c) + a)^3)*sin(b*
n*log(x) + b*log(c) + a))/(64*b^4*n^4 + 20*b^2*n^2 + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \cos^4\left(a + b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^4,x)
```

maxima [B] time = 0.41, size = 1078, normalized size = 5.64

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] 1/16*((16*(b^3*cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*
b*log(c)) + b^3*sin(4*b*log(c)))*n^3 + 4*(b^2*cos(8*b*log(c))*cos(4*b*log(c
)) + b^2*sin(8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*n^2 + 4*(b*
cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*sin
(4*b*log(c)))*n + cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b
*log(c)) + cos(4*b*log(c)))*x*cos(4*b*log(x^n) + 4*a) + 4*(32*(b^3*cos(4*b*
log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b
*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3 + 16*(b
^2*cos(6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) +
b^2*sin(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*
n^2 + 2*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(
c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c))
)*n + cos(6*b*log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c)) + s
in(6*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*x*cos(2*b
*log(x^n) + 2*a) + (16*(b^3*cos(8*b*log(c))*cos(4*b*log(c)) + b^3*sin(8*b*l
og(c))*sin(4*b*log(c)) + b^3*cos(4*b*log(c)))*n^3 - 4*(b^2*cos(4*b*log(c))*
sin(8*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))
)*n^2 + 4*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*lo
g(c)) + b*cos(4*b*log(c)))*n - cos(4*b*log(c))*sin(8*b*log(c)) + cos(8*b*lo
g(c))*sin(4*b*log(c)) - sin(4*b*log(c)))*x*sin(4*b*log(x^n) + 4*a) + 4*(32*
(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log(c))
+ b^3*sin(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c))
)*n^3 - 16*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(4
*b*log(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(
```

```
2*b*log(c)))*n^2 + 2*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*b*log(c))
*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c))*si
n(2*b*log(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*
b*log(c)) - cos(2*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(2*b*log(c
)))*x*sin(2*b*log(x^n) + 2*a) + 6*(64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*
log(c))^2)*n^4 + 20*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2 + c
os(4*b*log(c))^2 + sin(4*b*log(c))^2)*x)/(64*(b^4*cos(4*b*log(c))^2 + b^4*s
in(4*b*log(c))^2)*n^4 + 20*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*
n^2 + cos(4*b*log(c))^2 + sin(4*b*log(c))^2)
```

mupad [B] time = 2.82, size = 116, normalized size = 0.61

$$\frac{3\,x}{8}+\frac{x\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{8\,b\,n+4\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}{4+b\,n\,8\mathrm{i}}+\frac{x\,\mathrm{e}^{-a\,4\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}\,1\mathrm{i}}{64\,b\,n+16\mathrm{i}}+\frac{x\,\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}{16+b\,n\,64\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^4,x)
```

```
[Out] (3*x)/8 + (x*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(8*b*n + 4i) + (x*exp(a*2i)*(c*x
^n)^(b*2i))/(b*n*8i + 4) + (x*exp(-a*4i)/(c*x^n)^(b*4i)*1i)/(64*b*n + 16i)
+ (x*exp(a*4i)*(c*x^n)^(b*4i))/(b*n*64i + 16)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \int \cos^4\left(a-\frac{i\log\left(cx^n\right)}{2n}\right)dx \\ \int \cos^4\left(a-\frac{i\log\left(cx^n\right)}{4n}\right)dx \\ \int \cos^4\left(a+\frac{i\log\left(cx^n\right)}{4n}\right)dx \\ \int \cos^4\left(a+\frac{i\log\left(cx^n\right)}{2n}\right)dx \\ \frac{24b^4n^4x\sin^4\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{64b^4n^4+20b^2n^2+1}+\frac{48b^4n^4x\sin^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)\cos^2\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{64b^4n^4+20b^2n^2+1}+\frac{24b^4n^4x\cos^4\left(a+bn\log\left(x\right)+b\log\left(c\right)\right)}{64b^4n^4+20b^2n^2+1} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**4,x)
```

```
[Out] Piecewise((Integral(cos(a - I*log(c*x**n)/(2*n))**4, x), Eq(b, -I/(2*n))),
(Integral(cos(a - I*log(c*x**n)/(4*n))**4, x), Eq(b, -I/(4*n))), (Integral(
cos(a + I*log(c*x**n)/(4*n))**4, x), Eq(b, I/(4*n))), (Integral(cos(a + I*l
og(c*x**n)/(2*n))**4, x), Eq(b, I/(2*n))), (24*b**4*n**4*x*sin(a + b*n*log(
```

```
x) + b*log(c))**4/(64*b**4*n**4 + 20*b**2*n**2 + 1) + 48*b**4*n**4*x*sin(a
+ b*n*log(x) + b*log(c))**2*cos(a + b*n*log(x) + b*log(c))**2/(64*b**4*n**4
 + 20*b**2*n**2 + 1) + 24*b**4*n**4*x*cos(a + b*n*log(x) + b*log(c))**4/(64
*b**4*n**4 + 20*b**2*n**2 + 1) + 24*b**3*n**3*x*sin(a + b*n*log(x) + b*log(
c))**3*cos(a + b*n*log(x) + b*log(c))/(64*b**4*n**4 + 20*b**2*n**2 + 1) + 4
0*b**3*n**3*x*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))
**3/(64*b**4*n**4 + 20*b**2*n**2 + 1) + 12*b**2*n**2*x*sin(a + b*n*log(x) +
 b*log(c))**2*cos(a + b*n*log(x) + b*log(c))**2/(64*b**4*n**4 + 20*b**2*n**
2 + 1) + 16*b**2*n**2*x*cos(a + b*n*log(x) + b*log(c))**4/(64*b**4*n**4 + 2
0*b**2*n**2 + 1) + 4*b*n*x*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x
) + b*log(c))**3/(64*b**4*n**4 + 20*b**2*n**2 + 1) + x*cos(a + b*n*log(x) +
 b*log(c))**4/(64*b**4*n**4 + 20*b**2*n**2 + 1), True))
```

3.102 $\int \frac{\cos^4(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=73

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)\cos^3\left(a+b\log\left(cx^n\right)\right)}{4bn}+\frac{3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{8bn}+\frac{3\log(x)}{8}$$

```
[Out] 3/8*ln(x)+3/8*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/b/n+1/4*cos(a+b*ln(c*x^
n))^3*sin(a+b*ln(c*x^n))/b/n
```

Rubi [A] time = 0.04, antiderivative size = 73, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {2635, 8}

$$\frac{\sin\left(a+b\log\left(cx^n\right)\right)\cos^3\left(a+b\log\left(cx^n\right)\right)}{4bn}+\frac{3\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{8bn}+\frac{3\log(x)}{8}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] (3*Log[x])/8 + (3*Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/(8*b*n) + (C
os[a + b*Log[c*x^n]]^3*Sin[a + b*Log[c*x^n]])/(4*b*n)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rubi steps

$$\int \frac{\cos^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \cos^4(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{\cos^3\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{4bn} + \frac{3\,\text{Subst}\left(\int \cos^2(a+bx)\,dx, x, \log\left(\right.\right.}{4n}$$
$$= \frac{3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{8bn} + \frac{\cos^3\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\right.}{4bn}$$
$$= \frac{3\log(x)}{8} + \frac{3\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{8bn} + \frac{\cos^3\left(a+b\log\left(cx^n\right)\right)\text{s}}{4bn}$$

Mathematica [A] time = 0.10, size = 51, normalized size = 0.70

$$\frac{12\left(a+b\log\left(cx^n\right)\right)+8\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+\sin\left(4\left(a+b\log\left(cx^n\right)\right)\right)}{32bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] (12*(a + b*Log[c*x^n]) + 8*Sin[2*(a + b*Log[c*x^n])] + Sin[4*(a + b*Log[c*x
^n])])/(32*b*n)
```

fricas [A] time = 0.46, size = 59, normalized size = 0.81

$$\frac{3\,bn\log(x) + \left(2\,\cos\left(bn\log(x)+b\log(c)+a\right)^3 + 3\,\cos\left(bn\log(x)+b\log(c)+a\right)\right)\sin\left(bn\log(x)+b\log(c)+\right.}{8\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^4/x,x, algorithm="fricas")
```

```
[Out] 1/8*(3*b*n*log(x) + (2*cos(b*n*log(x) + b*log(c) + a)^3 + 3*cos(b*n*log(x)
+ b*log(c) + a))*sin(b*n*log(x) + b*log(c) + a))/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right)+a\right)^4}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^4/x,x, algorithm="giac")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^4/x, x)
```

maple [A] time = 0.03, size = 84, normalized size = 1.15

$$\frac{\left(\cos^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}{4bn}+\frac{3\cos\left(a+b\ln\left(c\,x^{n}\right)\right)\sin\left(a+b\ln\left(c\,x^{n}\right)\right)}{8bn}+\frac{3\ln\left(c\,x^{n}\right)}{8n}+\frac{3a}{8bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^4/x,x)
```

```
[Out] 1/4*cos(a+b*ln(c*x^n))^3*sin(a+b*ln(c*x^n))/b/n+3/8*cos(a+b*ln(c*x^n))*sin(
a+b*ln(c*x^n))/b/n+3/8/n*ln(c*x^n)+3/8/b/n*a
```

maxima [A] time = 0.37, size = 93, normalized size = 1.27

$$\frac{12\,bn\log(x)+\cos\left(4\,b\log\left(x^{n}\right)+4\,a\right)\sin\left(4\,b\log(c)\right)+8\,\cos\left(2\,b\log\left(x^{n}\right)+2\,a\right)\sin\left(2\,b\log(c)\right)+\cos\left(4\,b\log(c\right.}{32\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^4/x,x, algorithm="maxima")
```

```
[Out] 1/32*(12*b*n*log(x) + cos(4*b*log(x^n) + 4*a)*sin(4*b*log(c)) + 8*cos(2*b*l
og(x^n) + 2*a)*sin(2*b*log(c)) + cos(4*b*log(c))*sin(4*b*log(x^n) + 4*a) +
8*cos(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/(b*n)
```

mupad [B] time = 2.55, size = 50, normalized size = 0.68

$$\frac{3\,\ln\left(x^{n}\right)}{8\,n}+\frac{\frac{\sin\left(2\,a+2\,b\,\ln\left(c\,x^{n}\right)\right)}{4}+\frac{\sin\left(4\,a+4\,b\,\ln\left(c\,x^{n}\right)\right)}{32}}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^4/x,x)
```

```
[Out] (3*log(x^n))/(8*n) + (sin(2*a + 2*b*log(c*x^n))/4 + sin(4*a + 4*b*log(c*x^n
))/32)/(b*n)
```

sympy [A] time = 15.35, size = 110, normalized size = 1.51

$$\frac{\begin{cases}\log\left(x\right)\cos\left(2a\right) & \text{for}\ b=0\wedge\left(b=0\vee n=0\right)\\ \log\left(x\right)\cos\left(2a+2b\log\left(c\right)\right) & \text{for}\ n=0\\ \frac{\sin\left(2a+2bn\log\left(x\right)+2b\log\left(c\right)\right)}{2bn} & \text{otherwise}\end{cases}}{2}+\frac{\begin{cases}\log\left(x\right)\cos\left(4a\right) & \text{for}\ b=0\wedge\left(b=0\right.\\ \log\left(x\right)\cos\left(4a+4b\log\left(c\right)\right) & \text{for}\ n=0\\ \frac{\sin\left(4a+4bn\log\left(x\right)+4b\log\left(c\right)\right)}{4bn} & \text{otherwise}\end{cases}}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**4/x,x)
```

```
[Out] Piecewise((log(x)*cos(2*a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cos(
2*a + 2*b*log(c)), Eq(n, 0)), (sin(2*a + 2*b*n*log(x) + 2*b*log(c))/(2*b*n)
, True))/2 + Piecewise((log(x)*cos(4*a), Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))),
 (log(x)*cos(4*a + 4*b*log(c)), Eq(n, 0)), (sin(4*a + 4*b*n*log(x) + 4*b*lo
g(c))/(4*b*n), True))/8 + 3*log(x)/8
```

3.103 $\int \cos(\log(6+3x))\,dx$

Optimal. Leaf size=29

$$\frac{1}{2}(x+2)\sin(\log(3(x+2)))+\frac{1}{2}(x+2)\cos(\log(3(x+2)))$$

```
[Out] 1/2*(2+x)*cos(ln(6+3*x))+1/2*(2+x)*sin(ln(6+3*x))
```

Rubi [A] time = 0.01, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4476}

$$\frac{1}{2}(x+2)\sin(\log(3(x+2)))+\frac{1}{2}(x+2)\cos(\log(3(x+2)))$$

Antiderivative was successfully verified.

```
[In] Int[Cos[Log[6 + 3*x]],x]
```

```
[Out] ((2 + x)*Cos[Log[3*(2 + x)]])/2 + ((2 + x)*Sin[Log[3*(2 + x)]])/2
```

Rule 4476

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Simp[(x*
Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] + Simp[(b*d*n*x*Sin[d*(a +
 b*Log[c*x^n])])/(b^2*d^2*n^2 + 1), x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[
b^2*d^2*n^2 + 1, 0]
```

Rubi steps

$$\begin{aligned}\int \cos(\log(6+3x))\,dx &= \frac{1}{3}\operatorname{Subst}\left(\int \cos(\log(x))\,dx,x,6+3x\right)\\ &= \frac{1}{2}(2+x)\cos(\log(3(2+x)))+\frac{1}{2}(2+x)\sin(\log(3(2+x)))\end{aligned}$$

Mathematica [A] time = 0.01, size = 22, normalized size = 0.76

$$\frac{1}{2}(x+2)(\sin(\log(3(x+2)))+\cos(\log(3(x+2))))$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[Log[6 + 3*x]],x]
```

```
[Out] ((2 + x)*(Cos[Log[3*(2 + x)]] + Sin[Log[3*(2 + x)]]))/2
```

fricas [A] time = 0.44, size = 25, normalized size = 0.86

$$\frac{1}{2}\,(x+2)\cos\left(\log\left(3\,x+6\right)\right)+\frac{1}{2}\,(x+2)\sin\left(\log\left(3\,x+6\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(log(6+3*x)),x, algorithm="fricas")
[Out] 1/2*(x + 2)*cos(log(3*x + 6)) + 1/2*(x + 2)*sin(log(3*x + 6))
```

giac [A] time = 0.27, size = 25, normalized size = 0.86

$$\frac{1}{2}\,(x+2)\cos\left(\log\left(3\,x+6\right)\right)+\frac{1}{2}\,(x+2)\sin\left(\log\left(3\,x+6\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(log(6+3*x)),x, algorithm="giac")
[Out] 1/2*(x + 2)*cos(log(3*x + 6)) + 1/2*(x + 2)*sin(log(3*x + 6))
```

maple [C] time = 0.05, size = 34, normalized size = 1.17

$$\left(\frac{1}{4}-\frac{i}{4}\right)(2+x)\,(6+3x)^{i}+\left(\frac{1}{4}+\frac{i}{4}\right)(2+x)\,(6+3x)^{-i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(ln(6+3*x)),x)
[Out] (1/4-1/4*I)*(2+x)*(6+3*x)^I+(1/4+1/4*I)*(2+x)/((6+3*x)^I)
```

maxima [A] time = 0.34, size = 20, normalized size = 0.69

$$\frac{1}{2}\,(x+2)\left(\cos\left(\log\left(3\,x+6\right)\right)+\sin\left(\log\left(3\,x+6\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(log(6+3*x)),x, algorithm="maxima")
[Out] 1/2*(x + 2)*(cos(log(3*x + 6)) + sin(log(3*x + 6)))
```

mupad [B] time = 2.17, size = 21, normalized size = 0.72

$$\frac{\sqrt{2}\,\sin\left(\frac{\pi}{4}+\ln\left(3\,x+6\right)\right)\,\left(3\,x+6\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(log(3*x + 6)),x)
```

```
[Out] (2^(1/2)*sin(pi/4 + log(3*x + 6))*(3*x + 6))/6
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(\log\left(3x+6\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(ln(6+3*x)),x)
```

```
[Out] Integral(cos(log(3*x + 6)), x)
```

3.104 $\int x^m \cos\left(a + \sqrt{-\frac{(1+m)^2}{n^2}} \log(cx^n)\right) dx$

Optimal. Leaf size=101

$$\frac{x^{m+1} e^{\frac{a(m+1)}{n\sqrt{-\frac{(m+1)^2}{n^2}}}} (cx^n)^{\frac{m+1}{n}}}{4(m+1)} + \frac{1}{2} x^{m+1} \log(x) e^{\frac{an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}} (cx^n)^{-\frac{m+1}{n}}$$

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

Rubi [A] time = 0.15, antiderivative size = 101, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {4494, 4490}

$$\frac{x^{m+1} e^{\frac{a(m+1)}{n\sqrt{-\frac{(m+1)^2}{n^2}}}} (cx^n)^{\frac{m+1}{n}}}{4(m+1)} + \frac{1}{2} x^{m+1} \log(x) e^{\frac{an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}} (cx^n)^{-\frac{m+1}{n}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n]],x]
```

```
[Out] (E^((a*(1 + m))/(Sqrt[-((1 + m)^2/n^2)]*n))*x^(1 + m)*(c*x^n)^((1 + m)/n))/
(4*(1 + m)) + (E^((a*Sqrt[-((1 + m)^2/n^2)]*n)/(1 + m))*x^(1 + m)*Log[x])/(
2*(c*x^n)^((1 + m)/n))
```

Rule 4490

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[1/2^p, Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d^2*p)/(m + 1))/x^((m +
 1)/p) + x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x], x], x] /; FreeQ[{a,
b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m + 1)^2, 0]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \cos\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log(cx^n)\right)dx = \frac{\left(x^{1+m}(cx^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\cos\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log(x)\right)dx,\right.}{n}$$

$$= \frac{\left(x^{1+m}(cx^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int\left(\frac{e^{\frac{a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}}{x}+e^{\frac{a(1+m)}{\sqrt{-\frac{(1+m)^2}{n^2}}n}}x^{-1+\frac{2(1+m)}{n}}\right)dx,\right.}{2n}$$

$$= \frac{e^{\frac{a(1+m)}{\sqrt{-\frac{(1+m)^2}{n^2}}n}}x^{1+m}(cx^n)^{\frac{1+m}{n}}}{4(1+m)}+\frac{1}{2}e^{\frac{a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}x^{1+m}(cx^n)^{-\frac{1+m}{n}}\log(x)$$

Mathematica [F] time = 0.37, size = 0, normalized size = 0.00

$$\int x^m \cos\left(a+\sqrt{-\frac{(1+m)^2}{n^2}}\log(cx^n)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Cos[a + Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n]],x]
```

```
[Out] Integrate[x^m*Cos[a + Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n]], x]
```

fricas [C] time = 0.59, size = 60, normalized size = 0.59

$$\frac{\left(x^2x^{2m}+2(m+1)e^{\left(\frac{2(ian-(m+1)\log(c))}{n}\right)}\log(x)\right)e^{\left(-\frac{ian-(m+1)\log(c)}{n}\right)}}{4(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+log(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x, algorithm="fricas")
```

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

giac [C] time = 2.10, size = 267, normalized size = 2.64

$$\frac{mn^2xx^me^{\left(ia-\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+mn^2xx^me^{\left(-ia+\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+n^2xx^me^{\left(ia-\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+nxx^m|}{2\left(m^2n^2+2mn^2-\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+log(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x, algorithm="giac")
```

```
[Out] 1/2*(m*n^2*x*x^m*e^(I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2
) + m*n^2*x*x^m*e^(-I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2
) + n^2*x*x^m*e^(I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) +
 n*x*x^m*abs(m*n + n)*e^(I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c)
)/n^2) + n^2*x*x^m*e^(-I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/
n^2) - n*x*x^m*abs(m*n + n)*e^(-I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)
*log(c))/n^2))/(m^2*n^2 + 2*m*n^2 - (m*n + n)^2 + n^2)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int x^{m} \cos\left(a+\ln\left(c\,x^{n}\right)\sqrt{-\frac{(1+m)^{2}}{n^{2}}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+ln(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x)
```

```
[Out] int(x^m*cos(a+ln(c*x^n)*(-(1+m)^2/n^2)^(1/2)),x)
```

maxima [A] time = 0.41, size = 82, normalized size = 0.81

$$\frac{c^{\frac{2m}{n}+\frac{2}{n}}x\cos(a)e^{\left(m\log(x)+\frac{m\log\left(x^{n}\right)}{n}+\frac{\log\left(x^{n}\right)}{n}\right)}+2\left(m\cos(a)+\cos(a)\right)\log(x)}{4\left(c^{\frac{m}{n}+\frac{1}{n}}m+c^{\frac{m}{n}+\frac{1}{n}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*(c^(2*m/n + 2/n)*x*cos(a)*e^(m*log(x) + m*log(x^n)/n + log(x^n)/n) + 2*
(m*cos(a) + cos(a))*log(x))/(c^(m/n + 1/n)*m + c^(m/n + 1/n))
```

mupad [B] time = 3.78, size = 131, normalized size = 1.30

$$\frac{x\,x^{m}\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{\left(c\,x^{n}\right)^{\sqrt{-\frac{2\,m}{n^{2}}-\frac{1}{n^{2}}-\frac{m^{2}}{n^{2}}}\,1\mathrm{i}}}}{2\,m+2-n\,\sqrt{-\frac{(m+1)^{2}}{n^{2}}}\,2\mathrm{i}}+\frac{x\,x^{m}\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(c\,x^{n}\right)^{\sqrt{-\frac{2\,m}{n^{2}}-\frac{1}{n^{2}}-\frac{m^{2}}{n^{2}}}\,1\mathrm{i}}}{2\,m+2+n\,\sqrt{-\frac{(m+1)^{2}}{n^{2}}}\,2\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a + log(c*x^n)*(-(m + 1)^2/n^2)^(1/2)),x)
```

```
[Out] (x*x^m*exp(-a*1i)/(c*x^n)^((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i))/(2*m
- n*(-(m + 1)^2/n^2)^(1/2)*2i + 2) + (x*x^m*exp(a*1i)*(c*x^n)^((- (2*m)/n^2
 - 1/n^2 - m^2/n^2)^(1/2)*1i))/(2*m + n*(-(m + 1)^2/n^2)^(1/2)*2i + 2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \cos\left(a+\sqrt{-\frac{m^2}{n^2}-\frac{2m}{n^2}-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*cos(a+ln(c*x**n)*(-(1+m)**2/n**2)**(1/2)),x)
```

```
[Out] Integral(x**m*cos(a + sqrt(-m**2/n**2 - 2*m/n**2 - 1/n**2)*log(c*x**n)), x)
```

3.105 $\int \cos\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=62

$$\frac{1}{4}xe^{-a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{2}xe^{a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-1/n}$$

```
[Out] 1/4*x*(c*x^n)^(1/n)/exp(a*n*(-1/n^2)^(1/2))+1/2*exp(a*n*(-1/n^2)^(1/2))*x*l
n(x)/((c*x^n)^(1/n))
```

Rubi [A] time = 0.04, antiderivative size = 62, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {4484, 4490}

$$\frac{1}{4}xe^{-a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{2}xe^{a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-1/n}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + Sqrt[-n^(-2)]*Log[c*x^n]],x]
```

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

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4490

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[1/2^p, Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d^2*p)/(m + 1))/x^((m +
 1)/p) + x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x], x], x] /; FreeQ[{a,
b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \cos\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\cos\left(a+\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\left(\frac{e^{a\sqrt{-\frac{1}{n^2}}n}}{x}+e^{-a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{2}{n}}\right)dx, x, cx^n\right)}{2n}$$

$$= \frac{1}{4}e^{-a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{2}e^{a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{-1/n}\log(x)$$

Mathematica [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \cos\left(a+\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Cos[a + Sqrt[-n^(-2)]*Log[c*x^n]],x]
[Out] Integrate[Cos[a + Sqrt[-n^(-2)]*Log[c*x^n]], x]
```

fricas [C] time = 0.44, size = 40, normalized size = 0.65

$$\frac{1}{4}\left(x^2+2e^{\left(\frac{2(ian-\log(c))}{n}\right)}\log(x)\right)e^{\left(-\frac{ian-\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="fricas")
[Out] 1/4*(x^2 + 2*e^(2*(I*a*n - log(c))/n)*log(x))*e^(-(I*a*n - log(c))/n)
```

giac [A] time = 0.36, size = 1, normalized size = 0.02

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+log(c*x^n)*(-1/n^2)^(1/2)),x, algorithm="giac")
[Out] +Infinity
```

maple [F] time = 0.14, size = 0, normalized size = 0.00

$$\int \cos\left(a+\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

```
[Out] int(cos(a+ln(c*x^n)*(-1/n^2)^(1/2)),x)
```

maxima [A] time = 0.38, size = 29, normalized size = 0.47

$$\frac{c^{\frac{2}{n}}x^{2}\cos(a)+2\cos(a)\log(x)}{4\,c^{\left(\frac{1}{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 2.78, size = 83, normalized size = 1.34

$$\frac{x\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{\left(c\,x^{n}\right)^{\sqrt{-\frac{1}{n^{2}}}\,1\mathrm{i}}}\,1\mathrm{i}}{2\,n\,\sqrt{-\frac{1}{n^{2}}}+2\mathrm{i}}-\frac{x\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(c\,x^{n}\right)^{\sqrt{-\frac{1}{n^{2}}}\,1\mathrm{i}}\,1\mathrm{i}}{2\,n\,\sqrt{-\frac{1}{n^{2}}}-2\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + log(c*x^n)*(-1/n^2)^(1/2)),x)
```

```
[Out] (x*exp(-a*1i)/(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(2*n*(-1/n^2)^(1/2) + 2i) - (
x*exp(a*1i)*(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(2*n*(-1/n^2)^(1/2) - 2i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(a+\sqrt{-\frac{1}{n^{2}}}\,\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+ln(c*x**n)*(-1/n**2)**(1/2)),x)
```

```
[Out] Integral(cos(a + sqrt(-1/n**2)*log(c*x**n)), x)
```

3.106 $\int x^m \cos^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=117

$$\frac{x^{m+1}e^{-\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{\frac{m+1}{n}}}{8(m+1)}+\frac{1}{4}x^{m+1}\log(x)e^{\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{-\frac{m+1}{n}}+\frac{x^{m+1}}{2(m+1)}$$

```
[Out] 1/2*x^(1+m)/(1+m)+1/8*x^(1+m)*(c*x^n)^((1+m)/n)/exp(2*a*n*(-(1+m)^2/n^2)^(1
/2)/(1+m))/(1+m)+1/4*exp(2*a*n*(-(1+m)^2/n^2)^(1/2)/(1+m))*x^(1+m)*ln(x)/((
c*x^n)^((1+m)/n))
```

Rubi [A] time = 0.12, antiderivative size = 117, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {4494, 4490}

$$\frac{x^{m+1}e^{-\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{\frac{m+1}{n}}}{8(m+1)}+\frac{1}{4}x^{m+1}\log(x)e^{\frac{2an\sqrt{-\frac{(m+1)^2}{n^2}}}{m+1}}(cx^n)^{-\frac{m+1}{n}}+\frac{x^{m+1}}{2(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] x^(1 + m)/(2*(1 + m)) + (x^(1 + m)*(c*x^n)^((1 + m)/n))/(8*E^((2*a*Sqrt[-((
1 + m)^2/n^2)]*n)/(1 + m))*(1 + m)) + (E^((2*a*Sqrt[-((1 + m)^2/n^2)]*n)/(1
 + m))*x^(1 + m)*Log[x])/(4*(c*x^n)^((1 + m)/n))
```

Rule 4490

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[1/2^p, Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d^2*p)/(m + 1))/x^((m +
 1)/p) + x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x], x], x] /; FreeQ[{a,
b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m + 1)^2, 0]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \cos^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log(cx^n)\right)dx = \frac{\left(x^{1+m}(cx^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\cos^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log(x\right.\right.}{n}$$

$$= \frac{\left(x^{1+m}(cx^n)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int\left(\frac{e^{\frac{2a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}}{x}+2x^{-1+\frac{1+m}{n}}+e^{-\frac{2a\sqrt{-\frac{(1\cdots}{}}}{1+\cdots}}\right.\right.}{4n}$$

$$= \frac{x^{1+m}}{2(1+m)}+\frac{e^{-\frac{2a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}x^{1+m}(cx^n)^{\frac{1+m}{n}}}{8(1+m)}+\frac{1}{4}e^{\frac{2a\sqrt{-\frac{(1+m)^2}{n^2}}n}{1+m}}x^{1+m}(c$$

Mathematica [F] time = 0.45, size = 0, normalized size = 0.00

$$\int x^m \cos^2\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log(cx^n)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[x^m*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2,x]
[Out] Integrate[x^m*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2, x]
```

fricas [C] time = 0.77, size = 107, normalized size = 0.91

$$\frac{\left(2(m+1)e^{\left(-\frac{2\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}\right)}\log(x)+4e^{\left(-\frac{(m+1)n\log(x)-2i\,an+(m+1)\log(c)}{n}\right)}+1\right)e^{\left(\frac{2\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}+\frac{2i\,an-\cdots}{}\right.}}{8(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x, algorithm="fr
icas")
[Out] 1/8*(2*(m + 1)*e^(-2*((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n)*log(x
) + 4*e^(-((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n) + 1)*e^(2*((m +
1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n + (2*I*a*n - (m + 1)*log(c))/n)/(
m + 1)
```

giac [C] time = 5.63, size = 498, normalized size = 4.26

$$\frac{m^2n^2xx^me^{\left(2i\,a-\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+m^2n^2xx^me^{\left(-2i\,a+\frac{n|mn+n|\log(x)+|mn+n|\log(c)}{n^2}\right)}+2\,m^2n^2xx^m+2\,mn^2xx^me^{\left(2i\,a-\frac{n|mn+n|\log}{}\right.}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x, algorithm="gi
ac")
```

```
[Out] 1/4*(m^2*n^2*x*x^m*e^(2*I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))
/n^2) + m^2*n^2*x*x^m*e^(-2*I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log
(c))/n^2) + 2*m^2*n^2*x*x^m + 2*m*n^2*x*x^m*e^(2*I*a - (n*abs(m*n + n)*log(
x) + abs(m*n + n)*log(c))/n^2) + m*n*x*x^m*abs(m*n + n)*e^(2*I*a - (n*abs(m
*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 2*m*n^2*x*x^m*e^(-2*I*a + (n*a
bs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - m*n*x*x^m*abs(m*n + n)*e^(
-2*I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 4*m*n^2*x*x^m
 + n^2*x*x^m*e^(2*I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2)
+ n*x*x^m*abs(m*n + n)*e^(2*I*a - (n*abs(m*n + n)*log(x) + abs(m*n + n)*log
(c))/n^2) + n^2*x*x^m*e^(-2*I*a + (n*abs(m*n + n)*log(x) + abs(m*n + n)*log
(c))/n^2) - n*x*x^m*abs(m*n + n)*e^(-2*I*a + (n*abs(m*n + n)*log(x) + abs(m
*n + n)*log(c))/n^2) - 2*(m*n + n)^2*x*x^m + 2*n^2*x*x^m)/(m^3*n^2 + 3*m^2*
n^2 - (m*n + n)^2*m + 3*m*n^2 - (m*n + n)^2 + n^2)
```

maple [F] time = 0.09, size = 0, normalized size = 0.00

$$\int x^m\left(\cos^2\left(a+\frac{\ln(c\,x^n)\sqrt{-\frac{(1+m)^2}{n^2}}}{2}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x)
```

```
[Out] int(x^m*cos(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x)
```

maxima [A] time = 0.43, size = 172, normalized size = 1.47

$$\frac{4\left(\cos(2\,a)^2+\sin(2\,a)^2\right)c^{\frac{m}{n}+\frac{1}{n}}xx^m+c^{\frac{2m}{n}+\frac{2}{n}}x\cos(2\,a)\,e^{\left(m\log(x)+\frac{m\log(x^n)}{n}+\frac{\log(x^n)}{n}\right)}+2\left(\cos(2\,a)^3+\cos(2\,a)\sin(2\,a)\right.}{8\left(\left(\cos(2\,a)^2+\sin(2\,a)^2\right)c^{\frac{m}{n}+\frac{1}{n}}m+\left(\cos(2\,a)^2+\sin(2\,a)^2\right)c^{\frac{m}{n}+\frac{1}{n}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2,x, algorithm="ma
xima")
```

```
[Out] 1/8*(4*(cos(2*a)^2 + sin(2*a)^2)*c^(m/n + 1/n)*x*x^m + c^(2*m/n + 2/n)*x*co
s(2*a)*e^(m*log(x) + m*log(x^n)/n + log(x^n)/n) + 2*(cos(2*a)^3 + cos(2*a)*
sin(2*a)^2 + (cos(2*a)^3 + cos(2*a)*sin(2*a)^2)*m)*log(x))/((cos(2*a)^2 + s
in(2*a)^2)*c^(m/n + 1/n)*m + (cos(2*a)^2 + sin(2*a)^2)*c^(m/n + 1/n))
```

mupad [B] time = 3.71, size = 143, normalized size = 1.22

$$\frac{x\,x^m}{2\,m+2}+\frac{x\,x^m\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}}}{4\,m+4-n\,\sqrt{-\frac{{\left(m+1\right)}^2}{n^2}}\,4\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}}{4\,m+4+n\,\sqrt{-\frac{{\left(m+1\right)}^2}{n^2}}\,4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a + (log(c*x^n)*(-(m + 1)^2/n^2)^(1/2))/2)^2,x)
```

```
[Out] (x*x^m)/(2*m + 2) + (x*x^m*exp(-a*2i)/(c*x^n)^((- (2*m)/n^2 - 1/n^2 - m^2/n
^2)^(1/2)*1i))/(4*m - n*(-(m + 1)^2/n^2)^(1/2)*4i + 4) + (x*x^m*exp(a*2i)*(
c*x^n)^((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i))/(4*m + n*(-(m + 1)^2/n^2
)^(1/2)*4i + 4)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m}\cos^{2}{\left(a+\frac{\sqrt{-\frac{m^{2}}{n^{2}}-\frac{2m}{n^{2}}-\frac{1}{n^{2}}}\log{\left(cx^{n}\right)}}{2}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*cos(a+1/2*ln(c*x**n)*(-(1+m)**2/n**2)**(1/2))**2,x)
```

```
[Out] Integral(x**m*cos(a + sqrt(-m**2/n**2 - 2*m/n**2 - 1/n**2)*log(c*x**n)/2)**
2, x)
```

3.107 $\int \cos^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=68

$$\frac{1}{8}xe^{-2a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{4}xe^{2a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-1/n}+\frac{x}{2}$$

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

Rubi [A] time = 0.06, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {4484, 4490}

$$\frac{1}{8}xe^{-2a\sqrt{-\frac{1}{n^2}}n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{4}xe^{2a\sqrt{-\frac{1}{n^2}}n}\log(x)\left(cx^n\right)^{-1/n}+\frac{x}{2}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] x/2 + (x*(c*x^n)^n^(-1))/(8*E^(2*a*Sqrt[-n^(-2)]*n)) + (E^(2*a*Sqrt[-n^(-2)
]*n)*x*Log[x])/(4*(c*x^n)^n^(-1))
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4490

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[1/2^p, Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d^2*p)/(m + 1))/x^((m +
 1)/p) + x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x], x], x] /; FreeQ[{a,
b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \cos^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\cos^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\left(\frac{e^{2a\sqrt{-\frac{1}{n^2}}n}}{x}+2x^{-1+\frac{1}{n}}+e^{-2a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{2}{n}}\right)dx, x, cx^n\right.}{4n}$$

$$= \frac{x}{2}+\frac{1}{8}e^{-2a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{4}e^{2a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{-1/n}\log(x)$$

Mathematica [F] time = 0.12, size = 0, normalized size = 0.00

$$\int \cos^2\left(a+\frac{1}{2}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Cos[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2,x]
```

```
[Out] Integrate[Cos[a + (Sqrt[-n^(-2)]*Log[c*x^n])/2]^2, x]
```

fricas [C] time = 0.46, size = 57, normalized size = 0.84

$$\frac{1}{8}\left(x^2+4\,xe^{\left(\frac{2i\,an-\log(c)}{n}\right)}+2\,e^{\left(\frac{2\left(2i\,an-\log(c)\right)}{n}\right)}\log(x)\right)e^{\left(-\frac{2i\,an-\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="fricas")
```

```
[Out] 1/8*(x^2 + 4*x*e^((2*I*a*n - log(c))/n) + 2*e^(2*(2*I*a*n - log(c))/n)*log(
x))*e^(-(2*I*a*n - log(c))/n)
```

giac [A] time = 0.89, size = 1, normalized size = 0.01

$$+\infty$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/2*log(c*x^n)*(-1/n^2)^(1/2))^2,x, algorithm="giac")
```

```
[Out] +Infinity
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \cos^2\left(a + \frac{\ln(c\,x^n)\sqrt{-\frac{1}{n^2}}}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+1/2*ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

```
[Out] int(cos(a+1/2*ln(c*x^n)*(-1/n^2)^(1/2))^2,x)
```

maxima [A] time = 0.38, size = 41, normalized size = 0.60

$$\frac{c^{\frac{2}{n}}x^2\cos(2\,a) + 4\,c^{\left(\frac{1}{n}\right)}x + 2\,\cos(2\,a)\log(x)}{8\,c^{\left(\frac{1}{n}\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*(c^(2/n)*x^2*cos(2*a) + 4*c^(1/n)*x + 2*cos(2*a)*log(x))/c^(1/n)
```

mupad [B] time = 2.71, size = 86, normalized size = 1.26

$$\frac{x}{2} + \frac{x\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,1\mathrm{i}}}\,1\mathrm{i}}{4\,n\sqrt{-\frac{1}{n^2}} + 4\mathrm{i}} - \frac{x\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,1\mathrm{i}}\,1\mathrm{i}}{4\,n\sqrt{-\frac{1}{n^2}} - 4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + (log(c*x^n)*(-1/n^2)^(1/2))/2)^2,x)
```

```
[Out] x/2 + (x*exp(-a*2i)/(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(4*n*(-1/n^2)^(1/2) + 4
i) - (x*exp(a*2i)*(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(4*n*(-1/n^2)^(1/2) - 4i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos^2\left(a + \frac{\sqrt{-\frac{1}{n^2}}\log(cx^n)}{2}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/2*ln(c*x**n)*(-1/n**2)**(1/2))**2,x)
```

```
[Out] Integral(cos(a + sqrt(-1/n**2)*log(c*x**n)/2)**2, x)
```

3.108 $\int x^m \cos^3\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=226

$$\frac{4n\sqrt{-\frac{(m+1)^2}{n^2}}\,x^{m+1}\sin\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)}{5(m+1)^2}-\frac{4x^{m+1}\cos^3\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)}{5(m+1)}+\frac{8x^{m+1}\cos\left(a+\frac{1}{2}\sqrt{\right.}\right.}{5(m}$$

```
[Out] 8/5*x^(1+m)*cos(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))/(1+m)-4/5*x^(1+m)*cos
(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3/(1+m)+4/5*n*x^(1+m)*sin(a+1/2*ln(c
*x^n)*(-(1+m)^2/n^2)^(1/2))*(-(1+m)^2/n^2)^(1/2)/(1+m)^2-6/5*n*x^(1+m)*cos(
a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^2*sin(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^
(1/2))*(-(1+m)^2/n^2)^(1/2)/(1+m)^2
```

Rubi [A] time = 0.08, antiderivative size = 226, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.061, Rules used = {4488, 4486}

$$\frac{4n\sqrt{-\frac{(m+1)^2}{n^2}}\,x^{m+1}\sin\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)}{5(m+1)^2}-\frac{4x^{m+1}\cos^3\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)}{5(m+1)}+\frac{8x^{m+1}\cos\left(a+\frac{1}{2}\sqrt{\right.}\right.}{5(m}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^3,x]
```

```
[Out] (8*x^(1 + m)*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2])/(5*(1 + m)) -
(4*x^(1 + m)*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^3)/(5*(1 + m))
+ (4*Sqrt[-((1 + m)^2/n^2)]*n*x^(1 + m)*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log
[c*x^n])/2])/(5*(1 + m)^2) - (6*Sqrt[-((1 + m)^2/n^2)]*n*x^(1 + m)*Cos[a +
(Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^2*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Lo
g[c*x^n])/2])/(5*(1 + m)^2)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^m \cos^3\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)dx = -\frac{4x^{1+m}\cos^3\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)}{5(1+m)} - \frac{6\sqrt{-\frac{(1+m)^2}{n^2}}\,nx^{1+m}\cos}{}$$

$$= \frac{8x^{1+m}\cos\left(a+\frac{1}{2}\sqrt{-\frac{(1+m)^2}{n^2}}\log\left(cx^n\right)\right)}{5(1+m)} - \frac{4x^{1+m}\cos^3\left(a+\frac{1}{2}\sqrt{-\frac{(1-}{}}\right.}{5(1+m)}$$

Mathematica [A] time = 1.69, size = 158, normalized size = 0.70

$$\frac{x^{m+1}\left(n\sqrt{-\frac{(m+1)^2}{n^2}}\left(5\sin\left(a+\frac{1}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)-3\sin\left(3a+\frac{3}{2}\sqrt{-\frac{(m+1)^2}{n^2}}\log\left(cx^n\right)\right)\right)+10(m+1)\cos\left(a+\frac{1}{2}\right.\right.}{10(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2]^3,x]
```

```
[Out] (x^(1 + m)*(10*(1 + m)*Cos[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2] - 2*(
1 + m)*Cos[3*a + (3*Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2] + Sqrt[-((1 + m)^
2/n^2)]*n*(5*Sin[a + (Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2] - 3*Sin[3*a + (
3*Sqrt[-((1 + m)^2/n^2)]*Log[c*x^n])/2])))/(10*(1 + m)^2)
```

fricas [C] time = 0.48, size = 128, normalized size = 0.57

$$\frac{\left(5\,e^{\left(-\frac{(m+1)n\log(x)-2i\,an+(m+1)\log(c)}{n}\right)}+15\,e^{\left(-\frac{2\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}\right)}-5\,e^{\left(-\frac{3\left((m+1)n\log(x)-2i\,an+(m+1)\log(c)\right)}{n}\right)}+1\right)e^{\left(\frac{5\left((m+1)n\log(x)-\right.}{2}\right.}}{20\,(m+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x, algorithm="fr
icas")
```

```
[Out] 1/20*(5*e^(-((m + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n) + 15*e^(-2*((m
 + 1)*n*log(x) - 2*I*a*n + (m + 1)*log(c))/n) - 5*e^(-3*((m + 1)*n*log(x) -
 2*I*a*n + (m + 1)*log(c))/n) + 1)*e^(5/2*((m + 1)*n*log(x) - 2*I*a*n + (m
+ 1)*log(c))/n + (2*I*a*n - (m + 1)*log(c))/n)/(m + 1)
```

giac [C] time = 14.21, size = 1870, normalized size = 8.27

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x, algorithm="gi
ac")
```

```
[Out] 1/4*(8*m^3*n^4*x*x^m*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*l
og(c))/n^2) + 24*m^3*n^4*x*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*
n + n)*log(c))/n^2) + 24*m^3*n^4*x*x^m*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x)
 + abs(m*n + n)*log(c))/n^2) + 8*m^3*n^4*x*x^m*e^(-3*I*a + 3/2*(n*abs(m*n +
 n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*m^2*n^4*x*x^m*e^(3*I*a - 3/2*(n
*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 12*m^2*n^3*x*x^m*abs(m*n
 + n)*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 7
2*m^2*n^4*x*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/
n^2) + 12*m^2*n^3*x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) +
abs(m*n + n)*log(c))/n^2) + 72*m^2*n^4*x*x^m*e^(-I*a + 1/2*(n*abs(m*n + n)*
log(x) + abs(m*n + n)*log(c))/n^2) - 12*m^2*n^3*x*x^m*abs(m*n + n)*e^(-I*a
+ 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*m^2*n^4*x*x^m
*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 12*m^
2*n^3*x*x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n +
 n)*log(c))/n^2) - 2*(m*n + n)^2*m*n^2*x*x^m*e^(3*I*a - 3/2*(n*abs(m*n + n)
*log(x) + abs(m*n + n)*log(c))/n^2) + 24*m*n^4*x*x^m*e^(3*I*a - 3/2*(n*abs(
m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*m*n^3*x*x^m*abs(m*n + n)*e
^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 54*(m*n
+ n)^2*m*n^2*x*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c
))/n^2) + 72*m*n^4*x*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)
*log(c))/n^2) + 24*m*n^3*x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*n + n)*lo
g(x) + abs(m*n + n)*log(c))/n^2) - 54*(m*n + n)^2*m*n^2*x*x^m*e^(-I*a + 1/2
*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 72*m*n^4*x*x^m*e^(-I*
a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 24*m*n^3*x*x^m
*abs(m*n + n)*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n
^2) - 2*(m*n + n)^2*m*n^2*x*x^m*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + ab
s(m*n + n)*log(c))/n^2) + 24*m*n^4*x*x^m*e^(-3*I*a + 3/2*(n*abs(m*n + n)*lo
g(x) + abs(m*n + n)*log(c))/n^2) - 24*m*n^3*x*x^m*abs(m*n + n)*e^(-3*I*a +
3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 2*(m*n + n)^2*n^2*
```

```
x*x^m*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 8
*n^4*x*x^m*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2
) - 3*(m*n + n)^2*n*x*x^m*abs(m*n + n)*e^(3*I*a - 3/2*(n*abs(m*n + n)*log(x
) + abs(m*n + n)*log(c))/n^2) + 12*n^3*x*x^m*abs(m*n + n)*e^(3*I*a - 3/2*(n
*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 54*(m*n + n)^2*n^2*x*x^m
*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*n^4*x
*x^m*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) - 27*(
m*n + n)^2*n*x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*n + n)*log(x) + abs(m
*n + n)*log(c))/n^2) + 12*n^3*x*x^m*abs(m*n + n)*e^(I*a - 1/2*(n*abs(m*n +
n)*log(x) + abs(m*n + n)*log(c))/n^2) - 54*(m*n + n)^2*n^2*x*x^m*e^(-I*a +
1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 24*n^4*x*x^m*e^(-I
*a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 27*(m*n + n)^
2*n*x*x^m*abs(m*n + n)*e^(-I*a + 1/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*
log(c))/n^2) - 12*n^3*x*x^m*abs(m*n + n)*e^(-I*a + 1/2*(n*abs(m*n + n)*log(
x) + abs(m*n + n)*log(c))/n^2) - 2*(m*n + n)^2*n^2*x*x^m*e^(-3*I*a + 3/2*(n
*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 8*n^4*x*x^m*e^(-3*I*a +
3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(c))/n^2) + 3*(m*n + n)^2*n*x*
x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x) + abs(m*n + n)*log(
c))/n^2) - 12*n^3*x*x^m*abs(m*n + n)*e^(-3*I*a + 3/2*(n*abs(m*n + n)*log(x)
 + abs(m*n + n)*log(c))/n^2))/(16*m^4*n^4 + 64*m^3*n^4 - 40*(m*n + n)^2*m^2
*n^2 + 96*m^2*n^4 - 80*(m*n + n)^2*m*n^2 + 64*m*n^4 + 9*(m*n + n)^4 - 40*(m
*n + n)^2*n^2 + 16*n^4)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int x^{m} \left(\cos^{3}\left(a + \frac{\ln\left(c\,x^{n}\right)\sqrt{-\frac{(1+m)^{2}}{n^{2}}}}{2}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x)
```

```
[Out] int(x^m*cos(a+1/2*ln(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x)
```

maxima [A] time = 0.45, size = 195, normalized size = 0.86

$$\frac{\left(c^{\frac{3m}{n}+\frac{3}{n}} x \cos\left(3\,a\right) e^{\left(m \log(x)+\frac{3\,m \log\left(x^{n}\right)}{n}+\frac{3\,\log\left(x^{n}\right)}{n}\right)} + 5\,c^{\frac{2m}{n}+\frac{2}{n}} x \cos(a) e^{\left(m \log(x)+\frac{2\,m \log\left(x^{n}\right)}{n}+\frac{2\,\log\left(x^{n}\right)}{n}\right)} + 15\,c^{\frac{m}{n}+\frac{1}{n}} x \cos(a) e^{\left(m \log\right.}}{20\left(c^{\frac{3m}{2n}+\frac{3}{2n}} m + c^{\frac{3m}{2n}+\frac{3}{2n}}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+1/2*log(c*x^n)*(-(1+m)^2/n^2)^(1/2))^3,x, algorithm="ma
xima")
```

```
[Out] 1/20*(c^(3*m/n + 3/n)*x*cos(3*a)*e^(m*log(x) + 3*m*log(x^n)/n + 3*log(x^n)/
n) + 5*c^(2*m/n + 2/n)*x*cos(a)*e^(m*log(x) + 2*m*log(x^n)/n + 2*log(x^n)/n
) + 15*c^(m/n + 1/n)*x*cos(a)*e^(m*log(x) + m*log(x^n)/n + log(x^n)/n) - 5*
x*x^m*cos(3*a))*e^(-3/2*m*log(x^n)/n - 3/2*log(x^n)/n)/(c^(3/2*m/n + 3/2/n)
*m + c^(3/2*m/n + 3/2/n))
```

mupad [B] time = 4.71, size = 277, normalized size = 1.23

$$\frac{x\,x^m\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{(c\,x^n)^{\frac{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}{2}}}\,\left(2\,m+2+n\,\sqrt{-\frac{(m+1)^2}{n^2}}\,1\mathrm{i}\right)}{4\,(m+1)^2}+\frac{x\,x^m\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^n)^{\frac{\sqrt{-\frac{2\,m}{n^2}-\frac{1}{n^2}-\frac{m^2}{n^2}}\,1\mathrm{i}}{2}}\,\left(2\,m+2-n\,\sqrt{-\frac{(m+1)^2}{n^2}}\right.}{4\,(m+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a + (log(c*x^n)*(-(m + 1)^2/n^2)^(1/2))/2)^3,x)
```

```
[Out] (x*x^m*exp(-a*1i)/(c*x^n)^(((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i)/2)*(2
*m + n*(-(m + 1)^2/n^2)^(1/2)*1i + 2))/(4*(m + 1)^2) + (x*x^m*exp(a*1i)*(c*
x^n)^(((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(1/2)*1i)/2)*(2*m - n*(-(m + 1)^2/n^
2)^(1/2)*1i + 2))/(4*(m + 1)^2) - (x*x^m*exp(-a*3i)/(c*x^n)^(((- (2*m)/n^2
- 1/n^2 - m^2/n^2)^(1/2)*3i)/2)*(2*m + n*(-(m + 1)^2/n^2)^(1/2)*3i + 2))/(2
0*(m + 1)^2) - (x*x^m*exp(a*3i)*(c*x^n)^(((- (2*m)/n^2 - 1/n^2 - m^2/n^2)^(
1/2)*3i)/2)*(2*m - n*(-(m + 1)^2/n^2)^(1/2)*3i + 2))/(20*(m + 1)^2)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \cos^3\left(a + \frac{\sqrt{-\frac{m^2}{n^2} - \frac{2m}{n^2} - \frac{1}{n^2}}\,\log(cx^n)}{2}\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*cos(a+1/2*ln(c*x**n)*(-(1+m)**2/n**2)**(1/2))**3,x)
```

```
[Out] Integral(x**m*cos(a + sqrt(-m**2/n**2 - 2*m/n**2 - 1/n**2)*log(c*x**n)/2)**
3, x)
```

3.109 $\int \cos^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$

Optimal. Leaf size=128

$$\frac{9}{16}xe^{a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{-\frac{1}{3}/n}+\frac{9}{32}xe^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{3}/n}+\frac{1}{16}xe^{-3a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{8}xe^{3a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\left(cx^n\right)^{-1/n}$$

```
[Out] 9/16*exp(a*n*(-1/n^2)^(1/2))*x/((c*x^n)^(1/3/n))+9/32*x*(c*x^n)^(1/3/n)/exp
(a*n*(-1/n^2)^(1/2))+1/16*x*(c*x^n)^(1/n)/exp(3*a*n*(-1/n^2)^(1/2))+1/8*exp
(3*a*n*(-1/n^2)^(1/2))*x*ln(x)/((c*x^n)^(1/n))
```

Rubi [A] time = 0.10, antiderivative size = 128, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {4484, 4490}

$$\frac{9}{16}xe^{a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{-\frac{1}{3}/n}+\frac{9}{32}xe^{-a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{3}/n}+\frac{1}{16}xe^{-3a\sqrt{-\frac{1}{n^2}}\,n}\left(cx^n\right)^{\frac{1}{n}}+\frac{1}{8}xe^{3a\sqrt{-\frac{1}{n^2}}\,n}\log(x)\left(cx^n\right)^{-1/n}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3,x]
```

```
[Out] (9*E^(a*Sqrt[-n^(-2)]*n)*x)/(16*(c*x^n)^(1/(3*n))) + (9*x*(c*x^n)^(1/(3*n))
)/(32*E^(a*Sqrt[-n^(-2)]*n)) + (x*(c*x^n)^n^(-1))/(16*E^(3*a*Sqrt[-n^(-2)]*
n)) + (E^(3*a*Sqrt[-n^(-2)]*n)*x*Log[x])/(8*(c*x^n)^n^(-1))
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4490

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[1/2^p, Int[ExpandIntegrand[(e*x)^m*(E^((a*b*d^2*p)/(m + 1))/x^((m +
 1)/p) + x^((m + 1)/p)/E^((a*b*d^2*p)/(m + 1)))^p, x], x], x] /; FreeQ[{a,
b, d, e, m}, x] && IGtQ[p, 0] && EqQ[b^2*d^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int \cos^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\cos^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log(x)\right)dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\left(\frac{e^{3a\sqrt{-\frac{1}{n^2}}n}}{x}+3e^{a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{2}{3n}}+3e^{-a\sqrt{-\frac{1}{n^2}}n}x^{-1+\frac{4}{3n}}\right.\right.}{8n}$$

$$= \frac{9}{16}e^{a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{-\frac{1}{3}/n}+\frac{9}{32}e^{-a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{\frac{1}{3}/n}+\frac{1}{16}e^{-3a\sqrt{-\frac{1}{n^2}}n}x\left(cx^n\right)^{\frac{1}{n}}$$

Mathematica [F] time = 0.22, size = 0, normalized size = 0.00

$$\int \cos^3\left(a+\frac{1}{3}\sqrt{-\frac{1}{n^2}}\log\left(cx^n\right)\right)dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Cos[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3,x]
[Out] Integrate[Cos[a + (Sqrt[-n^(-2)]*Log[c*x^n])/3]^3, x]
```

fricas [C] time = 0.61, size = 84, normalized size = 0.66

$$\frac{1}{32}\left(9x^{\frac{4}{3}}e^{\left(\frac{2\left(3i\,an-\log(c)\right)}{3n}\right)}+2x^2+12e^{\left(\frac{2\left(3i\,an-\log(c)\right)}{n}\right)}\log\left(x^{\frac{1}{3}}\right)+18x^{\frac{2}{3}}e^{\left(\frac{4\left(3i\,an-\log(c)\right)}{3n}\right)}\right)e^{\left(-\frac{3i\,an-\log(c)}{n}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="fricas")
[Out] 1/32*(9*x^(4/3)*e^(2/3*(3*I*a*n - log(c))/n) + 2*x^2 + 12*e^(2*(3*I*a*n - l
og(c))/n)*log(x^(1/3)) + 18*x^(2/3)*e^(4/3*(3*I*a*n - log(c))/n))*e^(-(3*I*
a*n - log(c))/n)
```

giac [F(-2)] time = 0.00, size = 0, normalized size = 0.00

Exception raised: NotImplementedError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError >> Unable to parse Giac output: (9*n^
4*x*exp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)+27*n^4*x*exp((-i)*
a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)+27*n^4*x*exp(-(n*abs(n)*ln(x)
+abs(n)*ln(c))*1/3/n^2)*exp(i*a)+9*n^4*x*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))
/n^2)*exp(3*i*a)-9*n^3*x*abs(n)*exp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln
(c))/n^2)-9*n^3*x*abs(n)*exp((-i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/
n^2)+9*n^3*x*abs(n)*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)*exp(i*a)+9*
n^3*x*abs(n)*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)*exp(3*i*a)-n^2*x*n^2*e
xp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)-27*n^2*x*n^2*exp((-i)*a
)*exp((n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)-27*n^2*x*n^2*exp(-(n*abs(n)*ln
(x)+abs(n)*ln(c))*1/3/n^2)*exp(i*a)-n^2*x*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*l
n(c))/n^2)*exp(3*i*a)+n*x*abs(n)*n^2*exp((-3*i)*a)*exp((n*abs(n)*ln(x)+abs(
n)*ln(c))/n^2)+9*n*x*abs(n)*n^2*exp((-i)*a)*exp((n*abs(n)*ln(x)+abs(n)*ln(c
))*1/3/n^2)-9*n*x*abs(n)*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))*1/3/n^2)*ex
p(i*a)-n*x*abs(n)*n^2*exp(-(n*abs(n)*ln(x)+abs(n)*ln(c))/n^2)*exp(3*i*a))/(
72*n^4-80*n^2*n^2+8*n^4)
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int \cos^{3}\left(a+\frac{\ln\left(c\,x^{n}\right)\sqrt{-\frac{1}{n^{2}}}}{3}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+1/3*ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

```
[Out] int(cos(a+1/3*ln(c*x^n)*(-1/n^2)^(1/2))^3,x)
```

maxima [A] time = 0.40, size = 106, normalized size = 0.83

$$\frac{9\,c^{\frac{5}{3\,n}}x\left(x^{n}\right)^{\frac{2}{3\,n}}\cos\left(a\right)+4\,c^{\frac{1}{3\,n}}\left(x^{n}\right)^{\frac{1}{3\,n}}\cos\left(3\,a\right)\log\left(x\right)+18\,c^{\left(\frac{1}{n}\right)}x\cos\left(a\right)+2\,c^{\frac{7}{3\,n}}\cos\left(3\,a\right)e^{\left(\frac{\log\left(x^{n}\right)}{3\,n}+2\,\log\left(x\right)\right)}}{32\,c^{\frac{4}{3\,n}}\left(x^{n}\right)^{\frac{1}{3\,n}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/3*log(c*x^n)*(-1/n^2)^(1/2))^3,x, algorithm="maxima")
```

```
[Out] 1/32*(9*c^(5/3/n)*x*(x^n)^(2/3/n)*cos(a) + 4*c^(1/3/n)*(x^n)^(1/3/n)*cos(3*
a)*log(x) + 18*c^(1/n)*x*cos(a) + 2*c^(7/3/n)*cos(3*a)*e^(1/3*log(x^n)/n +
2*log(x)))/(c^(4/3/n)*(x^n)^(1/3/n))
```

mupad [B] time = 3.01, size = 158, normalized size = 1.23

$$x\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{(c\,x^n)^{\frac{\sqrt{-\frac{1}{n^2}}\,1\mathrm{i}}{3}}}\left(\frac{27}{64}+\frac{n\sqrt{-\frac{1}{n^2}}\,9\mathrm{i}}{64}\right)-x\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^n)^{\frac{\sqrt{-\frac{1}{n^2}}\,1\mathrm{i}}{3}}\left(-\frac{27}{64}+\frac{n\sqrt{-\frac{1}{n^2}}\,9\mathrm{i}}{64}\right)+\frac{x\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{(c\,x^n)^{\sqrt{-\frac{1}{n^2}}\,1\mathrm{i}}}\,1\mathrm{i}}{8\,n\sqrt{-\frac{1}{n^2}}+8\mathrm{i}}-\frac{x\,\mathrm{e}^{a\,3\mathrm{i}}}{8\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x*exp(-a*1i)/(c*x^n)^(((-1/n^2)^(1/2)*1i)/3)*((n*(-1/n^2)^(1/2)*9i)/64 + 27
/64) - x*exp(a*1i)*(c*x^n)^(((-1/n^2)^(1/2)*1i)/3)*((n*(-1/n^2)^(1/2)*9i)/6
4 - 27/64) + (x*exp(-a*3i)/(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(8*n*(-1/n^2)^(1
/2) + 8i) - (x*exp(a*3i)*(c*x^n)^((-1/n^2)^(1/2)*1i)*1i)/(8*n*(-1/n^2)^(1/2
) - 8i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\cos^3\left(a+\frac{\sqrt{-\frac{1}{n^2}}\,\log\left(cx^n\right)}{3}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+1/3*ln(c*x**n)*(-1/n**2)**(1/2))**3,x)
```

```
[Out] Integral(cos(a + sqrt(-1/n**2)*log(c*x**n)/3)**3, x)
```

3.110 $\int \sqrt{\cos \left(a+b \log \left(c x^n\right)\right)} \, dx$

Optimal. Leaf size=110

$$\frac{2 x \, _2F_1\left(-\frac{1}{2},-\frac{b n+2 i}{4 b n};\frac{1}{4} \left(3-\frac{2 i}{b n}\right);-e^{2 i a} \left(c x^n\right)^{2 i b}\right) \sqrt{\cos \left(a+b \log \left(c x^n\right)\right)}}{(2-i b n) \sqrt{1+e^{2 i a} \left(c x^n\right)^{2 i b}}}$$

```
[Out] 2*x*hypergeom([-1/2, 1/4*(-2*I-b*n)/b/n],[3/4-1/2*I/b/n],-exp(2*I*a)*(c*x^n
)^(2*I*b))*cos(a+b*ln(c*x^n))^(1/2)/(2-I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*I*b)
)^(1/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4492, 364}

$$\frac{2 x \, _2F_1\left(-\frac{1}{2},-\frac{b n+2 i}{4 b n};\frac{1}{4} \left(3-\frac{2 i}{b n}\right);-e^{2 i a} \left(c x^n\right)^{2 i b}\right) \sqrt{\cos \left(a+b \log \left(c x^n\right)\right)}}{(2-i b n) \sqrt{1+e^{2 i a} \left(c x^n\right)^{2 i b}}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Sqrt[Cos[a + b*Log[c*x^n]]]*Hypergeometric2F1[-1/2, -(2*I + b*n)/(4*b*
n), (3 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - I*b*n)*Sq
rt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sqrt{\cos(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{\frac{ib}{2}-\frac{1}{n}}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1}{n}}\sqrt{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}}$$

$$= \frac{2x\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(-\frac{1}{2},-\frac{2i+bn}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-ibn)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}}$$

Mathematica [B] time = 3.56, size = 377, normalized size = 3.43

$$-\frac{2x\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}{bn\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)-2\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}+\frac{2e^{ia}bnx\left(cx^n\right)^{ib}\sqrt{2+2e^{2ia}\left(cx^n\right)^{2ib}}\,(\ldots}{(bn+2i)(\ldots}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*b*E^(I*a)*n*x*(c*x^n)^(I*b)*Sqrt[2 + 2*E^((2*I)*a)*(c*x^n)^((2*I)*b)]*((
2*I + b*n)*x^((2*I)*b*n)*Hypergeometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I
/2)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))] + (-2*I + 3*b*n)*Hypergeometri
c2F1[1/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), -(E^((2*I)*a)*(c*x^n)^
((2*I)*b))]))/((2*I + b*n)*(-2*I + 3*b*n)*Sqrt[1/(E^(I*a)*(c*x^n)^(I*b)) +
E^(I*a)*(c*x^n)^(I*b)]*((-2 + I*b*n)*x^((2*I)*b*n) - I*E^((2*I)*a)*(-2*I +
b*n)*(c*x^n)^((2*I)*b))) - (2*x*Sqrt[Cos[a + b*Log[c*x^n]]]*Cos[a - b*n*Log
[x] + b*Log[c*x^n]])/(-2*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + b*n*Sin[a - b
*n*Log[x] + b*Log[c*x^n]])
```

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(cos(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\cos\left(b\log\left(cx^{n}\right) + a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(sqrt(cos(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.13, size = 0, normalized size = 0.00

$$\int \sqrt{\cos}\,\left(a + b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\cos\left(b\log\left(cx^{n}\right) + a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(cos(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{\cos\left(a + b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^(1/2),x)
```

```
[Out] int(cos(a + b*log(c*x^n))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\cos \left(a + b \log \left(cx^{n}\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(sqrt(cos(a + b*log(c*x**n))), x)
```

3.111 $\int \frac{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx$

Optimal. Leaf size=24

$$\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

```
[Out] 2*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticE
(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/b/n
```

Rubi [A] time = 0.03, antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {2639}

$$\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Cos[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*EllipticE[(a + b*Log[c*x^n])/2, 2])/(b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx &= \frac{\text{Subst}\left(\int \sqrt{\cos(a+bx)}\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= \frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}\end{aligned}$$

Mathematica [A] time = 0.09, size = 24, normalized size = 1.00

$$\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Cos[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*EllipticE[(a + b*Log[c*x^n])/2, 2])/(b*n)
```

fricas [F] time = 0.51, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(cos(b*log(c*x^n) + a))/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(cos(b*log(c*x^n) + a))/x, x)
```

maple [B] time = 0.08, size = 181, normalized size = 7.54

$$\frac{2\sqrt{\left(2\left(\cos^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)-1\right)\left(\sin^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)}\,\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(c\,x^{n}))}{2}}\,\sqrt{-2\left(\cos^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)+1}\ \text{Ellipt}}{n\sqrt{-2\left(\sin^{4}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)+\sin^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)}\ \sin\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\sqrt{2\left(\cos^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^(1/2)/x,x)
```

```
[Out] 2/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)
*(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(-2*cos(1/2*a+1/2*b*ln(c*x^n))^2+1)^(
1/2)*EllipticE(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/(-2*sin(1/2*a+1/2*b*ln(c
*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/2*b*ln(c*x^n))/(2*
cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(cos(b*log(c*x^n) + a))/x, x)
```

mupad [B] time = 2.37, size = 23, normalized size = 0.96

$$\frac{2\,\mathrm{E}\left(\frac{a}{2}+\frac{b\,\ln(c\,x^n)}{2}\middle|2\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^(1/2)/x,x)
```

```
[Out] (2*ellipticE(a/2 + (b*log(c*x^n))/2, 2))/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**(1/2)/x,x)
```

```
[Out] Integral(sqrt(cos(a + b*log(c*x**n)))/x, x)
```

3.112 $\int \cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=109

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(2-3ibn\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

```
[Out] 2*x*cos(a+b*ln(c*x^n))^(3/2)*hypergeom([-3/2, -3/4-1/2*I/b/n],[1/4-1/2*I/b/
n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2-3*I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*I*b))^
(3/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4492, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(2-3ibn\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x*Cos[a + b*Log[c*x^n]]^(3/2)*Hypergeometric2F1[-3/2, (-3 - (2*I)/(b*n))
/4, (1 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - (3*I)*b*n
)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
```

```
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\cos^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{\frac{3ib}{2}-\frac{1}{n}}\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1}{n}}\left(1+e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx^n\right)}{n\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

$$= \frac{2x\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right){}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Mathematica [A] time = 1.69, size = 163, normalized size = 1.50

$$\frac{x\left((bn-2i)\left(3bn\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+4\cos^2\left(a+b\log\left(cx^n\right)\right)\right)-6ib^2n^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}\right.\right.}{(bn-2i)\left(9b^2n^2+4\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (x*((-6*I)*b^2*n^2*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1,
 3/4 - (I/2)/(b*n), 5/4 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + (-2
*I + b*n)*(4*Cos[a + b*Log[c*x^n]]^2 + 3*b*n*Sin[2*(a + b*Log[c*x^n])])))/(
(-2*I + b*n)*(4 + 9*b^2*n^2)*Sqrt[Cos[a + b*Log[c*x^n]]])
```

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(cos(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
[Out] integrate(cos(b*log(c*x^n) + a)^(3/2), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \cos^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^(3/2),x)
[Out] int(cos(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
[Out] integrate(cos(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^(3/2),x)
[Out] int(cos(a + b*log(c*x^n))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos^{\frac{3}{2}}{\left(a+b\log{\left(cx^{n}\right)}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(cos(a + b*log(c*x**n))**(3/2), x)
```

3.113 $\int \frac{\cos^{\frac{3}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=63

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn}+\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{3bn}$$

```
[Out] 2/3*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*Ellipti
cF(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/b/n+2/3*sin(a+b*ln(c*x^n))*cos(a+b*l
n(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2635, 2641}

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn}+\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{3bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (2*EllipticF[(a + b*Log[c*x^n])/2, 2])/(3*b*n) + (2*Sqrt[Cos[a + b*Log[c*x^
n]]]*Sin[a + b*Log[c*x^n]])/(3*b*n)
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \cos^{\frac{3}{2}}(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sin\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\cos(a+bx)}}\,dx,x,\log\left(cx^n\right)\right)}{3n}$$
$$= \frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn} + \frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sin\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

Mathematica [A] time = 0.12, size = 54, normalized size = 0.86

$$\frac{2\left(F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)+\sin\left(a+b\log\left(cx^n\right)\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (2*(EllipticF[(a + b*Log[c*x^n])/2, 2] + Sqrt[Cos[a + b*Log[c*x^n]]]*Sin[a
+ b*Log[c*x^n]]))/(3*b*n)
```

fricas [F] time = 0.74, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(cos(b*log(c*x^n) + a)^(3/2)/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(3/2)/x,x, algorithm="giac")
```

[Out] integrate(cos(b*log(c*x^n) + a)^(3/2)/x, x)

maple [B] time = 0.08, size = 247, normalized size = 3.92

$$-\frac{2\sqrt{\left(2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)-1\right)\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)}\,\left(4\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\left(\sin^4\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)+\sqrt{\frac{1}{2}-\frac{\cos(a+}{}}}{3n\sqrt{-2\left(\sin^4\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)+\sin^2\left(\frac{a}{2}+\frac{b\ln(c}{2}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(cos(a+b*ln(c*x^n))^(3/2)/x,x)

[Out] -2/3/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(4*cos(1/2*a+1/2*b*ln(c*x^n))*sin(1/2*a+1/2*b*ln(c*x^n))^4+(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)*EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+1/2*b*ln(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*x^n)))/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/2*b*ln(c*x^n))/(2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(cos(a+b*log(c*x^n))^(3/2)/x,x, algorithm="maxima")

[Out] integrate(cos(b*log(c*x^n) + a)^(3/2)/x, x)

mupad [B] time = 2.30, size = 56, normalized size = 0.89

$$\frac{2\,\mathrm{F}\left(\frac{a}{2}+\frac{b\,\ln(c\,x^n)}{2}\middle|2\right)}{3\,b\,n}+\frac{2\,\sqrt{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}{3\,b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(cos(a + b*log(c*x^n))^(3/2)/x,x)

[Out] (2*ellipticF(a/2 + (b*log(c*x^n))/2, 2))/(3*b*n) + (2*cos(a + b*log(c*x^n))^(1/2)*sin(a + b*log(c*x^n)))/(3*b*n)

<u>**sympy**</u> **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos^{\frac{3}{2}}\left(a + b\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**(3/2)/x,x)
```

```
[Out] Integral(cos(a + b*log(c*x**n))**(3/2)/x, x)
```

3.114 $\int \cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=110

$$\frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(2-5ibn\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}}$$

```
[Out] 2*x*cos(a+b*ln(c*x^n))^(5/2)*hypergeom([-5/2, -5/4-1/2*I/b/n],[1/4*(-2*I-b*
n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2-5*I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*I
*b))^(5/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4492, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(2-5ibn\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x*Cos[a + b*Log[c*x^n]]^(5/2)*Hypergeometric2F1[-5/2, (-5 - (2*I)/(b*n))
/4, -(2*I + b*n)/(4*b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - (5*I)*b*
n)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
```

```
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\cos^{\frac{5}{2}}(a+b\log(x))\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{\frac{5ib}{2}-\frac{1}{n}}\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{5ib}{2}+\frac{1}{n}}\left(1+e^{2ia}x^{2ib}\right)^{5/2}\,dx, x, cx^n\right.}{n\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}}$$

$$= \frac{2x\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{2i+bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}}$$

Mathematica [B] time = 7.21, size = 696, normalized size = 6.33

$$\frac{30b^3n^3x^{1-ibn}e^{i\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)}\sqrt{2+2x^{2ibn}e^{2i\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)}}\left((bn+2i)x^{2ibn}\,{}_2F_1\left(\frac{1}{2},\frac{3}{4}-\frac{i}{2bn};\frac{7}{4}-\frac{i}{2bn};-e^{2i(a\cdots}\right.\right.}{(2-5ibn)(bn+2i)(3bn-2i)(5bn-2i)\left((bn-2i)e^{2i\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)}-bn-2i\right)\sqrt{\cdots}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (30*b^3*E^(I*(a + b*(-(n*Log[x]) + Log[c*x^n])))*n^3*x^(1 - I*b*n)*Sqrt[2 +
 2*E^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n)]*((2*I + b*n)
*x^((2*I)*b*n)*Hypergeometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(b*n),
 -(E^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n))] + (-2*I + 3
*b*n)*Hypergeometric2F1[1/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), -(E
^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n))]))/((2 - (5*I)*b
*n)*(2*I + b*n)*(-2*I + 3*b*n)*(-2*I + 5*b*n)*(-2*I - b*n + E^((2*I)*(a + b
*(-(n*Log[x]) + Log[c*x^n])))*(-2*I + b*n))*Sqrt[(1 + E^((2*I)*(a + b*(-(n*
Log[x]) + Log[c*x^n])))*x^((2*I)*b*n))/(E^(I*(a + b*(-(n*Log[x]) + Log[c*x^
n])))*x^(I*b*n))]) + Sqrt[Cos[a + b*n*Log[x] + b*(-(n*Log[x]) + Log[c*x^n])
]]*((-2*x*(2*Cos[a + b*(-(n*Log[x]) + Log[c*x^n])] + 15*b^2*n^2*Cos[a + b*(
-(n*Log[x]) + Log[c*x^n])] - b*n*Sin[a + b*(-(n*Log[x]) + Log[c*x^n])]))/((
-2*I + 5*b*n)*(2*I + 5*b*n)*(-2*Cos[a + b*(-(n*Log[x]) + Log[c*x^n])] + b*n
*Sin[a + b*(-(n*Log[x]) + Log[c*x^n])])) + (x*Sin[2*b*n*Log[x]]*(5*b*n*Cos[
2*(a + b*(-(n*Log[x]) + Log[c*x^n]))] - 2*Sin[2*(a + b*(-(n*Log[x]) + Log[c
```

```
*x^n]))]))/((-2*I + 5*b*n)*(2*I + 5*b*n)) + (x*Cos[2*b*n*Log[x]]*(2*Cos[2*(
a + b*(-(n*Log[x]) + Log[c*x^n]))] + 5*b*n*Sin[2*(a + b*(-(n*Log[x]) + Log[
c*x^n]))]))/((-2*I + 5*b*n)*(2*I + 5*b*n)))
```

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(cos(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(5/2), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \cos^{\frac{5}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(cos(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cos\left(a+b\,\ln\left(c\,x^n\right)\right)^{5/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^(5/2),x)
```

```
[Out] int(cos(a + b*log(c*x^n))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.115 $\int \frac{\cos^{\frac{5}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=63

$$\frac{6E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{5bn}+\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{5bn}$$

```
[Out] 6/5*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*Ellipti
cE(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/b/n+2/5*cos(a+b*ln(c*x^n))^(3/2)*sin
(a+b*ln(c*x^n))/b/n
```

Rubi [A] time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2635, 2639}

$$\frac{6E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{5bn}+\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{5bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (6*EllipticE[(a + b*Log[c*x^n])/2, 2])/(5*b*n) + (2*Cos[a + b*Log[c*x^n]]^(
3/2)*Sin[a + b*Log[c*x^n]])/(5*b*n)
```

Rule 2635

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Sin[c + d*x])^(n - 1))/(d*n), x] + Dist[(b^2*(n - 1))/n, Int[(b*Sin[c
+ d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] && IntegerQ[2*n
]
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \cos^{\frac{5}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{5bn} + \frac{3\,\text{Subst}\left(\int \sqrt{\cos(a+bx)}\,dx, x, \log\right.}{5n}$$
$$= \frac{6E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{5bn} + \frac{2\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{5bn}$$

Mathematica [A] time = 0.13, size = 58, normalized size = 0.92

$$\frac{6E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)+\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{5bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (6*EllipticE[(a + b*Log[c*x^n])/2, 2] + Sqrt[Cos[a + b*Log[c*x^n]]]*Sin[2*(
a + b*Log[c*x^n])])/(5*b*n)
```

fricas [F] time = 0.48, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(5/2)/x,x, algorithm="fricas")
```

```
[Out] integral(cos(b*log(c*x^n) + a)^(5/2)/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(5/2)/x,x, algorithm="giac")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(5/2)/x, x)
```

maple [B] time = 0.08, size = 280, normalized size = 4.44

$$-\frac{2\sqrt{\left(2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)-1\right)\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)}\,\left(-8\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\left(\sin^6\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)+8\cos\left(\frac{a}{2}+\right.\right.}{5n\sqrt{-2\left(\sin^4\left(\frac{a}{2}+\frac{b\ln(c}{2}\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^(5/2)/x,x)
```

```
[Out] -2/5/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1
/2)*(-8*cos(1/2*a+1/2*b*ln(c*x^n))*sin(1/2*a+1/2*b*ln(c*x^n))^6+8*cos(1/2*a
+1/2*b*ln(c*x^n))*sin(1/2*a+1/2*b*ln(c*x^n))^4-3*(sin(1/2*a+1/2*b*ln(c*x^n)
)^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)*EllipticE(cos(1/2*a+1/2
*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+1/2*b*ln(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*
x^n)))/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)
/sin(1/2*a+1/2*b*ln(c*x^n))/(2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*log(c*x^n))^(5/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(5/2)/x, x)
```

mupad [B] time = 2.38, size = 65, normalized size = 1.03

$$-\frac{2\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^{7/2}\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)\,{}_2\mathrm{F}_1\left(\frac{1}{2},\frac{7}{4};\ \frac{11}{4};\ \cos\left(a+b\,\ln\left(c\,x^n\right)\right)^2\right)}{7\,b\,n\,\sqrt{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^(5/2)/x,x)
```

```
[Out] -(2*cos(a + b*log(c*x^n))^(7/2)*sin(a + b*log(c*x^n))*hypergeom([1/2, 7/4],
 11/4, cos(a + b*log(c*x^n))^2))/(7*b*n*(sin(a + b*log(c*x^n))^2)^(1/2))
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**(5/2)/x,x)
[Out] Timed out
```

3.116 $\int \frac{1}{\sqrt{\cos(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=109

$$\frac{2x\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+ibn)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*x*hypergeom([1/2, 1/4-1/2*I/b/n],[5/4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2*I
*b))*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)/(2+I*b*n)/cos(a+b*ln(c*x^n))^(1/2
)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4492, 364}

$$\frac{2x\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+ibn)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2, (1 - (2
*I)/(b*n))/4, (5 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 +
 I*b*n)*Sqrt[Cos[a + b*Log[c*x^n]]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\operatorname{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sqrt{\cos(a+b\log(x))}}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{ib}{2}-\frac{1}{n}}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\right)\operatorname{Subst}\left(\int \frac{x^{-1+\frac{ib}{2}+\frac{1}{n}}}{\sqrt{1+e^{2ia}x^{2ib}}}\,dx, x, cx^n\right)}{n\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

$$= \frac{2x\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+ibn)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [**A**] time = 0.38, size = 99, normalized size = 0.91

$$-\frac{2ix\left(1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{(bn-2i)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] ((-2*I)*(1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Hypergeometric2F1[1, 3/4 - (I/
2)/(b*n), 5/4 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/((-2*I + b*n)*
Sqrt[Cos[a + b*Log[c*x^n]]])
```

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/cos(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)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(cos(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\cos\left(a+b\ln\left(c\,x^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(1/cos(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/sqrt(cos(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sqrt{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n))^(1/2),x)
```

```
[Out] int(1/cos(a + b*log(c*x^n))^(1/2), x)
```

<u>**sympy**</u> **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/sqrt(cos(a + b*log(c*x**n))), x)
```

3.117 $\int \frac{1}{x\sqrt{\cos(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=24

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

```
[Out] 2*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticF
(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/b/n
```

Rubi [A] time = 0.03, antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.053, Rules used = {2641}

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Cos[a + b*Log[c*x^n]]]),x]
```

```
[Out] (2*EllipticF[(a + b*Log[c*x^n])/2, 2])/(b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{1}{x\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}\,dx &= \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\cos(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= \frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}\end{aligned}$$

Mathematica [A] time = 0.08, size = 24, normalized size = 1.00

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Cos[a + b*Log[c*x^n]]]),x]
[Out] (2*EllipticF[(a + b*Log[c*x^n])/2, 2])/(b*n)
```

fricas [F] time = 0.62, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
[Out] integral(1/(x*sqrt(cos(b*log(c*x^n) + a))), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate(1/(x*sqrt(cos(b*log(c*x^n) + a))), x)
```

maple [C] time = 0.01, size = 26, normalized size = 1.08

$$\frac{2\,\mathrm{am}^{-1}\left(\frac{a}{2}+\frac{b\ln\left(c\,x^{n}\right)}{2}|\sqrt{2}\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/cos(a+b*ln(c*x^n))^(1/2),x)
[Out] 2/b/n*InverseJacobiAM(1/2*a+1/2*b*ln(c*x^n),2^(1/2))
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\cos\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [B] time = 2.37, size = 23, normalized size = 0.96

$$\frac{2\,\mathrm{F}\left(\frac{a}{2}+\frac{b\,\ln(c\,x^n)}{2}\middle|2\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))^(1/2)),x)
[Out] (2*ellipticF(a/2 + (b*log(c*x^n))/2, 2))/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(1/(x*sqrt(cos(a + b*log(c*x**n)))), x)
```

3.118 $\int \frac{1}{\cos^{\frac{3}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2} {}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+3ibn)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*hypergeom([3/2, 3/4-1/2*I/b/n],[7/
4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2+3*I*b*n)/cos(a+b*ln(c*x^n))^(3
/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4492, 364}

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2} {}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+3ibn)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (2*x*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Hypergeometric2F1[3/2, (3 -
(2*I)/(b*n))/4, (7 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2
 + (3*I)*b*n)*Cos[a + b*Log[c*x^n]]^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\cos^{\frac{3}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{3ib}{2}+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^{3/2}}\,dx,x,cx^n\right)}{n\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+3ibn)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [B]   time = 3.71, size = 431, normalized size = 3.95

$$\frac{x\left((3bn-2i)x^{-ibn}\left(2x^{ibn}\sqrt{e^{-ia}\left(cx^n\right)^{-ib}+e^{ia}\left(cx^n\right)^{ib}}\,(bn\cos(bn\log(x))-2\sin(bn\log(x)))-(bn-2i)\sqrt{2+2e^{2ia}\left(\right.}\right.\right.}{bn(3bn-2i)\sqrt{e^{-ia}\left(cx^n\right)^{-ib}+e^{ia}\left(cx^n\right)^{ib}}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (x*(-((4 + b^2*n^2)*x^(I*b*n)*Sqrt[2 + 2*E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqr
t[Cos[a + b*Log[c*x^n]]]*Hypergeometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I
/2)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]) + ((-2*I + 3*b*n)*(-((-2*I +
b*n)*Sqrt[2 + 2*E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Cos[a + b*Log[c*x^n]]]*
Hypergeometric2F1[1/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), -(E^((2*I
)*a)*(c*x^n)^((2*I)*b))]) + 2*x^(I*b*n)*Sqrt[1/(E^(I*a)*(c*x^n)^(I*b)) + E^
(I*a)*(c*x^n)^(I*b)]*(b*n*Cos[b*n*Log[x]] - 2*Sin[b*n*Log[x]])))/x^(I*b*n))
)/(b*n*(-2*I + 3*b*n)*Sqrt[1/(E^(I*a)*(c*x^n)^(I*b)) + E^(I*a)*(c*x^n)^(I*b
)]*Sqrt[Cos[a + b*Log[c*x^n]]]*(-2*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + b*n
*Sin[a - b*n*Log[x] + b*Log[c*x^n]]))
```

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/cos(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(-3/2), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(1/cos(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(-3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n))^(3/2),x)
```

```
[Out] int(1/cos(a + b*log(c*x^n))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(cos(a + b*log(c*x**n))**(-3/2), x)
```

3.119 $\int \frac{1}{x\cos^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=59

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}-\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

```
[Out] -2*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*Elliptic
E(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/b/n+2*sin(a+b*ln(c*x^n))/b/n/cos(a+b*
ln(c*x^n))^(1/2)
```

Rubi [A] time = 0.04, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2636, 2639}

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}-\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Cos[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (-2*EllipticE[(a + b*Log[c*x^n])/2, 2])/(b*n) + (2*Sin[a + b*Log[c*x^n]])/(
b*n*Sqrt[Cos[a + b*Log[c*x^n]]])
```

Rule 2636

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Sin[c + d*x])^(n + 1))/(b*d*(n + 1)), x] + Dist[(n + 2)/(b^2*(n + 1)), In
t[(b*Sin[c + d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] &&
IntegerQ[2*n]
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{1}{x\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\cos^{\frac{3}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \sqrt{\cos(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn} + \frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{bn\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [A] time = 0.15, size = 54, normalized size = 0.92

$$\frac{2\left(\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}} - E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Cos[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (2*(-EllipticE[(a + b*Log[c*x^n])/2, 2] + Sin[a + b*Log[c*x^n]]/Sqrt[Cos[a
+ b*Log[c*x^n]]]))/(b*n)
```

fricas [F] time = 0.46, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(1/(x*cos(b*log(c*x^n) + a)^(3/2)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*cos(b*log(c*x^n) + a)^(3/2)), x)
```

maple [A] time = 0.08, size = 139, normalized size = 2.36

$$-\frac{2\left(\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(c\,x^n))}{2}}\,\sqrt{2\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)-1}\ \mathrm{EllipticE}\left(\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right),\sqrt{2}\right)-2\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)}{n\sin\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\sqrt{2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)-1}\ b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/cos(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] -2/n*((sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n))^2-
1)^(1/2)*EllipticE(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+1/2*b*ln
(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*x^n)))/sin(1/2*a+1/2*b*ln(c*x^n))/(2*cos(1/
2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*cos(b*log(c*x^n) + a)^(3/2)), x)
```

mupad [B] time = 2.67, size = 65, normalized size = 1.10

$$\frac{2\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\ \frac{3}{4};\ \cos\left(a+b\,\ln\left(c\,x^n\right)\right)^2\right)}{b\,n\,\sqrt{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\,\sqrt{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))^(3/2)),x)
```

```
[Out] (2*sin(a + b*log(c*x^n))*hypergeom([-1/4, 1/2], 3/4, cos(a + b*log(c*x^n))^
2))/(b*n*cos(a + b*log(c*x^n))^(1/2)*(sin(a + b*log(c*x^n))^2)^(1/2))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cos^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(1/(x*cos(a + b*log(c*x**n))**(3/2)), x)
```

3.120 $\int \frac{1}{\cos^{\frac{5}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+5ibn)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*hypergeom([5/2, 5/4-1/2*I/b/n],[9/
4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2+5*I*b*n)/cos(a+b*ln(c*x^n))^(5
/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4492, 364}

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+5ibn)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (2*x*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Hypergeometric2F1[5/2, (5 -
(2*I)/(b*n))/4, (9 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2
 + (5*I)*b*n)*Cos[a + b*Log[c*x^n]]^(5/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\cos^{\frac{5}{2}}(a+b\log(x))}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^{5/2}}\,dx, x, cx^n\right)}{n\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+5ibn)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 1.13, size = 147, normalized size = 1.35

$$\frac{2x\left(\left(2-ibn\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\cos\left(a+b\log\left(cx^n\right)\right)+bn\sin\left(a+b\log\right.\right.}{3b^2n^2\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (2*x*(-2*Cos[a + b*Log[c*x^n]] + (2 - I*b*n)*(1 + E^((2*I)*a)*(c*x^n)^((2*I
)*b))*Cos[a + b*Log[c*x^n]]*Hypergeometric2F1[1, 3/4 - (I/2)/(b*n), 5/4 - (
I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + b*n*Sin[a + b*Log[c*x^n]]))/(3
*b^2*n^2*Cos[a + b*Log[c*x^n]]^(3/2))
```

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/cos(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >> Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(-5/2), x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(1/cos(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(cos(b*log(c*x^n) + a)^(-5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n))^(5/2),x)
```

```
[Out] int(1/cos(a + b*log(c*x^n))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.121 $\int \frac{1}{x\cos^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=63

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn}+\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2/3*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*Ellipti
cF(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/b/n+2/3*sin(a+b*ln(c*x^n))/b/n/cos(a
+b*ln(c*x^n))^(3/2)
```

Rubi [A] time = 0.04, antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2636, 2641}

$$\frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn}+\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Cos[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (2*EllipticF[(a + b*Log[c*x^n])/2, 2])/(3*b*n) + (2*Sin[a + b*Log[c*x^n]])/
(3*b*n*Cos[a + b*Log[c*x^n]]^(3/2))
```

Rule 2636

```
Int[((b_.)*sin[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Sin[c + d*x])^(n + 1))/(b*d*(n + 1)), x] + Dist[(n + 2)/(b^2*(n + 1)), In
t[(b*Sin[c + d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] &&
IntegerQ[2*n]
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{1}{x\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\cos^{\frac{5}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} + \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\cos(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{3n}$$

$$= \frac{2F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn} + \frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 0.14, size = 54, normalized size = 0.86

$$\frac{2\left(F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)+\frac{\sin\left(a+b\log\left(cx^n\right)\right)}{\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Cos[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (2*(EllipticF[(a + b*Log[c*x^n])/2, 2] + Sin[a + b*Log[c*x^n]]/Cos[a + b*Lo
g[c*x^n]]^(3/2)))/(3*b*n)
```

fricas [F] time = 0.57, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] integral(1/(x*cos(b*log(c*x^n) + a)^(5/2)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*cos(b*log(c*x^n) + a)^(5/2)), x)
```

maple [B] time = 0.08, size = 291, normalized size = 4.62

$$-\frac{2\left(-2\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(c\,x^n))}{2}}\,\sqrt{2\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)-1}\;\mathrm{EllipticF}\left(\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right),\sqrt{2}\right)\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)\right.}{3n\sqrt{-2\left(\sin^4\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/cos(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] -2/3/n*(-2*(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n
))^2-1)^(1/2)*EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))*sin(1/2*a+1/2*b
*ln(c*x^n))^2+(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*
x^n))^2-1)^(1/2)*EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+
1/2*b*ln(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*x^n)))*((2*cos(1/2*a+1/2*b*ln(c*x^n
))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^
4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/(2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(3
/2)/sin(1/2*a+1/2*b*ln(c*x^n))/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*cos(b*log(c*x^n) + a)^(5/2)), x)
```

mupad [B] time = 2.71, size = 65, normalized size = 1.03

$$\frac{2\,\sin\left(a+b\,\ln\left(c\,x^n\right)\right)\,{}_2\mathrm{F}_1\left(-\frac{3}{4},\frac{1}{2};\,\frac{1}{4};\,\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^2\right)}{3\,b\,n\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}\,\sqrt{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))^(5/2)),x)
```

```
[Out] (2*sin(a + b*log(c*x^n))*hypergeom([-3/4, 1/2], 1/4, cos(a + b*log(c*x^n))^
2))/(3*b*n*cos(a + b*log(c*x^n))^(3/2)*(sin(a + b*log(c*x^n))^2)^(1/2))
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cos(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.122 $\int \frac{1}{\cos^{\frac{3}{2}}(a-2i\log(cx))}\,dx$

Optimal. Leaf size=48

$$-\frac{e^{-2ia}\left(1+e^{2ia}c^4x^4\right)}{2c^4x^3\cos^{\frac{3}{2}}(a-2i\log(cx))}$$

```
[Out] 1/2*(-1-c^4*exp(2*I*a)*x^4)/c^4/exp(2*I*a)/x^3/cos(a-2*I*ln(c*x))^(3/2)
```

Rubi [A] time = 0.04, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4484, 4482, 261}

$$-\frac{e^{-2ia}\left(1+e^{2ia}c^4x^4\right)}{2c^4x^3\cos^{\frac{3}{2}}(a-2i\log(cx))}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a - (2*I)*Log[c*x]]^(-3/2),x]
```

```
[Out] -(1 + c^4*E^((2*I)*a)*x^4)/(2*c^4*E^((2*I)*a)*x^3*Cos[a - (2*I)*Log[c*x]]^(
3/2))
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4482

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_), x_Symbol] :> Dist[(Cos[d*(a +
b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, Int[(1 + E^(2*I*
a*d)*x^(2*I*b*d))^p/x^(I*b*d*p), x], x] /; FreeQ[{a, b, d, p}, x] &&  !Inte
gerQ[p]
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{1}{\cos^{\frac{3}{2}}(a-2i\log(cx))}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\cos^{\frac{3}{2}}(a-2i\log(x))}\,dx, x, cx\right)}{c}$$
$$= \frac{\left(1+c^4e^{2ia}x^4\right)^{3/2}\text{Subst}\left(\int \frac{x^3}{\left(1+e^{2ia}x^4\right)^{3/2}}\,dx, x, cx\right)}{c^4x^3\cos^{\frac{3}{2}}(a-2i\log(cx))}$$
$$= -\frac{e^{-2ia}\left(1+c^4e^{2ia}x^4\right)}{2c^4x^3\cos^{\frac{3}{2}}(a-2i\log(cx))}$$

Mathematica [A] time = 0.12, size = 82, normalized size = 1.71

$$-\frac{x(\cos(a)-i\sin(a))\sqrt{\frac{2\cos(a)\left(c^4x^4+1\right)+2i\sin(a)\left(c^4x^4-1\right)}{c^2x^2}}}{\cos(a)\left(c^4x^4+1\right)+i\sin(a)\left(c^4x^4-1\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cos[a - (2*I)*Log[c*x]]^(-3/2),x]
```

```
[Out] -((x*(Cos[a] - I*Sin[a])*Sqrt[(2*(1 + c^4*x^4)*Cos[a] + (2*I)*(-1 + c^4*x^4
)*Sin[a])/(c^2*x^2)])/((1 + c^4*x^4)*Cos[a] + I*(-1 + c^4*x^4)*Sin[a]))
```

fricas [A] time = 0.61, size = 39, normalized size = 0.81

$$-\frac{2\sqrt{\frac{1}{2}}\sqrt{c^4x^4+e^{(-2ia)}}e^{\left(-\frac{3}{2}ia\right)}}{c^5x^4+ce^{(-2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a-2*I*log(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] -2*sqrt(1/2)*sqrt(c^4*x^4 + e^(-2*I*a))*e^(-3/2*I*a)/(c^5*x^4 + c*e^(-2*I*a
))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(a-2i\log(cx)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cos(a - 2*I*log(c*x))^(-3/2), x)
```

maple [F] time = 0.23, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos\left(a-2i\ln\left(cx\right)\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a-2*I*ln(c*x))^(3/2),x)
```

```
[Out] int(1/cos(a-2*I*ln(c*x))^(3/2),x)
```

maxima [B] time = 0.47, size = 187, normalized size = 3.90

$$-\frac{\left(\left(\sqrt{2}\cos\left(\frac{3}{2}a\right)+i\sqrt{2}\sin\left(\frac{3}{2}a\right)\right)c^4x^4+\sqrt{2}\cos\left(\frac{1}{2}a\right)-i\sqrt{2}\sin\left(\frac{1}{2}a\right)\right)\cos\left(\frac{3}{2}\arctan\left(c^4x^4\sin\left(2a\right),c^4x^4\cos\left(2\right.\right.\right.}{\left(\left(\cos\left(2a\right)^2+\mathrm{si}\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a-2*I*log(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] -((((sqrt(2)*cos(3/2*a) + I*sqrt(2)*sin(3/2*a))*c^4*x^4 + sqrt(2)*cos(1/2*a)
 - I*sqrt(2)*sin(1/2*a))*cos(3/2*arctan2(c^4*x^4*sin(2*a), c^4*x^4*cos(2*a)
 + 1)) + ((-I*sqrt(2)*cos(3/2*a) + sqrt(2)*sin(3/2*a))*c^4*x^4 - I*sqrt(2)*
cos(1/2*a) - sqrt(2)*sin(1/2*a))*sin(3/2*arctan2(c^4*x^4*sin(2*a), c^4*x^4*
cos(2*a) + 1)))/(((cos(2*a)^2 + sin(2*a)^2)*c^8*x^8 + 2*c^4*x^4*cos(2*a) +
1)^(3/4)*c)
```

mupad [B] time = 2.79, size = 48, normalized size = 1.00

$$-\frac{2\,x\,\sqrt{\frac{{\mathrm{e}}^{-a\,1{}\mathrm{i}}}{2\,c^2\,x^2}+\frac{c^2\,x^2\,{\mathrm{e}}^{a\,1{}\mathrm{i}}}{2}}}{{\mathrm{e}}^{a\,2{}\mathrm{i}}\,c^4\,x^4+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a - log(c*x)*2i)^(3/2),x)
```

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\cos^{\frac{3}{2}}\left(a-2i\log\left(cx\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/cos(a-2*I*ln(c*x))**(3/2),x)
```

```
[Out] Integral(cos(a - 2*I*log(c*x))**(-3/2), x)
```

3.123 $\int x^m \cos^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=266

$$\frac{(m+1)x^{m+1}\cos^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+(m+1)^2}+\frac{12b^2(m+1)n^2x^{m+1}\cos^2\left(a+b\log\left(cx^n\right)\right)}{\left(4b^2n^2+(m+1)^2\right)\left(16b^2n^2+(m+1)^2\right)}+\frac{4bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)\cos}{16b^2n^2+(m+1}$$

```
[Out] 24*b^4*n^4*x^(1+m)/(1+m)/((1+m)^2+4*b^2*n^2)/((1+m)^2+16*b^2*n^2)+12*b^2*(1
+m)*n^2*x^(1+m)*cos(a+b*ln(c*x^n))^2/((1+m)^2+4*b^2*n^2)/((1+m)^2+16*b^2*n^
2)+(1+m)*x^(1+m)*cos(a+b*ln(c*x^n))^4/((1+m)^2+16*b^2*n^2)+24*b^3*n^3*x^(1+
m)*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))/((1+m)^2+4*b^2*n^2)/((1+m)^2+16*b^
2*n^2)+4*b*n*x^(1+m)*cos(a+b*ln(c*x^n))^3*sin(a+b*ln(c*x^n))/((1+m)^2+16*b^
2*n^2)
```

Rubi [A] time = 0.12, antiderivative size = 260, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 30}

$$\frac{(m+1)x^{m+1}\cos^4\left(a+b\log\left(cx^n\right)\right)}{16b^2n^2+(m+1)^2}+\frac{12b^2(m+1)n^2x^{m+1}\cos^2\left(a+b\log\left(cx^n\right)\right)}{20b^2(m+1)^2n^2+64b^4n^4+(m+1)^4}+\frac{4bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)\cos}{16b^2n^2+(m+1}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (24*b^4*n^4*x^(1 + m))/((1 + m)*((1 + m)^2 + 4*b^2*n^2)*((1 + m)^2 + 16*b^2
*n^2)) + (12*b^2*(1 + m)*n^2*x^(1 + m)*Cos[a + b*Log[c*x^n]]^2)/((1 + m)^4
+ 20*b^2*(1 + m)^2*n^2 + 64*b^4*n^4) + ((1 + m)*x^(1 + m)*Cos[a + b*Log[c*x
^n]]^4)/((1 + m)^2 + 16*b^2*n^2) + (24*b^3*n^3*x^(1 + m)*Cos[a + b*Log[c*x^
n]]*Sin[a + b*Log[c*x^n]])/((1 + m)^4 + 20*b^2*(1 + m)^2*n^2 + 64*b^4*n^4)
+ (4*b*n*x^(1 + m)*Cos[a + b*Log[c*x^n]]^3*Sin[a + b*Log[c*x^n]])/((1 + m)^
2 + 16*b^2*n^2)
```

Rule 30

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

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
```

```
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^m \cos^4\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{(1+m)x^{1+m}\cos^4\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+16b^2n^2}+\frac{4bnx^{1+m}\cos^3\left(a+b\log\left(cx^n\right)\right)\sin\left(a+\right.}{(1+m)^2+16b^2n^2}$$
$$=\frac{12b^2(1+m)n^2x^{1+m}\cos^2\left(a+b\log\left(cx^n\right)\right)}{(1+m)^4+20b^2(1+m)^2n^2+64b^4n^4}+\frac{(1+m)x^{1+m}\cos^4\left(a+b\log\left(cx^n\right.\right.}{(1+m)^2+16b^2n^2}$$
$$=\frac{24b^4n^4x^{1+m}}{(1+m)\left((1+m)^4+20b^2(1+m)^2n^2+64b^4n^4\right)}+\frac{12b^2(1+m)n^2x^{1+m}\cos^2\left(a\right.}{(1+m)^4+20b^2(1+m)^2n}$$

Mathematica [A] time = 4.03, size = 312, normalized size = 1.17

$$\frac{1}{8}x^{m+1}\left(-\frac{4\sin(2bn\log(x))\left((m+1)\sin\left(2\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)-2bn\cos\left(2\left(a+b\log\left(cx^n\right)-bn\log(x\right.\right.\right.}{4b^2n^2+m^2+2m+1}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Cos[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x^(1 + m)*(3/(1 + m) - (4*Sin[2*b*n*Log[x]]*(-2*b*n*Cos[2*(a - b*n*Log[x]
+ b*Log[c*x^n])] + (1 + m)*Sin[2*(a - b*n*Log[x] + b*Log[c*x^n])]))/(1 + 2*
m + m^2 + 4*b^2*n^2) + (4*Cos[2*b*n*Log[x]]*((1 + m)*Cos[2*(a - b*n*Log[x]
+ b*Log[c*x^n])] + 2*b*n*Sin[2*(a - b*n*Log[x] + b*Log[c*x^n])]))/(1 + 2*m
+ m^2 + 4*b^2*n^2) - (Sin[4*b*n*Log[x]]*(-4*b*n*Cos[4*(a - b*n*Log[x] + b*L
og[c*x^n])] + (1 + m)*Sin[4*(a - b*n*Log[x] + b*Log[c*x^n])]))/(1 + 2*m + m
^2 + 16*b^2*n^2) + (Cos[4*b*n*Log[x]]*((1 + m)*Cos[4*(a - b*n*Log[x] + b*Lo
g[c*x^n])] + 4*b*n*Sin[4*(a - b*n*Log[x] + b*Log[c*x^n])]))/(1 + 2*m + m^2
+ 16*b^2*n^2)))/8
```

fricas [A] time = 1.01, size = 273, normalized size = 1.03

$$\frac{4\left(6\left(b^3m+b^3\right)n^3x\cos\left(bn\log(x)+b\log(c)+a\right)+\left(4\left(b^3m+b^3\right)n^3+\left(bm^3+3\,bm^2+3\,bm+b\right)n\right)x\cos\left(bn\,\mathrm{lo}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] (4*(6*(b^3*m + b^3)*n^3*x*cos(b*n*log(x) + b*log(c) + a) + (4*(b^3*m + b^3)
*n^3 + (b*m^3 + 3*b*m^2 + 3*b*m + b)*n)*x*cos(b*n*log(x) + b*log(c) + a)^3)
*x^m*sin(b*n*log(x) + b*log(c) + a) + (24*b^4*n^4*x + 12*(b^2*m^2 + 2*b^2*m
 + b^2)*n^2*x*cos(b*n*log(x) + b*log(c) + a)^2 + (m^4 + 4*m^3 + 4*(b^2*m^2
+ 2*b^2*m + b^2)*n^2 + 6*m^2 + 4*m + 1)*x*cos(b*n*log(x) + b*log(c) + a)^4)
*x^m)/(m^5 + 64*(b^4*m + b^4)*n^4 + 5*m^4 + 10*m^3 + 20*(b^2*m^3 + 3*b^2*m^
2 + 3*b^2*m + b^2)*n^2 + 10*m^2 + 5*m + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.09, size = 0, normalized size = 0.00

$$\int x^{m} \left(\cos^{4}\left(a+b\ln\left(c\,x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(x^m*cos(a+b*ln(c*x^n))^4,x)
```

maxima [B] time = 0.62, size = 3537, normalized size = 13.30

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] 1/16*(((cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)) +
 cos(4*b*log(c)))*m^4 + 4*(cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c)
)*sin(4*b*log(c)) + cos(4*b*log(c)))*m^3 + 16*(b^3*cos(4*b*log(c))*sin(8*b*
log(c)) - b^3*cos(8*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c)) + (b^3*
cos(4*b*log(c))*sin(8*b*log(c)) - b^3*cos(8*b*log(c))*sin(4*b*log(c)) + b^3
*sin(4*b*log(c)))*m)*n^3 + 6*(cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log
(c))*sin(4*b*log(c)) + cos(4*b*log(c)))*m^2 + 4*(b^2*cos(8*b*log(c))*cos(4*
b*log(c)) + b^2*sin(8*b*log(c))*sin(4*b*log(c)) + (b^2*cos(8*b*log(c))*cos(
4*b*log(c)) + b^2*sin(8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*m^
```

2 + b^2*cos(4*b*log(c)) + 2*(b^2*cos(8*b*log(c))*cos(4*b*log(c)) + b^2*sin(
8*b*log(c))*sin(4*b*log(c)) + b^2*cos(4*b*log(c)))*m)*n^2 + 4*(cos(8*b*log(
c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c)))*m
+ 4*((b*cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c))
 + b*sin(4*b*log(c)))*m^3 + 3*(b*cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*
b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c)))*m^2 + b*cos(4*b*log(c))*sin(
8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + 3*(b*cos(4*b*log(c))*sin(
8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log(c)))*m + b*
sin(4*b*log(c)))*n + cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(
4*b*log(c)) + cos(4*b*log(c)))*x*x^m*cos(4*b*log(x^n) + 4*a) + 4*((cos(6*b*
log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))
*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*m^4 + 4*(cos(6*b*log(c)
)*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(4
*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*m^3 + 32*(b^3*cos(4*b*log(c))
*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b*log(c)
)*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)) + (b^3*cos(4*b*log(
c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)) + b^3*cos(2*b*log
(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*m)*n^3 + 6*(cos
(6*b*log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c)) + sin(6*b*lo
g(c))*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*m^2 + 16*(b^2*cos(
6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin
(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)) + (b^2*c
os(6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*
sin(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*m^2
+ 2*(b^2*cos(6*b*log(c))*cos(4*b*log(c)) + b^2*cos(4*b*log(c))*cos(2*b*log(
c)) + b^2*sin(6*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log
(c)))*m)*n^2 + 4*(cos(6*b*log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b
*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)
))*m + 2*((b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*lo
g(c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c
)))*m^3 + 3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*
log(c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log
(c)))*m^2 + b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*l
og(c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(
c)) + 3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(
c)) + b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c))
)*m)*n + cos(6*b*log(c))*cos(4*b*log(c)) + cos(4*b*log(c))*cos(2*b*log(c))
+ sin(6*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*x*x^m*
cos(2*b*log(x^n) + 2*a) - ((cos(4*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c
))*sin(4*b*log(c)) + sin(4*b*log(c)))*m^4 + 4*(cos(4*b*log(c))*sin(8*b*log(
c)) - cos(8*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c)))*m^3 - 16*(b^3*cos(
8*b*log(c))*cos(4*b*log(c)) + b^3*sin(8*b*log(c))*sin(4*b*log(c)) + b^3*cos
(4*b*log(c)) + (b^3*cos(8*b*log(c))*cos(4*b*log(c)) + b^3*sin(8*b*log(c))*s
in(4*b*log(c)) + b^3*cos(4*b*log(c)))*m)*n^3 + 6*(cos(4*b*log(c))*sin(8*b*l
og(c)) - cos(8*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c)))*m^2 + 4*(b^2*co

```
s(4*b*log(c))*sin(8*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + (b^2*
cos(4*b*log(c))*sin(8*b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2
*sin(4*b*log(c)))*m^2 + b^2*sin(4*b*log(c)) + 2*(b^2*cos(4*b*log(c))*sin(8*
b*log(c)) - b^2*cos(8*b*log(c))*sin(4*b*log(c)) + b^2*sin(4*b*log(c)))*m)*n
^2 + 4*(cos(4*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)) +
 sin(4*b*log(c)))*m - 4*((b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log
(c))*sin(4*b*log(c)) + b*cos(4*b*log(c)))*m^3 + 3*(b*cos(8*b*log(c))*cos(4*
b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c)) + b*cos(4*b*log(c)))*m^2 + b*
cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c)) + 3*(b*
cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c)) + b*cos
(4*b*log(c)))*m + b*cos(4*b*log(c)))*n + cos(4*b*log(c))*sin(8*b*log(c)) -
cos(8*b*log(c))*sin(4*b*log(c)) + sin(4*b*log(c)))*x*x^m*sin(4*b*log(x^n) +
 4*a) - 4*((cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c
)) + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*m^4
 + 4*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c)) + c
os(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*m^3 - 32*
(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log(c))
+ b^3*sin(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c))
 + (b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*cos(4*b*log(c))*cos(2*b*log(c
)) + b^3*sin(6*b*log(c))*sin(4*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(
c)))*m)*n^3 + 6*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*
log(c)) + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c))
)*m^2 + 16*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(4
*b*log(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(
2*b*log(c)) + (b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*si
n(4*b*log(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*s
in(2*b*log(c)))*m^2 + 2*(b^2*cos(4*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*
log(c))*sin(4*b*log(c)) + b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b
*log(c))*sin(2*b*log(c)))*m)*n^2 + 4*(cos(4*b*log(c))*sin(6*b*log(c)) - cos
(6*b*log(c))*sin(4*b*log(c)) + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*lo
g(c))*sin(2*b*log(c)))*m - 2*((b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*
b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*l
og(c))*sin(2*b*log(c)))*m^3 + 3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(
4*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b
*log(c))*sin(2*b*log(c)))*m^2 + b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4
*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*
log(c))*sin(2*b*log(c)) + 3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*cos(4*b*
log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)) + b*sin(4*b*log
(c))*sin(2*b*log(c)))*m)*n + cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(
c))*sin(4*b*log(c)) + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin
(2*b*log(c)))*x*x^m*sin(2*b*log(x^n) + 2*a) + 6*((cos(4*b*log(c))^2 + sin(4
*b*log(c))^2)*m^4 + 64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n^4
+ 4*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*m^3 + 6*(cos(4*b*log(c))^2 + si
n(4*b*log(c))^2)*m^2 + 20*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2 +
(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*m^2 + 2*(b^2*cos(4*b*log(c)
```

```
)^2 + b^2*sin(4*b*log(c))^2)*m)*n^2 + 4*(cos(4*b*log(c))^2 + sin(4*b*log(c)
)^2)*m + cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*x*x^m)/((cos(4*b*log(c))^2
+ sin(4*b*log(c))^2)*m^5 + 5*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*m^4 +
64*(b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2 + (b^4*cos(4*b*log(c))^2
+ b^4*sin(4*b*log(c))^2)*m)*n^4 + 10*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2
)*m^3 + 10*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*m^2 + 20*((b^2*cos(4*b*l
og(c))^2 + b^2*sin(4*b*log(c))^2)*m^3 + b^2*cos(4*b*log(c))^2 + b^2*sin(4*b
*log(c))^2 + 3*(b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*m^2 + 3*(b^2
*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*m)*n^2 + 5*(cos(4*b*log(c))^2 +
 sin(4*b*log(c))^2)*m + cos(4*b*log(c))^2 + sin(4*b*log(c))^2)
```

mupad [B] time = 3.59, size = 152, normalized size = 0.57

$$\frac{3\,x\,x^m}{8\,m+8}+\frac{x\,x^m\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}{4\,m+4+b\,n\,8\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{m\,4\mathrm{i}+8\,b\,n+4\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}{16\,m+16+b\,n\,64\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{-a\,4\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,4\mathrm{i}}}\,1\mathrm{i}}{m\,16\mathrm{i}+64\,b\,n+16\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a + b*log(c*x^n))^4,x)
```

```
[Out] (3*x*x^m)/(8*m + 8) + (x*x^m*exp(a*2i)*(c*x^n)^(b*2i))/(4*m + b*n*8i + 4) +
 (x*x^m*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(m*4i + 8*b*n + 4i) + (x*x^m*exp(a*4i
)*(c*x^n)^(b*4i))/(16*m + b*n*64i + 16) + (x*x^m*exp(-a*4i)/(c*x^n)^(b*4i)*
1i)/(m*16i + 64*b*n + 16i)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*cos(a+b*ln(c*x**n))**4,x)
```

```
[Out] Timed out
```

3.124 $\int x^m \cos^3\left(a+b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=201

$$\frac{(m+1)x^{m+1}\cos^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+(m+1)^2}+\frac{6b^2(m+1)n^2x^{m+1}\cos\left(a+b\log\left(cx^n\right)\right)}{\left(b^2n^2+(m+1)^2\right)\left(9b^2n^2+(m+1)^2\right)}+\frac{3bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)\cos^2(}{9b^2n^2+(m+1)^2}$$

```
[Out] 6*b^2*(1+m)*n^2*x^(1+m)*cos(a+b*ln(c*x^n))/((1+m)^2+b^2*n^2)/((1+m)^2+9*b^2
*n^2)+(1+m)*x^(1+m)*cos(a+b*ln(c*x^n))^3/((1+m)^2+9*b^2*n^2)+6*b^3*n^3*x^(1
+m)*sin(a+b*ln(c*x^n))/((1+m)^2+b^2*n^2)/((1+m)^2+9*b^2*n^2)+3*b*n*x^(1+m)*
cos(a+b*ln(c*x^n))^2*sin(a+b*ln(c*x^n))/((1+m)^2+9*b^2*n^2)
```

Rubi [A] time = 0.08, antiderivative size = 201, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 4486}

$$\frac{6b^3n^3x^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)}{\left(b^2n^2+(m+1)^2\right)\left(9b^2n^2+(m+1)^2\right)}+\frac{(m+1)x^{m+1}\cos^3\left(a+b\log\left(cx^n\right)\right)}{9b^2n^2+(m+1)^2}+\frac{6b^2(m+1)n^2x^{m+1}\cos\left(a+b\log(cx^n\right)}{\left(b^2n^2+(m+1)^2\right)\left(9b^2n^2+(m+1)^2\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (6*b^2*(1 + m)*n^2*x^(1 + m)*Cos[a + b*Log[c*x^n]])/(((1 + m)^2 + b^2*n^2)*
((1 + m)^2 + 9*b^2*n^2)) + ((1 + m)*x^(1 + m)*Cos[a + b*Log[c*x^n]]^3)/((1
+ m)^2 + 9*b^2*n^2) + (6*b^3*n^3*x^(1 + m)*Sin[a + b*Log[c*x^n]])/(((1 + m)
^2 + b^2*n^2)*((1 + m)^2 + 9*b^2*n^2)) + (3*b*n*x^(1 + m)*Cos[a + b*Log[c*x
^n]]^2*Sin[a + b*Log[c*x^n]])/((1 + m)^2 + 9*b^2*n^2)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
```

```
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^m \cos^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{(1+m)x^{1+m}\cos^3\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+9b^2n^2} + \frac{3bnx^{1+m}\cos^2\left(a+b\log\left(cx^n\right)\right)\sin\left(a+\right.}{(1+m)^2+9b^2n^2}$$

$$= \frac{6b^2(1+m)n^2x^{1+m}\cos\left(a+b\log\left(cx^n\right)\right)}{\left((1+m)^2+b^2n^2\right)\left((1+m)^2+9b^2n^2\right)} + \frac{(1+m)x^{1+m}\cos^3\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+9b^2n^2}$$

Mathematica [A] time = 1.94, size = 292, normalized size = 1.45

$$\frac{1}{4}x^{m+1}\left(-\frac{3\sin(bn\log(x))\left((m+1)\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)-bn\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)}{b^2n^2+m^2+2m+1}+\frac{3\,\cdots}{\cdots}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Cos[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^(1 + m)*((-3*Sin[b*n*Log[x]]*(-(b*n*Cos[a - b*n*Log[x] + b*Log[c*x^n]])
+ (1 + m)*Sin[a - b*n*Log[x] + b*Log[c*x^n]]))/(1 + 2*m + m^2 + b^2*n^2) +
(3*Cos[b*n*Log[x]]*((1 + m)*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + b*n*Sin[a
- b*n*Log[x] + b*Log[c*x^n]]))/(1 + 2*m + m^2 + b^2*n^2) - (Sin[3*b*n*Log[x
]]*(-3*b*n*Cos[3*(a - b*n*Log[x] + b*Log[c*x^n])] + (1 + m)*Sin[3*(a - b*n*
Log[x] + b*Log[c*x^n])]))/(1 + 2*m + m^2 + 9*b^2*n^2) + (Cos[3*b*n*Log[x]]*
((1 + m)*Cos[3*(a - b*n*Log[x] + b*Log[c*x^n])] + 3*b*n*Sin[3*(a - b*n*Log[
x] + b*Log[c*x^n])]))/(1 + 2*m + m^2 + 9*b^2*n^2)))/4
```

fricas [A] time = 0.69, size = 190, normalized size = 0.95

$$\frac{3\left(2\,b^3n^3x+\left(b^3n^3+\left(bm^2+2\,bm+b\right)n\right)x\cos\left(bn\log(x)+b\log(c)+a\right)^2\right)x^m\sin\left(bn\log(x)+b\log(c)+a\right)+\left(\cdots\right.}{9\,b^4n^4+m^4+4\,m^3+10\left(\cdots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*(2*b^3*n^3*x + (b^3*n^3 + (b*m^2 + 2*b*m + b)*n)*x*cos(b*n*log(x) + b*lo
g(c) + a)^2)*x^m*sin(b*n*log(x) + b*log(c) + a) + (6*(b^2*m + b^2)*n^2*x*co
s(b*n*log(x) + b*log(c) + a) + (m^3 + (b^2*m + b^2)*n^2 + 3*m^2 + 3*m + 1)*
```

```
x*cos(b*n*log(x) + b*log(c) + a)^3)*x^m)/(9*b^4*n^4 + m^4 + 4*m^3 + 10*(b^2
*m^2 + 2*b^2*m + b^2)*n^2 + 6*m^2 + 4*m + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^3,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int x^{m} \left(\cos^{3}\left(a + b \ln \left(c\, x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+b*ln(c*x^n))^3,x)
[Out] int(x^m*cos(a+b*ln(c*x^n))^3,x)
```

maxima [B] time = 0.51, size = 2352, normalized size = 11.70

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^3,x, algorithm="maxima")
[Out] 1/8*(((cos(6*b*log(c))*cos(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*log(c)) +
cos(3*b*log(c)))*m^3 + 3*(b^3*cos(3*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b
*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c)))*n^3 + 3*(cos(6*b*log(c))*co
s(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*log(c)) + cos(3*b*log(c)))*m^2 + (b
^2*cos(6*b*log(c))*cos(3*b*log(c)) + b^2*sin(6*b*log(c))*sin(3*b*log(c)) +
b^2*cos(3*b*log(c)) + (b^2*cos(6*b*log(c))*cos(3*b*log(c)) + b^2*sin(6*b*lo
g(c))*sin(3*b*log(c)) + b^2*cos(3*b*log(c)))*m)*n^2 + 3*(cos(6*b*log(c))*co
s(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*log(c)) + cos(3*b*log(c)))*m + 3*((
b*cos(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(3*b*log(c)) + b*s
in(3*b*log(c)))*m^2 + b*cos(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))
*sin(3*b*log(c)) + 2*(b*cos(3*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))
*sin(3*b*log(c)) + b*sin(3*b*log(c)))*m + b*sin(3*b*log(c)))*n + cos(6*b*lo
g(c))*cos(3*b*log(c)) + sin(6*b*log(c))*sin(3*b*log(c)) + cos(3*b*log(c)))*
x*x^m*cos(3*b*log(x^n) + 3*a) + 3*((cos(4*b*log(c))*cos(3*b*log(c)) + cos(3
*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)) + sin(3*b*log(
c))*sin(2*b*log(c)))*m^3 + 9*(b^3*cos(3*b*log(c))*sin(4*b*log(c)) - b^3*cos
```

```
(4*b*log(c))*sin(3*b*log(c)) + b^3*cos(2*b*log(c))*sin(3*b*log(c)) - b^3*co
s(3*b*log(c))*sin(2*b*log(c)))*n^3 + 3*(cos(4*b*log(c))*cos(3*b*log(c)) + c
os(3*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)) + sin(3*b*
log(c))*sin(2*b*log(c)))*m^2 + 9*(b^2*cos(4*b*log(c))*cos(3*b*log(c)) + b^2
*cos(3*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(3*b*log(c)) + b^
2*sin(3*b*log(c))*sin(2*b*log(c)) + (b^2*cos(4*b*log(c))*cos(3*b*log(c)) +
b^2*cos(3*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(3*b*log(c)) +
 b^2*sin(3*b*log(c))*sin(2*b*log(c)))*m)*n^2 + 3*(cos(4*b*log(c))*cos(3*b*l
og(c)) + cos(3*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c))
+ sin(3*b*log(c))*sin(2*b*log(c)))*m + ((b*cos(3*b*log(c))*sin(4*b*log(c))
- b*cos(4*b*log(c))*sin(3*b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b
*cos(3*b*log(c))*sin(2*b*log(c)))*m^2 + b*cos(3*b*log(c))*sin(4*b*log(c)) -
 b*cos(4*b*log(c))*sin(3*b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b*
cos(3*b*log(c))*sin(2*b*log(c)) + 2*(b*cos(3*b*log(c))*sin(4*b*log(c)) - b*
cos(4*b*log(c))*sin(3*b*log(c)) + b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos
(3*b*log(c))*sin(2*b*log(c)))*m)*n + cos(4*b*log(c))*cos(3*b*log(c)) + cos(
3*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)) + sin(3*b*log
(c))*sin(2*b*log(c)))*x*x^m*cos(b*log(x^n) + a) - ((cos(3*b*log(c))*sin(6*b
*log(c)) - cos(6*b*log(c))*sin(3*b*log(c)) + sin(3*b*log(c)))*m^3 - 3*(b^3*
cos(6*b*log(c))*cos(3*b*log(c)) + b^3*sin(6*b*log(c))*sin(3*b*log(c)) + b^3
*cos(3*b*log(c)))*n^3 + 3*(cos(3*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c)
)*sin(3*b*log(c)) + sin(3*b*log(c)))*m^2 + (b^2*cos(3*b*log(c))*sin(6*b*log
(c)) - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*sin(3*b*log(c)) + (b^2*cos
(3*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(3*b*log(c)) + b^2*si
n(3*b*log(c)))*m)*n^2 + 3*(cos(3*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c)
)*sin(3*b*log(c)) + sin(3*b*log(c)))*m - 3*((b*cos(6*b*log(c))*cos(3*b*log(
c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3*b*log(c)))*m^2 + b*cos(6*
b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + 2*(b*cos(6*
b*log(c))*cos(3*b*log(c)) + b*sin(6*b*log(c))*sin(3*b*log(c)) + b*cos(3*b*l
og(c)))*m + b*cos(3*b*log(c)))*n + cos(3*b*log(c))*sin(6*b*log(c)) - cos(6*
b*log(c))*sin(3*b*log(c)) + sin(3*b*log(c)))*x*x^m*sin(3*b*log(x^n) + 3*a)
- 3*((cos(3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b*log(c)) + c
os(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*m^3 - 9*(
b^3*cos(4*b*log(c))*cos(3*b*log(c)) + b^3*cos(3*b*log(c))*cos(2*b*log(c)) +
 b^3*sin(4*b*log(c))*sin(3*b*log(c)) + b^3*sin(3*b*log(c))*sin(2*b*log(c)))
*n^3 + 3*(cos(3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b*log(c))
 + cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*m^2 +
 9*(b^2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*log(c
)) + b^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*log(
c)) + (b^2*cos(3*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(3*b*lo
g(c)) + b^2*cos(2*b*log(c))*sin(3*b*log(c)) - b^2*cos(3*b*log(c))*sin(2*b*l
og(c)))*m)*n^2 + 3*(cos(3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3
*b*log(c)) + cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(
c)))*m - ((b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*lo
g(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c
```

```
)))*m^2 + b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log
(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)
) + 2*(b*cos(4*b*log(c))*cos(3*b*log(c)) + b*cos(3*b*log(c))*cos(2*b*log(c)
) + b*sin(4*b*log(c))*sin(3*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*
m)*n + cos(3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b*log(c)) +
cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*x*x^m*si
n(b*log(x^n) + a))/((cos(3*b*log(c))^2 + sin(3*b*log(c))^2)*m^4 + 9*(b^4*co
s(3*b*log(c))^2 + b^4*sin(3*b*log(c))^2)*n^4 + 4*(cos(3*b*log(c))^2 + sin(3
*b*log(c))^2)*m^3 + 6*(cos(3*b*log(c))^2 + sin(3*b*log(c))^2)*m^2 + 10*(b^2
*cos(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2 + (b^2*cos(3*b*log(c))^2 + b^2*s
in(3*b*log(c))^2)*m^2 + 2*(b^2*cos(3*b*log(c))^2 + b^2*sin(3*b*log(c))^2)*m
)*n^2 + 4*(cos(3*b*log(c))^2 + sin(3*b*log(c))^2)*m + cos(3*b*log(c))^2 + s
in(3*b*log(c))^2)
```

mupad [B] time = 3.53, size = 140, normalized size = 0.70

$$\frac{3\,x\,x^m\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{8\,m+8+b\,n\,8\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{-a\,1\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}\,3\mathrm{i}}{m\,8\mathrm{i}+8\,b\,n+8\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}{8\,m+8+b\,n\,24\mathrm{i}}+\frac{x\,x^m\,\mathrm{e}^{-a\,3\mathrm{i}}\,\frac{1}{{\left(c\,x^n\right)}^{b\,3\mathrm{i}}}\,1\mathrm{i}}{m\,8\mathrm{i}+24\,b\,n+8\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (3*x*x^m*exp(a*1i)*(c*x^n)^(b*1i))/(8*m + b*n*8i + 8) + (x*x^m*exp(-a*1i)/(
c*x^n)^(b*1i)*3i)/(m*8i + 8*b*n + 8i) + (x*x^m*exp(a*3i)*(c*x^n)^(b*3i))/(8
*m + b*n*24i + 8) + (x*x^m*exp(-a*3i)/(c*x^n)^(b*3i)*1i)/(m*8i + 24*b*n + 8
i)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.125 $\int x^m \cos^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=120

$$\frac{(m+1)x^{m+1}\cos^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+(m+1)^2}+\frac{2bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+(m+1)^2}+\frac{2b^2n^2x^{m+1}}{(m+1)\left(4b^2n^2+(m+\right.}$$

```
[Out] 2*b^2*n^2*x^(1+m)/(1+m)/((1+m)^2+4*b^2*n^2)+(1+m)*x^(1+m)*cos(a+b*ln(c*x^n)
)^2/((1+m)^2+4*b^2*n^2)+2*b*n*x^(1+m)*cos(a+b*ln(c*x^n))*sin(a+b*ln(c*x^n))
/((1+m)^2+4*b^2*n^2)
```

Rubi [A] time = 0.03, antiderivative size = 120, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {4488, 30}

$$\frac{(m+1)x^{m+1}\cos^2\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+(m+1)^2}+\frac{2bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)\cos\left(a+b\log\left(cx^n\right)\right)}{4b^2n^2+(m+1)^2}+\frac{2b^2n^2x^{m+1}}{(m+1)\left(4b^2n^2+(m+\right.}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (2*b^2*n^2*x^(1 + m))/((1 + m)*((1 + m)^2 + 4*b^2*n^2)) + ((1 + m)*x^(1 + m
)*Cos[a + b*Log[c*x^n]]^2)/((1 + m)^2 + 4*b^2*n^2) + (2*b*n*x^(1 + m)*Cos[a
 + b*Log[c*x^n]]*Sin[a + b*Log[c*x^n]])/((1 + m)^2 + 4*b^2*n^2)
```

Rule 30

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

Rule 4488

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.
), x_Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])]^p)/(b
^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x] + (Dist[(b^2*d^2*n^2*p*(p - 1))/(b^2*d^
2*n^2*p^2 + (m + 1)^2), Int[(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^(p - 2), x],
x] + Simp[(b*d*n*p*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n])]*Cos[d*(a + b*Log
[c*x^n])]^(p - 1))/(b^2*d^2*e*n^2*p^2 + e*(m + 1)^2), x]) /; FreeQ[{a, b, c
, d, e, m, n}, x] && IGtQ[p, 1] && NeQ[b^2*d^2*n^2*p^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^m \cos^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{(1+m)x^{1+m}\cos^2\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+4b^2n^2} + \frac{2bnx^{1+m}\cos\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\,\mathrm{l}\right.}{(1+m)^2+4b^2n^2}$$

$$= \frac{2b^2n^2x^{1+m}}{(1+m)\left((1+m)^2+4b^2n^2\right)} + \frac{(1+m)x^{1+m}\cos^2\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+4b^2n^2} + \frac{2bnx^{1+m}\,\mathrm{co}}{}$$

Mathematica [C] time = 0.34, size = 91, normalized size = 0.76

$$\frac{x^{m+1}\left(2b(m+1)n\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+(m+1)^2\cos\left(2\left(a+b\log\left(cx^n\right)\right)\right)+4b^2n^2+m^2+2m+1\right)}{2(m+1)(-2ibn+m+1)(2ibn+m+1)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Cos[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^(1 + m)*(1 + 2*m + m^2 + 4*b^2*n^2 + (1 + m)^2*Cos[2*(a + b*Log[c*x^n])]
 + 2*b*(1 + m)*n*Sin[2*(a + b*Log[c*x^n])]))/(2*(1 + m)*(1 + m - (2*I)*b*n)
*(1 + m + (2*I)*b*n))
```

fricas [A] time = 0.62, size = 105, normalized size = 0.88

$$\frac{2\,(bm+b)nxx^m\cos\left(bn\log(x)+b\log(c)+a\right)\sin\left(bn\log(x)+b\log(c)+a\right)+\left(2\,b^2n^2x+\left(m^2+2\,m+1\right)x\cos\left(b\right.\right.}{m^3+4\left(b^2m+b^2\right)n^2+3\,m^2+3\,m+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (2*(b*m + b)*n*x*x^m*cos(b*n*log(x) + b*log(c) + a)*sin(b*n*log(x) + b*log(
c) + a) + (2*b^2*n^2*x + (m^2 + 2*m + 1)*x*cos(b*n*log(x) + b*log(c) + a)^2
)*x^m)/(m^3 + 4*(b^2*m + b^2)*n^2 + 3*m^2 + 3*m + 1)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^{m} \left(\cos^{2}\left(a + b\ln\left(c\,x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(x^m*cos(a+b*ln(c*x^n))^2,x)
```

maxima [B] time = 0.40, size = 646, normalized size = 5.38

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*(((cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)) +
cos(2*b*log(c)))*m^2 + 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))
*sin(2*b*log(c)) + cos(2*b*log(c)))*m + 2*(b*cos(2*b*log(c))*sin(4*b*log(c)
) - b*cos(4*b*log(c))*sin(2*b*log(c)) + (b*cos(2*b*log(c))*sin(4*b*log(c))
- b*cos(4*b*log(c))*sin(2*b*log(c)) + b*sin(2*b*log(c)))*m + b*sin(2*b*log(
c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c))
+ cos(2*b*log(c)))*x*x^m*cos(2*b*log(x^n) + 2*a) - ((cos(2*b*log(c))*sin(4*
b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)) + sin(2*b*log(c)))*m^2 + 2*(cos
(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)) + sin(2*b*lo
g(c)))*m - 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b
*log(c)) + (b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*l
og(c)) + b*cos(2*b*log(c)))*m + b*cos(2*b*log(c)))*n + cos(2*b*log(c))*sin(
4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)) + sin(2*b*log(c)))*x*x^m*sin(
2*b*log(x^n) + 2*a) + 2*((cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*m^2 + 4*(b
^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2 + 2*(cos(2*b*log(c))^2 +
sin(2*b*log(c))^2)*m + cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*x*x^m)/((cos(
2*b*log(c))^2 + sin(2*b*log(c))^2)*m^3 + 3*(cos(2*b*log(c))^2 + sin(2*b*log
(c))^2)*m^2 + 4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2 + (b^2*cos(2
*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*m)*n^2 + 3*(cos(2*b*log(c))^2 + sin(2
*b*log(c))^2)*m + cos(2*b*log(c))^2 + sin(2*b*log(c))^2)
```

mupad [B] time = 2.79, size = 82, normalized size = 0.68

$$\frac{x\,x^{m}}{2\,m+2} + \frac{x\,x^{m}\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^{n}\right)}^{b\,2\mathrm{i}}}{4\,m+4+b\,n\,8\mathrm{i}} + \frac{x\,x^{m}\,\mathrm{e}^{-a\,2\mathrm{i}}\,\frac{1}{{\left(c\,x^{n}\right)}^{b\,2\mathrm{i}}}\,1\mathrm{i}}{m\,4\mathrm{i}+8\,b\,n+4\mathrm{i}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*x^m)/(2*m + 2) + (x*x^m*exp(a*2i)*(c*x^n)^(b*2i))/(4*m + b*n*8i + 4) + (
x*x^m*exp(-a*2i)/(c*x^n)^(b*2i)*1i)/(m*4i + 8*b*n + 4i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \log(x)\cos^2(a) \\ \int x^m \cos^2\left(-a + \frac{im\log(cx^n)}{2n} + \frac{i\log(cx^n)}{2n}\right)dx \\ \int x^m \cos^2\left(a + \frac{im\log(cx^n)}{2n} + \frac{i\log(cx^n)}{2n}\right)dx \\ \frac{\begin{cases} \log(x)\cos(2a) & \text{for } b = 0 \wedge (b = 0 \vee n = 0) \\ \log(x)\cos\left(2a + 2b\log(c)\right) & \text{for } n = 0 \\ \frac{\sin\left(2a+2bn\log(x)+2b\log(c)\right)}{2bn} & \text{otherwise} \end{cases}}{2} + \frac{\log(x)}{2} \\ \frac{2b^2n^2xx^m\sin^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2mn^2+4b^2n^2+m^3+3m^2+3m+1} + \frac{2b^2n^2xx^m\cos^2\left(a+bn\log(x)+b\log(c)\right)}{4b^2mn^2+4b^2n^2+m^3+3m^2+3m+1} + \frac{2bmnxx^m\sin\left(a+bn\log(x)+b\log(c)\right)\cos\left(a+bn\log(x)+b\log\right.}{4b^2mn^2+4b^2n^2+m^3+3m^2+3m+1} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*cos(a)**2, Eq(b, 0) & Eq(m, -1)), (Integral(x**m*cos(-a +
 I*m*log(c*x**n)/(2*n) + I*log(c*x**n)/(2*n))**2, x), Eq(b, -I*(m + 1)/(2*n
))), (Integral(x**m*cos(a + I*m*log(c*x**n)/(2*n) + I*log(c*x**n)/(2*n))**2
, x), Eq(b, I*(m + 1)/(2*n))), (Piecewise((log(x)*cos(2*a), Eq(b, 0) & (Eq(
b, 0) | Eq(n, 0))), (log(x)*cos(2*a + 2*b*log(c)), Eq(n, 0)), (sin(2*a + 2*
b*n*log(x) + 2*b*log(c))/(2*b*n), True))/2 + log(x)/2, Eq(m, -1)), (2*b**2*
n**2*x*x**m*sin(a + b*n*log(x) + b*log(c))**2/(4*b**2*m*n**2 + 4*b**2*n**2
+ m**3 + 3*m**2 + 3*m + 1) + 2*b**2*n**2*x*x**m*cos(a + b*n*log(x) + b*log(
c))**2/(4*b**2*m*n**2 + 4*b**2*n**2 + m**3 + 3*m**2 + 3*m + 1) + 2*b*m*n*x*
x**m*sin(a + b*n*log(x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*
m*n**2 + 4*b**2*n**2 + m**3 + 3*m**2 + 3*m + 1) + 2*b*n*x*x**m*sin(a + b*n*
log(x) + b*log(c))*cos(a + b*n*log(x) + b*log(c))/(4*b**2*m*n**2 + 4*b**2*n
**2 + m**3 + 3*m**2 + 3*m + 1) + m**2*x*x**m*cos(a + b*n*log(x) + b*log(c))
**2/(4*b**2*m*n**2 + 4*b**2*n**2 + m**3 + 3*m**2 + 3*m + 1) + 2*m*x*x**m*co
s(a + b*n*log(x) + b*log(c))**2/(4*b**2*m*n**2 + 4*b**2*n**2 + m**3 + 3*m**
2 + 3*m + 1) + x*x**m*cos(a + b*n*log(x) + b*log(c))**2/(4*b**2*m*n**2 + 4*
b**2*n**2 + m**3 + 3*m**2 + 3*m + 1), True))
```

3.126 $\int x^m \cos\left(a + b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=70

$$\frac{bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+(m+1)^2}+\frac{(m+1)x^{m+1}\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+(m+1)^2}$$

```
[Out] (1+m)*x^(1+m)*cos(a+b*ln(c*x^n))/((1+m)^2+b^2*n^2)+b*n*x^(1+m)*sin(a+b*ln(c
*x^n))/((1+m)^2+b^2*n^2)
```

Rubi [A] time = 0.02, antiderivative size = 70, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {4486}

$$\frac{bnx^{m+1}\sin\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+(m+1)^2}+\frac{(m+1)x^{m+1}\cos\left(a+b\log\left(cx^n\right)\right)}{b^2n^2+(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + b*Log[c*x^n]],x]
```

```
[Out] ((1 + m)*x^(1 + m)*Cos[a + b*Log[c*x^n]])/((1 + m)^2 + b^2*n^2) + (b*n*x^(1
 + m)*Sin[a + b*Log[c*x^n]])/((1 + m)^2 + b^2*n^2)
```

Rule 4486

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*((e_.)*(x_))^(m_.), x_
Symbol] :> Simp[((m + 1)*(e*x)^(m + 1)*Cos[d*(a + b*Log[c*x^n])])/(b^2*d^2*
e*n^2 + e*(m + 1)^2), x] + Simp[(b*d*n*(e*x)^(m + 1)*Sin[d*(a + b*Log[c*x^n
])])/(b^2*d^2*e*n^2 + e*(m + 1)^2), x] /; FreeQ[{a, b, c, d, e, m, n}, x] &
& NeQ[b^2*d^2*n^2 + (m + 1)^2, 0]
```

Rubi steps

$$\int x^m \cos\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{(1+m)x^{1+m}\cos\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+b^2n^2}+\frac{bnx^{1+m}\sin\left(a+b\log\left(cx^n\right)\right)}{(1+m)^2+b^2n^2}$$

Mathematica [A] time = 0.15, size = 53, normalized size = 0.76

$$\frac{x^{m+1}\left((m+1)\cos\left(a+b\log\left(cx^n\right)\right)+bn\sin\left(a+b\log\left(cx^n\right)\right)\right)}{b^2n^2+m^2+2m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Cos[a + b*Log[c*x^n]],x]
```

```
[Out] (x^(1 + m)*((1 + m)*Cos[a + b*Log[c*x^n]] + b*n*Sin[a + b*Log[c*x^n]]))/(1
+ 2*m + m^2 + b^2*n^2)
```

fricas [A] time = 0.55, size = 58, normalized size = 0.83

$$\frac{bnxx^m \sin\left(bn\log(x) + b\log(c) + a\right) + (m+1)xx^m \cos\left(bn\log(x) + b\log(c) + a\right)}{b^2n^2 + m^2 + 2m + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b*n*x*x^m*sin(b*n*log(x) + b*log(c) + a) + (m + 1)*x*x^m*cos(b*n*log(x) +
b*log(c) + a))/(b^2*n^2 + m^2 + 2*m + 1)
```

giac [B] time = 3.02, size = 5162, normalized size = 73.74

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(2*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) -
 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(
x) - 1/4*pi*m)^2*tan(1/2*a) + 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*
pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(ab
s(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a) - 2*b*n*x*abs(x)^m*e^
(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*l
og(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a
)^2 + 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c)
 + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sg
n(x) - 1/4*pi*m)*tan(1/2*a)^2 + 2*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2
*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(a
bs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 + 2*b*n*x*abs(x)^m*e
^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n
*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2
*a)^2 - m*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) -
1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x
) - 1/4*pi*m)^2*tan(1/2*a)^2 - m*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*
b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c
)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 - x*abs(x)^m*e^(1/2*pi
*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(
```

```
x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 -
 x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b
)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*
pi*m)^2*tan(1/2*a)^2 + 2*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n +
 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2
*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) +
 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*l
og(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - 2*b*n*x*abs(x)^m*e^(1/2*pi*
b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x
)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 - 2*b*n*x*abs(x)^
m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*
b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + m*
x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*
tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi
*m)^2 + m*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) +
 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(
x) - 1/4*pi*m)^2 - 2*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2
*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan
(1/2*a) - 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sg
n(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)
+ 8*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/
2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) -
1/4*pi*m)*tan(1/2*a) - 8*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n
- 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*
tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a) - 4*m*x*abs(x)^m*e^(1/2*pi*b*n*s
gn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a) + 4*m*x*abs
(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(
1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*
tan(1/2*a) - 2*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*
sgn(c) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a) - 2*b*n*x*a
bs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*ta
n(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a) + 4*m*x*abs(x)^m*e^(1/2*pi*b*n*s
gn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) +
1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a) + 4*m*x*abs
(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(
1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*
tan(1/2*a) - 2*b*n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*
sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^
2 - 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) +
 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a)^2 + m*x*
abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*ta
n(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + m*x*abs(x)^m*e^
(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*
log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + 2*b*n*x*abs(x)^m*e^(1/2*p
```

```
i*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x)
 - 1/4*pi*m)*tan(1/2*a)^2 - 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi
*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*
a)^2 - 4*m*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) -
 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x)
 - 1/4*pi*m)*tan(1/2*a)^2 + 4*m*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b
*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)
))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a)^2 + m*x*abs(x)^m*e^(1/2*pi*b*
n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1
/4*pi*m)^2*tan(1/2*a)^2 + m*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n -
 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2
 + x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*
b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4
*pi*m)^2 + x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c)
+ 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn
(x) - 1/4*pi*m)^2 - 4*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi
*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/
4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a) + 4*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) +
 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*l
og(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a) + 4*x*abs(x)^m*e^(
1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*lo
g(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)
 + 4*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*
pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/
4*pi*m)^2*tan(1/2*a) + x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*p
i*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1
/2*a)^2 + x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) +
 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 - 4*
x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*
tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m
)*tan(1/2*a)^2 + 4*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b
*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi
*m*sgn(x) - 1/4*pi*m)*tan(1/2*a)^2 + x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*
pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(
1/2*a)^2 + x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c)
+ 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 + 2*b*n*x*abs(x)
^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*
b*n*log(abs(x)) + 1/2*b*log(abs(c))) + 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(
x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2
*b*log(abs(c))) - m*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b
*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 - m*x*ab
s(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan
(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 - 2*b*n*x*abs(x)^m*e^(1/2*pi*b*
n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1
/4*pi*m) + 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*s
```

```
gn(c) + 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) + 4*m*x*abs(x)^m*e^(1/2*p
i*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs
(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - 4*m*x*abs(x)^m*
e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*
n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi*m*sgn(x) - 1/4*pi*m) - m*x*ab
s(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(
1/4*pi*m*sgn(x) - 1/4*pi*m)^2 - m*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi
*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + 2*b*
n*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b
)*tan(1/2*a) + 2*b*n*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi
*b*sgn(c) + 1/2*pi*b)*tan(1/2*a) - 4*m*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/
2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(
abs(c)))*tan(1/2*a) - 4*m*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1
/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan
(1/2*a) + 4*m*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c
) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a) - 4*m*x*abs(x)^m*e
^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/4*pi*
m*sgn(x) - 1/4*pi*m)*tan(1/2*a) - m*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*p
i*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*a)^2 - m*x*abs(x)^m*e^(-1/2*pi*
b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 - x*abs(
x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/
2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 - x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x)
 + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b
*log(abs(c)))^2 + 4*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b
*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/4*pi
*m*sgn(x) - 1/4*pi*m) - 4*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1
/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan
(1/4*pi*m*sgn(x) - 1/4*pi*m) - x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n
 + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 - x*abs(x)
^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/4
*pi*m*sgn(x) - 1/4*pi*m)^2 - 4*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n
 + 1/2*pi*b*sgn(c) - 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))
*tan(1/2*a) - 4*x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sg
n(c) + 1/2*pi*b)*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))*tan(1/2*a) +
4*x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b
)*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)*tan(1/2*a) - 4*x*abs(x)^m*e^(-1/2*pi*b*n*
sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/4*pi*m*sgn(x) - 1/4
*pi*m)*tan(1/2*a) - x*abs(x)^m*e^(1/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b
*sgn(c) - 1/2*pi*b)*tan(1/2*a)^2 - x*abs(x)^m*e^(-1/2*pi*b*n*sgn(x) + 1/2*p
i*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b)*tan(1/2*a)^2 + m*x*abs(x)^m*e^(1/2*pi*b
*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b) + m*x*abs(x)^m*e^(-1/2
*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b) + x*abs(x)^m*e^(1
/2*pi*b*n*sgn(x) - 1/2*pi*b*n + 1/2*pi*b*sgn(c) - 1/2*pi*b) + x*abs(x)^m*e^
(-1/2*pi*b*n*sgn(x) + 1/2*pi*b*n - 1/2*pi*b*sgn(c) + 1/2*pi*b))/(b^2*n^2*ta
n(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m
```

```
)^2*tan(1/2*a)^2 + b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*t
an(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + b^2*n^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*
log(abs(c)))^2*tan(1/2*a)^2 + b^2*n^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan
(1/2*a)^2 + m^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*m
*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 + 2*m*tan(1/2*b*n*log(abs(x)) + 1/2*b*lo
g(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 + b^2*n^2*tan(1
/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + b^2*n^2*tan(1/4*pi*m*sgn(x) - 1
/4*pi*m)^2 + m^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*
m*sgn(x) - 1/4*pi*m)^2 + b^2*n^2*tan(1/2*a)^2 + m^2*tan(1/2*b*n*log(abs(x))
 + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + m^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^
2*tan(1/2*a)^2 + tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/4*pi*
m*sgn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 + 2*m*tan(1/2*b*n*log(abs(x)) + 1/2*b*l
og(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + 2*m*tan(1/2*b*n*log(abs(x
)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + 2*m*tan(1/4*pi*m*sgn(x) - 1/4*pi*m
)^2*tan(1/2*a)^2 + b^2*n^2 + m^2*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)
))^2 + m^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + tan(1/2*b*n*log(abs(x)) + 1/
2*b*log(abs(c)))^2*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + m^2*tan(1/2*a)^2 + t
an(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2*tan(1/2*a)^2 + tan(1/4*pi*m*s
gn(x) - 1/4*pi*m)^2*tan(1/2*a)^2 + 2*m*tan(1/2*b*n*log(abs(x)) + 1/2*b*log(
abs(c)))^2 + 2*m*tan(1/4*pi*m*sgn(x) - 1/4*pi*m)^2 + 2*m*tan(1/2*a)^2 + m^2
 + tan(1/2*b*n*log(abs(x)) + 1/2*b*log(abs(c)))^2 + tan(1/4*pi*m*sgn(x) - 1
/4*pi*m)^2 + tan(1/2*a)^2 + 2*m + 1)
```

maple [F] time = 0.03, size = 0, normalized size = 0.00

$$\int x^{m} \cos \left(a + b \ln \left(c\, x^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+b*ln(c*x^n)),x)
```

```
[Out] int(x^m*cos(a+b*ln(c*x^n)),x)
```

maxima [B] time = 0.37, size = 313, normalized size = 4.47

$$\frac{\left(\left(\cos\left(2\, b \log(c)\right) \cos\left(b \log(c)\right) + \sin\left(2\, b \log(c)\right) \sin\left(b \log(c)\right) + \cos\left(b \log(c)\right)\right) m + \left(b \cos\left(b \log(c)\right) \sin\left(2\, b \log\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(((cos(2*b*log(c))*cos(b*log(c)) + sin(2*b*log(c))*sin(b*log(c)) + cos(
b*log(c)))*m + (b*cos(b*log(c))*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*l
og(c)) + b*sin(b*log(c)))*n + cos(2*b*log(c))*cos(b*log(c)) + sin(2*b*log(c
```

```
))*sin(b*log(c)) + cos(b*log(c)))*x*x^m*cos(b*log(x^n) + a) - ((cos(b*log(c
))*sin(2*b*log(c)) - cos(2*b*log(c))*sin(b*log(c)) + sin(b*log(c)))*m - (b*
cos(2*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)) + b*cos(b*l
og(c)))*n + cos(b*log(c))*sin(2*b*log(c)) - cos(2*b*log(c))*sin(b*log(c)) +
 sin(b*log(c)))*x*x^m*sin(b*log(x^n) + a))/((cos(b*log(c))^2 + sin(b*log(c)
)^2)*m^2 + (b^2*cos(b*log(c))^2 + b^2*sin(b*log(c))^2)*n^2 + 2*(cos(b*log(c
))^2 + sin(b*log(c))^2)*m + cos(b*log(c))^2 + sin(b*log(c))^2)
```

mupad [B] time = 2.67, size = 70, normalized size = 1.00

$$\frac{x\,x^m\,e^{a\,1i}\,(c\,x^n)^{b\,1i}}{2\,m+2+b\,n\,2i}+\frac{x\,x^m\,e^{-a\,1i}\,\frac{1}{(c\,x^n)^{b\,1i}}\,1i}{m\,2i+2\,b\,n+2i}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (x*x^m*exp(a*1i)*(c*x^n)^(b*1i))/(2*m + b*n*2i + 2) + (x*x^m*exp(-a*1i)/(c*
x^n)^(b*1i)*1i)/(m*2i + 2*b*n + 2i)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\begin{cases} \log(x)\cos(a) & \text{for}\ b=0\wedge m=-1 \\ \int x^m\cos\left(-a+\frac{im\log(cx^n)}{n}+\frac{i\log(cx^n)}{n}\right)dx & \text{for}\ b=-\frac{i(m+1)}{n} \\ \int x^m\cos\left(a+\frac{im\log(cx^n)}{n}+\frac{i\log(cx^n)}{n}\right)dx & \text{for}\ b=\frac{i(m+1)}{n} \\ \frac{bnxx^m\sin\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+m^2+2m+1}+\frac{mxx^m\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+m^2+2m+1}+\frac{xx^m\cos\left(a+bn\log(x)+b\log(c)\right)}{b^2n^2+m^2+2m+1} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*cos(a), Eq(b, 0) & Eq(m, -1)), (Integral(x**m*cos(-a + I*
m*log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, -I*(m + 1)/n)), (Integral(x**
m*cos(a + I*m*log(c*x**n)/n + I*log(c*x**n)/n), x), Eq(b, I*(m + 1)/n)), (b
*n*x*x**m*sin(a + b*n*log(x) + b*log(c))/(b**2*n**2 + m**2 + 2*m + 1) + m*x
*x**m*cos(a + b*n*log(x) + b*log(c))/(b**2*n**2 + m**2 + 2*m + 1) + x*x**m*
cos(a + b*n*log(x) + b*log(c))/(b**2*n**2 + m**2 + 2*m + 1), True))
```

3.127 $\int x^m \cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{3}{2},-\frac{2im+3bn+2i}{4bn};-\frac{2im-bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(-3ibn+2m+2\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

```
[Out] 2*x^(1+m)*cos(a+b*ln(c*x^n))^(3/2)*hypergeom([-3/2, 1/4*(-2*I-2*I*m-3*b*n)/
b/n],[1/4*(-2*I-2*I*m+b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2+2*m-3*I*b*n
)/(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4494, 4492, 364}

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bn}-3\right);-\frac{2im-bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{\left(-3ibn+2m+2\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Cos[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*Cos[a + b*Log[c*x^n]]^(3/2)*Hypergeometric2F1[-3/2, (-3 - ((2*
I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - b*n)/(4*b*n), -(E^((2*I)*a)*(c*x^n)
^((2*I)*b))])/((2 + 2*m - (3*I)*b*n)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3
/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\cos^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{\frac{3ib}{2}-\frac{1+m}{n}}\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1+m}{n}}\left(1+e^{2ia}x^{2ib}\right)^{3}\right.}{n\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

$$= \frac{2x^{1+m}\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-bn}{4bn};-e^{2ia}\left(cx^n\right.\right.}{(2+2m-3ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}}$$

Mathematica [A] time = 2.03, size = 204, normalized size = 1.57

$$\frac{x^{m+1}\left(6b^2n^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,-\frac{2im-3bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+(ibn+2m+2)\left(4(m+1)\cos^2\right.\right.}{(ibn+2m+2)(-3ibn+2m+2)(3ibn+2m+2)\sqrt{\cos\left(a+b\log\left(c\right.\right.}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Cos[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (x^(1 + m)*(6*b^2*n^2*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1
[1, -1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), -1/4*(2*I + (2*I)*m - 5*b*n)/(b*n),
 -E^((2*I)*(a + b*Log[c*x^n]))] + (2 + 2*m + I*b*n)*(4*(1 + m)*Cos[a + b*Lo
g[c*x^n]]^2 + 3*b*n*Sin[2*(a + b*Log[c*x^n])])))/((2 + 2*m + I*b*n)*(2 + 2*
m - (3*I)*b*n)*(2 + 2*m + (3*I)*b*n)*Sqrt[Cos[a + b*Log[c*x^n]]])
```

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^m*cos(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^m*cos(b*log(c*x^n) + a)^(3/2), x)
```

maple [F] time = 0.07, size = 0, normalized size = 0.00

$$\int x^m \left(\cos^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(x^m*cos(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*cos(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^m\,{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a + b*log(c*x^n))^(3/2),x)
```

```
[Out] int(x^m*cos(a + b*log(c*x^n))^(3/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*cos(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Timed out
```

3.128 $\int x^m \sqrt{\cos \left(a+b \log \left(c x^n\right)\right)} \, dx$

Optimal. Leaf size=129

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{1}{2},-\frac{2im+bn+2i}{4bn};-\frac{2im-3bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{(-ibn+2m+2)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}}$$

```
[Out] 2*x^(1+m)*hypergeom([-1/2, 1/4*(-2*I-2*I*m-b*n)/b/n],[1/4*(-2*I-2*I*m+3*b*n
)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*cos(a+b*ln(c*x^n))^(1/2)/(2+2*m-I*b*n)/
(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4494, 4492, 364}

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bn}-1\right);-\frac{2im-3bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}{(-ibn+2m+2)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^(1 + m)*Sqrt[Cos[a + b*Log[c*x^n]]]*Hypergeometric2F1[-1/2, (-1 - ((2*
I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - 3*b*n)/(4*b*n), -(E^((2*I)*a)*(c*x^
n)^((2*I)*b))])/((2 + 2*m - I*b*n)*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sqrt{\cos(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{\frac{ib}{2}-\frac{1+m}{n}}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1+m}{n}}\sqrt{1+e^{2ia}x^{2ib}}\right.}{n\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}}$$

$$= \frac{2x^{1+m}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-3bn}{4bn};-e^{2ia}\left(cx\right.\right.}{(2+2m-ibn)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}}$$

Mathematica [B] time = 5.37, size = 436, normalized size = 3.38

$$\frac{2x^{m+1}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}{2(m+1)\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)-bn\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}-\frac{2e^{ia}bnx^{m+1}\left(cx^n\right)^{ib}\sqrt{2+2e^{2ia}\left(\right.}}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (-2*b*E^(I*a)*n*x^(1 + m)*(c*x^n)^(I*b)*Sqrt[2 + 2*E^((2*I)*a)*(c*x^n)^((2*
I)*b)]*((2*I + (2*I)*m + b*n)*x^((2*I)*b*n)*Hypergeometric2F1[1/2, ((-1/2*I
)*(1 + m + ((3*I)/2)*b*n))/(b*n), -1/4*(2*I + (2*I)*m - 7*b*n)/(b*n), -(E^(
(2*I)*a)*(c*x^n)^((2*I)*b))] + (-2*I - (2*I)*m + 3*b*n)*Hypergeometric2F1[1
/2, -1/4*(2*I + (2*I)*m + b*n)/(b*n), -1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), -
(E^((2*I)*a)*(c*x^n)^((2*I)*b))]))/((2 + 2*m - I*b*n)*(2 + 2*m + (3*I)*b*n)
*Sqrt[1/(E^(I*a)*(c*x^n)^(I*b)) + E^(I*a)*(c*x^n)^(I*b)]*((2 + 2*m - I*b*n)
*x^((2*I)*b*n) + E^((2*I)*a)*(2 + 2*m + I*b*n)*(c*x^n)^((2*I)*b))) + (2*x^(
1 + m)*Sqrt[Cos[a + b*Log[c*x^n]]]*Cos[a - b*n*Log[x] + b*Log[c*x^n]])/(2*(
1 + m)*Cos[a - b*n*Log[x] + b*Log[c*x^n]] - b*n*Sin[a - b*n*Log[x] + b*Log[
c*x^n]])
```

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^m*cos(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sqrt{\cos\left(b \log\left(cx^n\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*cos(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^m*sqrt(cos(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int x^m \left(\sqrt{\cos}\ \left(a + b\ln\left(c\, x^n\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(x^m*cos(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sqrt{\cos\left(b \log\left(cx^n\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^m*sqrt(cos(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^m\, \sqrt{\cos\left(a + b\ \ln\left(c\, x^n\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*cos(a + b*log(c*x^n))^(1/2),x)
[Out] int(x^m*cos(a + b*log(c*x^n))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sqrt{\cos\left(a + b\log\left(cx^n\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*cos(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(x**m*sqrt(cos(a + b*log(c*x**n))), x)
```

3.129 $\int \frac{x^m}{\sqrt{\cos(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\ {}_2F_1\left(\frac{1}{2},-\frac{2im-bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(ibn+2m+2)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*x^(1+m)*hypergeom([1/2, 1/4*(-2*I-2*I*m+b*n)/b/n],[1/4*(-2*I-2*I*m+5*b*n)
/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)/(2+
2*m+I*b*n)/cos(a+b*ln(c*x^n))^(1/2)
```

Rubi [A] time = 0.09, antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4494, 4492, 364}

$$\frac{2x^{m+1}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\ {}_2F_1\left(\frac{1}{2},-\frac{2im-bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(ibn+2m+2)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^(1 + m)*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2,
 -(2*I + (2*I)*m - b*n)/(4*b*n), -(2*I + (2*I)*m - 5*b*n)/(4*b*n), -(E^((2*
I)*a)*(c*x^n)^((2*I)*b))])/((2 + 2*m + I*b*n)*Sqrt[Cos[a + b*Log[c*x^n]]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\sqrt{\cos(a+b\log(x))}}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{ib}{2}-\frac{1+m}{n}}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{ib}{2}+\frac{1+m}{n}}}{\sqrt{1+e^{2ia}x^{2ib}}}\,dx, x, cx^n\right)}{n\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

$$= \frac{2x^{1+m}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2}, -\frac{2i+2im-bn}{4bn}; -\frac{2i+2im-5bn}{4bn}; -e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+2m+ibn)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [A] time = 0.58, size = 119, normalized size = 0.92

$$\frac{2x^{m+1}\left(1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1, -\frac{2im-3bn+2i}{4bn}; -\frac{2im-5bn+2i}{4bn}; -e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{(ibn+2m+2)\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Sqrt[Cos[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*(1 + E^((2*I)*(a + b*Log[c*x^n])))*x^(1 + m)*Hypergeometric2F1[1, -1/4*(
2*I + (2*I)*m - 3*b*n)/(b*n), -1/4*(2*I + (2*I)*m - 5*b*n)/(b*n), -E^((2*I)
*(a + b*Log[c*x^n]))])/((2 + 2*m + I*b*n)*Sqrt[Cos[a + b*Log[c*x^n]]])
```

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^m/cos(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)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\cos\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/cos(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/sqrt(cos(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\cos\left(a+b\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(x^m/cos(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\cos\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^m/sqrt(cos(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\sqrt{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + b*log(c*x^n))^(1/2),x)
```

```
[Out] int(x^m/cos(a + b*log(c*x^n))^(1/2), x)
```

<u>**sympy**</u> **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\cos\left(a + b\log\left(cx^n\right)\right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/cos(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(x**m/sqrt(cos(a + b*log(c*x**n))), x)
```

3.130 $\int \frac{x^m}{\cos^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},-\frac{2im-3bn+2i}{4bn};-\frac{2im-7bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(3ibn+2m+2)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x^(1+m)*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*hypergeom([3/2, 1/4*(-2*I-2*
I*m+3*b*n)/b/n],[1/4*(-2*I-2*I*m+7*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(
2+2*m+3*I*b*n)/cos(a+b*ln(c*x^n))^(3/2)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4494, 4492, 364}

$$\frac{2x^{m+1}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(m+1)}{bn}\right);-\frac{2im-7bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(3ibn+2m+2)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Cos[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Hypergeometric2F1[3/
2, (3 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - 7*b*n)/(4*b*n), -(E^((2
*I)*a)*(c*x^n)^((2*I)*b))])/((2 + 2*m + (3*I)*b*n)*Cos[a + b*Log[c*x^n]]^(3
/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\cos^{\frac{3}{2}}(a+b\log(x))}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1+m}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{3ib}{2}+\frac{1+m}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^{3/2}}\,dx, x, cx^n\right)}{n\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x^{1+m}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-7bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+2m+3ibn)\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [B] time = 5.20, size = 487, normalized size = 3.75

$$-\frac{x^{-ibn+m+1}\left(\left(b^2n^2+4m^2+8m+4\right)x^{2ibn}\sqrt{2+2e^{2ia}\left(cx^n\right)^{2ib}}\;{}_2F_1\left(\frac{1}{2},-\frac{i\left(m+\frac{3ibn}{2}+1\right)}{2bn};-\frac{2im-7bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\text{c}}\cdots\right.}{bn(3bn-2im-2\cdots}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Cos[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] -((x^(1 + m - I*b*n)*((4 + 8*m + 4*m^2 + b^2*n^2)*x^((2*I)*b*n)*Sqrt[2 + 2*
E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Cos[a + b*Log[c*x^n]]]*Hypergeometric2F
1[1/2, ((-1/2*I)*(1 + m + ((3*I)/2)*b*n))/(b*n), -1/4*(2*I + (2*I)*m - 7*b*
n)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))] + (-2*I - (2*I)*m + 3*b*n)*((-2
*I - (2*I)*m + b*n)*Sqrt[2 + 2*E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Cos[a +
b*Log[c*x^n]]]*Hypergeometric2F1[1/2, -1/4*(2*I + (2*I)*m + b*n)/(b*n), -1/
4*(2*I + (2*I)*m - 3*b*n)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))] - 2*x^(I
*b*n)*Sqrt[1/(E^(I*a)*(c*x^n)^(I*b)) + E^(I*a)*(c*x^n)^(I*b)]*(b*n*Cos[b*n*
```

```
Log[x]] - 2*(1 + m)*Sin[b*n*Log[x]]])))/(b*n*(-2*I - (2*I)*m + 3*b*n)*Sqrt[
1/(E^(I*a)*(c*x^n)^(I*b)) + E^(I*a)*(c*x^n)^(I*b)]*Sqrt[Cos[a + b*Log[c*x^n
]]]*(-2*(1 + m)*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + b*n*Sin[a - b*n*Log[x]
 + b*Log[c*x^n]])))
```

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^m/cos(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/cos(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/cos(b*log(c*x^n) + a)^(3/2), x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(x^m/cos(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/cos(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/cos(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + b*log(c*x^n))^(3/2),x)
```

```
[Out] int(x^m/cos(a + b*log(c*x^n))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/cos(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(x**m/cos(a + b*log(c*x**n))**(3/2), x)
```

3.131 $\int \frac{x^m}{\cos^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},-\frac{2im-5bn+2i}{4bn};-\frac{2im-9bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(5ibn+2m+2)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x^(1+m)*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*hypergeom([5/2, 1/4*(-2*I-2*
I*m+5*b*n)/b/n],[1/4*(-2*I-2*I*m+9*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(
2+2*m+5*I*b*n)/cos(a+b*ln(c*x^n))^(5/2)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4494, 4492, 364}

$$\frac{2x^{m+1}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(m+1)}{bn}\right);-\frac{2im-9bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(5ibn+2m+2)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Cos[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 + m)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Hypergeometric2F1[5/
2, (5 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - 9*b*n)/(4*b*n), -(E^((2
*I)*a)*(c*x^n)^((2*I)*b))])/((2 + 2*m + (5*I)*b*n)*Cos[a + b*Log[c*x^n]]^(5
/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\cos^{\frac{5}{2}}(a+b\log(x))}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1+m}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}+\frac{1+m}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^{5/2}}\,dx, x, cx^n\right)}{n\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x^{1+m}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-9bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+2m+5ibn)\cos^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 2.25, size = 205, normalized size = 1.58

$$\frac{2x^{m+1}\left((-ibn+2m+2)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)\cos\left(a+b\log\left(cx^n\right)\right){}_2F_1\left(1,-\frac{2im-3bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{3b^2n^2 \cdots}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Cos[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 + m)*((2 + 2*m - I*b*n)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Cos[a +
 b*Log[c*x^n]]*Hypergeometric2F1[1, -1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), -1/
4*(2*I + (2*I)*m - 5*b*n)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + b*n*Sec[a
 - b*n*Log[x] + b*Log[c*x^n]]*Sin[b*n*Log[x]] + Cos[a + b*Log[c*x^n]]*(-2*(
1 + m) + b*n*Tan[a - b*n*Log[x] + b*Log[c*x^n]])))/(3*b^2*n^2*Cos[a + b*Log
[c*x^n]]^(3/2))
```

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^m/cos(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/cos(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/cos(b*log(c*x^n) + a)^(5/2), x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(x^m/cos(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\cos\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/cos(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/cos(b*log(c*x^n) + a)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + b*log(c*x^n))^(5/2),x)
```

```
[Out] int(x^m/cos(a + b*log(c*x^n))^(5/2), x)
```

sympy **[F(-1)]** time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/cos(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.132 $\int (ex)^m \cos^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=144

$$\frac{(ex)^{m+1}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\,{}_2F_1\left(-p,-\frac{im+bdnp+i}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}-p+2\right);-e^{2iad}\left(cx^n\right)^{2ibd}\right)\cos^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(-ibdnp+m+1)}$$

```
[Out] (e*x)^(1+m)*cos(d*(a+b*ln(c*x^n)))^p*hypergeom([-p, 1/2*(-I-I*m-b*d*n*p)/b/
d/n],[1-1/2*I*(1+m)/b/d/n-1/2*p],-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/e/(1+m-I*
b*d*n*p)/((1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p)
```

Rubi [A] time = 0.10, antiderivative size = 144, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4494, 4492, 364}

$$\frac{(ex)^{m+1}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\,{}_2F_1\left(-p,-\frac{im+bdnp+i}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}-p+2\right);-e^{2iad}\left(cx^n\right)^{2ibd}\right)\cos^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(-ibdnp+m+1)}$$

Antiderivative was successfully verified.

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

```
[Out] ((e*x)^(1 + m)*Cos[d*(a + b*Log[c*x^n])]^p*Hypergeometric2F1[-p, -(I + I*m
+ b*d*n*p)/(2*b*d*n), (2 - (I*(1 + m))/(b*d*n) - p)/2, -(E^((2*I)*a*d)*(c*x
^n)^((2*I)*b*d))])/(e*(1 + m - I*b*d*n*p)*(1 + E^((2*I)*a*d)*(c*x^n)^((2*I)
*b*d))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \cos^p \left(d \left(a + b \log (cx^n)\right)\right) dx = \frac{\left((ex)^{1+m} (cx^n)^{-\frac{1+m}{n}}\right) \text{Subst}\left(\int x^{-1+\frac{1+m}{n}} \cos^p(d(a + b\log(x)))\, dx, x, cx^n\right)}{en}$$

$$= \frac{\left((ex)^{1+m} (cx^n)^{-\frac{1+m}{n}+ibdp} \left(1 + e^{2iad} (cx^n)^{2ibd}\right)^{-p} \cos^p \left(d \left(a + b \log (cx^n)\right)\right)\right)}{en}$$

$$= \frac{(ex)^{1+m} \left(1 + e^{2iad} (cx^n)^{2ibd}\right)^{-p} \cos^p \left(d \left(a + b \log (cx^n)\right)\right) {}_2F_1 \left(-p, -\frac{i+im+b}{2bdn}\right.}{e(1 + m - ibdnp)}$$

Mathematica [A] time = 1.02, size = 123, normalized size = 0.85

$$\frac{x(ex)^m \left(1 + e^{2id\left(a+b\log(cx^n)\right)}\right) \cos^p \left(d \left(a + b \log (cx^n)\right)\right) {}_2F_1 \left(1, \frac{1}{2} \left(-\frac{i(m+1)}{bdn} + p + 2\right); -\frac{i(m+1)}{2bdn} - \frac{p}{2} + 1; -e^{2id\left(a+b\log(cx\right.}\right.}{-ibdnp + m + 1}$$

Warning: Unable to verify antiderivative.

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

```
[Out] ((1 + E^((2*I)*d*(a + b*Log[c*x^n])))*x*(e*x)^m*Cos[d*(a + b*Log[c*x^n])]^p
*Hypergeometric2F1[1, (2 - (I*(1 + m))/(b*d*n) + p)/2, 1 - ((I/2)*(1 + m))/
(b*d*n) - p/2, -E^((2*I)*d*(a + b*Log[c*x^n]))])/(1 + m - I*b*d*n*p)
```

fricas [F] time = 0.53, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m \cos\left(bd\log(cx^n) + ad\right)^p, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((e*x)^m*cos(b*d*log(c*x^n) + a*d)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cos\left(\left(b\log(cx^n) + a\right)d\right)^p dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m*cos((b*log(c*x^n) + a)*d)^p, x)
```

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int (ex)^{m} \left(\cos^{p}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cos(d*(a+b*ln(c*x^n)))^p,x)
```

```
[Out] int((e*x)^m*cos(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^{m} \cos\left(\left(b \log\left(cx^{n}\right) + a\right)d\right)^{p} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((e*x)^m*cos((b*log(c*x^n) + a)*d)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cos\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)^{p}\,(e\,x)^{m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(cos(d*(a + b*log(c*x^n)))^p*(e*x)^m, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.133 $\int x \cos^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=114

$$\frac{x^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(-p-\frac{2i}{bn}\right),-p;\frac{1}{2}\left(-p-\frac{2i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^p\left(a+b\log\left(cx^n\right)\right)}{2-ibnp}$$

```
[Out] x^2*cos(a+b*ln(c*x^n))^p*hypergeom([-p, -I/b/n-1/2*p],[1-I/b/n-1/2*p],-exp(
2*I*a)*(c*x^n)^(2*I*b))/(2-I*b*n*p)/((1+exp(2*I*a)*(c*x^n)^(2*I*b))^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 = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4494, 4492, 364}

$$\frac{x^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(\frac{1}{2}\left(-p-\frac{2i}{bn}\right),-p;\frac{1}{2}\left(-p-\frac{2i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^p\left(a+b\log\left(cx^n\right)\right)}{2-ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[x*Cos[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x^2*Cos[a + b*Log[c*x^n]]^p*Hypergeometric2F1[((-2*I)/(b*n) - p)/2, -p, (2
 - (2*I)/(b*n) - p)/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - I*b*n*p)*(1
 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
eQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4494

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Cos[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\cos^p\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\cos^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(x^2\left(cx^n\right)^{-\frac{2}{n}+ibp}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\cos^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}-ibp}\left(1\right.\right.}{n}$$
$$= \frac{x^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\cos^p\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{1}{2}\left(-\frac{2i}{bn}-p\right),-p;\frac{1}{2}\left(2-\frac{2i}{bn}-p\right)\right.}{2-ibnp}$$

Mathematica [A] time = 0.65, size = 102, normalized size = 0.89

$$\frac{ix^2\left(1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{p}{2}-\frac{i}{bn}+1;-\frac{p}{2}-\frac{i}{bn}+1;-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\cos^p\left(a+b\log\left(cx^n\right)\right)}{bnp+2i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Cos[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (I*(1 + E^((2*I)*(a + b*Log[c*x^n])))*x^2*Cos[a + b*Log[c*x^n]]^p*Hypergeom
etric2F1[1, 1 - I/(b*n) + p/2, 1 - I/(b*n) - p/2, -E^((2*I)*(a + b*Log[c*x^
n]))])/(2*I + b*n*p)
```

fricas [F] time = 0.63, size = 0, normalized size = 0.00

$$\text{integral}\left(x\cos\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x*cos(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\cos\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int x\left(\cos^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cos(a+b*ln(c*x^n))^p,x)
[Out] int(x*cos(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\cos\left(b\log\left(cx^{n}\right)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cos(a + b*log(c*x^n))^p,x)
[Out] int(x*cos(a + b*log(c*x^n))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\cos^{p}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cos(a+b*ln(c*x**n))**p,x)
[Out] Integral(x*cos(a + b*log(c*x**n))**p, x)
```

3.134 $\int \cos^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=112

$$\frac{x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{bnp+i}{2bn};\frac{1}{2}\left(-p-\frac{i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^p\left(a+b\log\left(cx^n\right)\right)}{1-ibnp}$$

```
[Out] x*cos(a+b*ln(c*x^n))^p*hypergeom([-p, 1/2*(-I-b*n*p)/b/n],[1-1/2*I/b/n-1/2*
p],-exp(2*I*a)*(c*x^n)^(2*I*b))/(1-I*b*n*p)/((1+exp(2*I*a)*(c*x^n)^(2*I*b))
^p)
```

Rubi [A] time = 0.07, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4484, 4492, 364}

$$\frac{x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\,{}_2F_1\left(-p,-\frac{bnp+i}{2bn};\frac{1}{2}\left(-p-\frac{i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\cos^p\left(a+b\log\left(cx^n\right)\right)}{1-ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[Cos[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x*Cos[a + b*Log[c*x^n]]^p*Hypergeometric2F1[-p, -(I + b*n*p)/(2*b*n), (2 -
 I/(b*n) - p)/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - I*b*n*p)*(1 + E^(
(2*I)*a)*(c*x^n)^((2*I)*b))^p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4484

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Cos[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4492

```
Int[Cos[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_)*((e_.)*(x_))^(m_.), x_Symbol] :
> Dist[(Cos[d*(a + b*Log[x])]^p*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^
p, Int[((e*x)^m*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), x], x] /; Fre
```

```
eQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \cos^p\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\cos^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{1}{n}+ibp}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\cos^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}-ibp}\left(1+\right.\right.}{n}$$

$$= \frac{x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{-p}\cos^p\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(-p,-\frac{i+bnp}{2bn};\frac{1}{2}\left(2-\frac{i}{bn}-p\right);-e^{2ia}\right.}{1-ibnp}$$

Mathematica [A] time = 0.56, size = 102, normalized size = 0.91

$$\frac{ix\left(1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{1}{2}\left(p-\frac{i}{bn}+2\right);-\frac{p}{2}-\frac{i}{2bn}+1;-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\cos^p\left(a+b\log\left(cx^n\right)\right)}{bnp+i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cos[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (I*(1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Cos[a + b*Log[c*x^n]]^p*Hypergeomet
ric2F1[1, (2 - I/(b*n) + p)/2, 1 - (I/2)/(b*n) - p/2, -E^((2*I)*(a + b*Log[
c*x^n]))])/(I + b*n*p)
```

fricas [F] time = 0.58, size = 0, normalized size = 0.00

$$\text{integral}\left(\cos\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(cos(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.04, size = 0, normalized size = 0.00

$$\int \cos^{p}\left(a + b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a+b*ln(c*x^n))^p,x)
[Out] int(cos(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos\left(b\log\left(cx^{n}\right) + a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cos\left(a + b\,\ln\left(c\,x^{n}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cos(a + b*log(c*x^n))^p,x)
[Out] int(cos(a + b*log(c*x^n))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cos^{p}\left(a + b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cos(a+b*ln(c*x**n))**p,x)
[Out] Integral(cos(a + b*log(c*x**n))**p, x)
```

3.135 $\int x^3 \tan(a + i \log(x))\,dx$

Optimal. Leaf size=47

$$-ie^{2ia}x^2 + ie^{4ia}\log\left(x^2 + e^{2ia}\right) + \frac{ix^4}{4}$$

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

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3 \tan(a + i \log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^3*Tan[a + I*Log[x]],x]
```

```
[Out] Defer[Int][x^3*Tan[a + I*Log[x]], x]
```

Rubi steps

$$\int x^3 \tan(a + i \log(x))\,dx = \int x^3 \tan(a + i \log(x))\,dx$$

Mathematica [B] time = 0.04, size = 132, normalized size = 2.81

$$x^2 \sin(2a) - ix^2 \cos(2a) + \cos(4a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cos(a)}{\sin(a) - x^2\sin(a)}\right) + i\sin(4a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cos(a)}{\sin(a) - x^2\sin(a)}\right) + \frac{1}{2}i\cos(4a)\log$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Tan[a + I*Log[x]],x]
```

```
[Out] (I/4)*x^4 - I*x^2*Cos[2*a] + ArcTan[((1 + x^2)*Cos[a])/(Sin[a] - x^2*Sin[a]
)]*Cos[4*a] + (I/2)*Cos[4*a]*Log[1 + x^4 + 2*x^2*Cos[2*a]] + x^2*Sin[2*a] +
 I*ArcTan[((1 + x^2)*Cos[a])/(Sin[a] - x^2*Sin[a])]*Sin[4*a] - (Log[1 + x^4
 + 2*x^2*Cos[2*a]]*Sin[4*a])/2
```

fricas [A] time = 0.60, size = 30, normalized size = 0.64

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

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^3*tan(a+I*log(x)),x, algorithm="fricas")

[Out] 1/4*I*x^4 - I*x^2*e^(2*I*a) + I*e^(4*I*a)*log(x^2 + e^(2*I*a))

giac [A] time = 0.51, size = 34, normalized size = 0.72

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

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^3*tan(a+I*log(x)),x, algorithm="giac")

[Out] 1/4*I*x^4 - I*x^2*e^(2*I*a) + I*e^(4*I*a)*log(I*x^2 + I*e^(2*I*a))

maple [A] time = 0.06, size = 37, normalized size = 0.79

$$-i e^{2ia} x^2 + \frac{i x^4}{4} + i e^{4ia} \ln\left(e^{2ia} + x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(x^3*tan(a+I*ln(x)),x)

[Out] -I*exp(2*I*a)*x^2+1/4*I*x^4+I*exp(4*I*a)*ln(exp(2*I*a)+x^2)

maxima [B] time = 0.34, size = 90, normalized size = 1.91

$$\frac{1}{4} i x^4 + x^2 (-i \cos(2a) + \sin(2a)) - \frac{1}{4} (4 \cos(4a) + 4i \sin(4a)) \arctan\left(\sin(2a), x^2 + \cos(2a)\right) + \frac{1}{2} (i \cos(4a) -$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(x^3*tan(a+I*log(x)),x, algorithm="maxima")

[Out] 1/4*I*x^4 + x^2*(-I*cos(2*a) + sin(2*a)) - 1/4*(4*cos(4*a) + 4*I*sin(4*a))*
arctan2(sin(2*a), x^2 + cos(2*a)) + 1/2*(I*cos(4*a) - sin(4*a))*log(x^4 + 2
*x^2*cos(2*a) + cos(2*a)^2 + sin(2*a)^2)

mupad [B] time = 2.22, size = 36, normalized size = 0.77

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

Verification of antiderivative is not currently implemented for this CAS.

[In] int(x^3*tan(a + log(x)*1i),x)

[Out] exp(a*4i)*log(exp(a*2i) + x^2)*1i - x^2*exp(a*2i)*1i + (x^4*1i)/4

sympy [A] time = 0.21, size = 37, normalized size = 0.79

$$\frac{ix^4}{4} - ix^2e^{2ia} + ie^{4ia}\log\left(x^2 + e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*tan(a+I*ln(x)),x)
```

```
[Out] I*x**4/4 - I*x**2*exp(2*I*a) + I*exp(4*I*a)*log(x**2 + exp(2*I*a))
```

3.136 $\int x^2 \tan(a + i\log(x))\,dx$

Optimal. Leaf size=43

$$-2ie^{2ia}x + 2ie^{3ia}\tan^{-1}\left(e^{-ia}x\right) + \frac{ix^3}{3}$$

```
[Out] -2*I*exp(2*I*a)*x+1/3*I*x^3+2*I*exp(3*I*a)*arctan(x/exp(I*a))
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^2 \tan(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^2*Tan[a + I*Log[x]],x]
[Out] Defer[Int][x^2*Tan[a + I*Log[x]], x]
```

Rubi steps

$$\int x^2 \tan(a + i\log(x))\,dx = \int x^2 \tan(a + i\log(x))\,dx$$

Mathematica [A] time = 0.02, size = 66, normalized size = 1.53

$$2x\sin(2a)-2ix\cos(2a)+2i\cos(3a)\tan^{-1}(x\cos(a)-ix\sin(a))-2\sin(3a)\tan^{-1}(x\cos(a)-ix\sin(a))+\frac{ix^3}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Tan[a + I*Log[x]],x]
[Out] (I/3)*x^3 - (2*I)*x*Cos[2*a] + (2*I)*ArcTan[x*Cos[a] - I*x*Sin[a]]*Cos[3*a]
 + 2*x*Sin[2*a] - 2*ArcTan[x*Cos[a] - I*x*Sin[a]]*Sin[3*a]
```

fricas [A] time = 0.54, size = 42, normalized size = 0.98

$$\frac{1}{3}i\,x^3 - 2i\,xe^{(2i\,a)} - e^{(3i\,a)}\log\left(x + i\,e^{(i\,a)}\right) + e^{(3i\,a)}\log\left(x - i\,e^{(i\,a)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*tan(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] 1/3*I*x^3 - 2*I*x*e^(2*I*a) - e^(3*I*a)*log(x + I*e^(I*a)) + e^(3*I*a)*log(
x - I*e^(I*a))
```

giac [A] time = 0.35, size = 26, normalized size = 0.60

$$\frac{1}{3}i\,x^3 + 2i\,\arctan\left(xe^{(-i\,a)}\right)e^{(3i\,a)} - 2i\,xe^{(2i\,a)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*tan(a+I*log(x)),x, algorithm="giac")
```

```
[Out] 1/3*I*x^3 + 2*I*arctan(x*e^(-I*a))*e^(3*I*a) - 2*I*x*e^(2*I*a)
```

maple [A] time = 0.06, size = 33, normalized size = 0.77

$$\frac{ix^3}{3} - 2ie^{2ia}x + 2i\arctan\left(x\,e^{-ia}\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*tan(a+I*ln(x)),x)
```

```
[Out] 1/3*I*x^3-2*I*exp(2*I*a)*x+2*I*arctan(x*exp(-I*a))*exp(3*I*a)
```

maxima [B] time = 0.45, size = 151, normalized size = 3.51

$$\frac{1}{3}i\,x^3 - 2\,x(i\,\cos(2\,a) - \sin(2\,a)) - (i\,\cos(3\,a) - \sin(3\,a))\arctan\left(\frac{2\,x\cos(a)}{x^2 + \cos(a)^2 - 2\,x\sin(a) + \sin(a)^2}, \frac{x^2 -}{x^2 + \cos(a}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*tan(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] 1/3*I*x^3 - 2*x*(I*cos(2*a) - sin(2*a)) - (I*cos(3*a) - sin(3*a))*arctan2(2
*x*cos(a)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2), (x^2 - cos(a)^2 - sin(a
)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)) + 1/6*(3*cos(3*a) + 3*I*sin(
3*a))*log((x^2 + cos(a)^2 + 2*x*sin(a) + sin(a)^2)/(x^2 + cos(a)^2 - 2*x*si
n(a) + sin(a)^2))
```

mupad [B] time = 2.21, size = 36, normalized size = 0.84

$$\left(e^{a\,2i}\right)^{3/2}\,\mathrm{atan}\left(\frac{x}{\sqrt{e^{a\,2i}}}\right)\,2i + \frac{x^3\,1i}{3} - x\,e^{a\,2i}\,2i$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*tan(a + log(x)*1i),x)
```

```
[Out] exp(a*2i)^(3/2)*atan(x/exp(a*2i)^(1/2))*2i + (x^3*1i)/3 - x*exp(a*2i)*2i
```

sympy [**A**] time = 0.20, size = 61, normalized size = 1.42

$$\frac{ix^3}{3} - 2ixe^{2ia} + \left(\log\left(xe^{2ia} - ie^{3ia}\right) - \log\left(xe^{2ia} + ie^{3ia}\right)\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*tan(a+I*ln(x)),x)
```

```
[Out] I*x**3/3 - 2*I*x*exp(2*I*a) + (log(x*exp(2*I*a) - I*exp(3*I*a)) - log(x*exp
(2*I*a) + I*exp(3*I*a)))*exp(3*I*a)
```

3.137 $\int x \tan(a + i \log(x))\,dx$

Optimal. Leaf size=33

$$\frac{ix^2}{2} - ie^{2ia}\log\left(x^2 + e^{2ia}\right)$$

```
[Out] 1/2*I*x^2-I*exp(2*I*a)*ln(exp(2*I*a)+x^2)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x \tan(a + i \log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x*Tan[a + I*Log[x]],x]
```

```
[Out] Defer[Int][x*Tan[a + I*Log[x]], x]
```

Rubi steps

$$\int x \tan(a + i \log(x))\,dx = \int x \tan(a + i \log(x))\,dx$$

Mathematica [B] time = 0.02, size = 114, normalized size = 3.45

$$-\cos(2a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cos(a)}{\sin(a)-x^2\sin(a)}\right)-i\sin(2a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cos(a)}{\sin(a)-x^2\sin(a)}\right)-\frac{1}{2}i\cos(2a)\log\left(2x^2\cos(2a)+x^4+1\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Tan[a + I*Log[x]],x]
```

```
[Out] (I/2)*x^2 - ArcTan[((1 + x^2)*Cos[a])/(Sin[a] - x^2*Sin[a])]*Cos[2*a] - (I/
2)*Cos[2*a]*Log[1 + x^4 + 2*x^2*Cos[2*a]] - I*ArcTan[((1 + x^2)*Cos[a])/(Si
n[a] - x^2*Sin[a])]*Sin[2*a] + (Log[1 + x^4 + 2*x^2*Cos[2*a]]*Sin[2*a])/2
```

fricas [A] time = 0.46, size = 21, normalized size = 0.64

$$\frac{1}{2}i\,x^2 - i\,e^{(2i\,a)}\log\left(x^2 + e^{(2i\,a)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] 1/2*I*x^2 - I*e^(2*I*a)*log(x^2 + e^(2*I*a))
```

giac [A] time = 0.32, size = 25, normalized size = 0.76

$$\frac{1}{2}i\,x^2 - i\,e^{(2i\,a)}\log\left(-i\,x^2 - i\,e^{(2i\,a)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*log(x)),x, algorithm="giac")
```

```
[Out] 1/2*I*x^2 - I*e^(2*I*a)*log(-I*x^2 - I*e^(2*I*a))
```

maple [A] time = 0.05, size = 26, normalized size = 0.79

$$\frac{ix^2}{2} - ie^{2ia}\ln\left(e^{2ia} + x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*tan(a+I*ln(x)),x)
```

```
[Out] 1/2*I*x^2-I*exp(2*I*a)*ln(exp(2*I*a)+x^2)
```

maxima [B] time = 0.34, size = 73, normalized size = 2.21

$$\frac{1}{2}i\,x^2+\frac{1}{2}\left(2\,\cos\left(2\,a\right)+2i\,\sin\left(2\,a\right)\right)\arctan\left(\sin\left(2\,a\right),x^2+\cos\left(2\,a\right)\right)+\frac{1}{2}\left(-i\,\cos\left(2\,a\right)+\sin\left(2\,a\right)\right)\log\left(x^4+2\,x^2\,\mathrm{co}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] 1/2*I*x^2 + 1/2*(2*cos(2*a) + 2*I*sin(2*a))*arctan2(sin(2*a), x^2 + cos(2*a
)) + 1/2*(-I*cos(2*a) + sin(2*a))*log(x^4 + 2*x^2*cos(2*a) + cos(2*a)^2 + s
in(2*a)^2)
```

mupad [B] time = 2.19, size = 25, normalized size = 0.76

$$-e^{a\,2i}\,\ln\left(x^2+e^{a\,2i}\right)\,1i+\frac{x^2\,1i}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*tan(a + log(x)*1i),x)
```

```
[Out] (x^2*1i)/2 - exp(a*2i)*log(exp(a*2i) + x^2)*1i
```

sympy [A] time = 0.19, size = 26, normalized size = 0.79

$$\frac{ix^2}{2} - ie^{2ia}\log\left(x^2 + e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*ln(x)),x)
```

```
[Out] I*x**2/2 - I*exp(2*I*a)*log(x**2 + exp(2*I*a))
```

3.138 $\int \tan(a + i\log(x))\,dx$

Optimal. Leaf size=27

$$ix - 2ie^{ia}\tan^{-1}\left(e^{-ia}x\right)$$

[Out] I*x-2*I*exp(I*a)*arctan(x/exp(I*a))

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

[In] Int[Tan[a + I*Log[x]],x]

[Out] Defer[Int][Tan[a + I*Log[x]], x]

Rubi steps

$$\int \tan(a + i\log(x))\,dx = \int \tan(a + i\log(x))\,dx$$

Mathematica [A] time = 0.01, size = 42, normalized size = 1.56

$$-2i\cos(a)\tan^{-1}(x\cos(a) - ix\sin(a)) + 2\sin(a)\tan^{-1}(x\cos(a) - ix\sin(a)) + ix$$

Antiderivative was successfully verified.

[In] Integrate[Tan[a + I*Log[x]],x]

[Out] I*x - (2*I)*ArcTan[x*Cos[a] - I*x*Sin[a]]*Cos[a] + 2*ArcTan[x*Cos[a] - I*x*Sin[a]]*Sin[a]

fricas [A] time = 0.42, size = 33, normalized size = 1.22

$$e^{(ia)}\log\left(x + ie^{(ia)}\right) - e^{(ia)}\log\left(x - ie^{(ia)}\right) + ix$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(tan(a+I*log(x)),x, algorithm="fricas")

[Out] e^(I*a)*log(x + I*e^(I*a)) - e^(I*a)*log(x - I*e^(I*a)) + I*x

giac [A] time = 1.42, size = 30, normalized size = 1.11

$$\frac{2\arctan\left(\frac{ix}{\sqrt{-e^{(2ia)}}}\right)e^{(2ia)}}{\sqrt{-e^{(2ia)}}}+ix$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x)),x, algorithm="giac")
```

```
[Out] 2*arctan(I*x/sqrt(-e^(2*I*a)))*e^(2*I*a)/sqrt(-e^(2*I*a)) + I*x
```

maple [A] time = 0.04, size = 22, normalized size = 0.81

$$ix-2i\arctan\left(x\,e^{-ia}\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x)),x)
```

```
[Out] I*x-2*I*arctan(x*exp(-I*a))*exp(I*a)
```

maxima [B] time = 0.50, size = 122, normalized size = 4.52

$$(i\cos(a)-\sin(a))\arctan\left(\frac{2\,x\cos(a)}{x^2+\cos(a)^2-2\,x\sin(a)+\sin(a)^2},\frac{x^2-\cos(a)^2-\sin(a)^2}{x^2+\cos(a)^2-2\,x\sin(a)+\sin(a)^2}\right)-\frac{1}{2}\,(\cos(a)+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] (I*cos(a) - sin(a))*arctan2(2*x*cos(a)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a
)^2), (x^2 - cos(a)^2 - sin(a)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2))
 - 1/2*(cos(a) + I*sin(a))*log((x^2 + cos(a)^2 + 2*x*sin(a) + sin(a)^2)/(x^
2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)) + I*x
```

mupad [B] time = 2.17, size = 25, normalized size = 0.93

$$x\,1i-\sqrt{e^{a\,2i}}\,\mathrm{atan}\left(\frac{x}{\sqrt{e^{a\,2i}}}\right)2i$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i),x)
```

```
[Out] x*1i - exp(a*2i)^(1/2)*atan(x/exp(a*2i)^(1/2))*2i
```

sympy [A] time = 0.18, size = 27, normalized size = 1.00

$$ix + \left(-\log\left(x - ie^{ia}\right) + \log\left(x + ie^{ia}\right)\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x)),x)
```

```
[Out] I*x + (-log(x - I*exp(I*a)) + log(x + I*exp(I*a)))*exp(I*a)
```

3.139 $\int \frac{\tan(a+i\log(x))}{x}\,dx$

Optimal. Leaf size=14

$$i\log(\cos(a+i\log(x)))$$

```
[Out] I*ln(cos(a+I*ln(x)))
```

Rubi [A] time = 0.01, antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {3475}

$$i\log(\cos(a+i\log(x)))$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + I*Log[x]]/x,x]
```

```
[Out] I*Log[Cos[a + I*Log[x]]]
```

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\tan(a+i\log(x))}{x}\,dx &= \text{Subst}\left(\int \tan(a+ix)\,dx, x, \log(x)\right)\\ &= i\log(\cos(a+i\log(x)))\end{aligned}$$

Mathematica [A] time = 0.02, size = 14, normalized size = 1.00

$$i\log(\cos(a+i\log(x)))$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + I*Log[x]]/x,x]
```

```
[Out] I*Log[Cos[a + I*Log[x]]]
```

fricas [A] time = 0.41, size = 16, normalized size = 1.14

$$i\,\log\left(x^2+e^{(2i\,a)}\right)-i\,\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x,x, algorithm="fricas")
```

```
[Out] I*log(x^2 + e^(2*I*a)) - I*log(x)
```

giac [B] time = 0.24, size = 43, normalized size = 3.07

$$i \log\left(\frac{i\left(x^2-1\right)\tan(a)}{x^2+1}-1\right)-\frac{1}{2}i \log\left(-\frac{\left(x^2-1\right)^2}{\left(x^2+1\right)^2}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x,x, algorithm="giac")
```

```
[Out] I*log(I*(x^2 - 1)*tan(a)/(x^2 + 1) - 1) - 1/2*I*log(-(x^2 - 1)^2/(x^2 + 1)^
2 + 1)
```

maple [A] time = 0.00, size = 17, normalized size = 1.21

$$-\frac{i \ln\left(1+\tan^2\left(a+i \ln(x)\right)\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))/x,x)
```

```
[Out] -1/2*I*ln(1+tan(a+I*ln(x))^2)
```

maxima [A] time = 0.33, size = 10, normalized size = 0.71

$$-i \log\left(\sec\left(a+i \log(x)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x,x, algorithm="maxima")
```

```
[Out] -I*log(sec(a + I*log(x)))
```

mupad [B] time = 3.73, size = 16, normalized size = 1.14

$$-\frac{\ln\left(\tan\left(a+\ln(x)\,1\mathrm{i}\right)^2+1\right)\,1\mathrm{i}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)/x,x)
```

```
[Out] -(log(tan(a + log(x)*1i)^2 + 1)*1i)/2
```

sympy [A] time = 0.27, size = 17, normalized size = 1.21

$$-i\log(x) + i\log\left(x^2 + e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))/x,x)
```

```
[Out] -I*log(x) + I*log(x**2 + exp(2*I*a))
```

3.140 $\int \frac{\tan(a+i\log(x))}{x^2}\,dx$

Optimal. Leaf size=29

$$2ie^{-ia}\tan^{-1}\left(e^{-ia}x\right)+\frac{i}{x}$$

[Out] I/x+2*I*arctan(x/exp(I*a))/exp(I*a)

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan(a+i\log(x))}{x^2}\,dx$$

Verification is Not applicable to the result.

[In] Int[Tan[a + I*Log[x]]/x^2,x]

[Out] Defer[Int][Tan[a + I*Log[x]]/x^2, x]

Rubi steps

$$\int \frac{\tan(a+i\log(x))}{x^2}\,dx=\int \frac{\tan(a+i\log(x))}{x^2}\,dx$$

Mathematica [A] time = 0.02, size = 44, normalized size = 1.52

$$2i\cos(a)\tan^{-1}(x\cos(a)-ix\sin(a))+2\sin(a)\tan^{-1}(x\cos(a)-ix\sin(a))+\frac{i}{x}$$

Antiderivative was successfully verified.

[In] Integrate[Tan[a + I*Log[x]]/x^2,x]

[Out] I/x + (2*I)*ArcTan[x*Cos[a] - I*x*Sin[a]]*Cos[a] + 2*ArcTan[x*Cos[a] - I*x*Sin[a]]*Sin[a]

fricas [B] time = 0.51, size = 39, normalized size = 1.34

$$-\frac{\left(x\log\left(x+ie^{(ia)}\right)-x\log\left(x-ie^{(ia)}\right)-ie^{(ia)}\right)e^{(-ia)}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(tan(a+I*log(x))/x^2,x, algorithm="fricas")

```
[Out] -(x*log(x + I*e^(I*a)) - x*log(x - I*e^(I*a)) - I*e^(I*a))*e^(-I*a)/x
```

giac [A] time = 0.44, size = 28, normalized size = 0.97

$$-\frac{2 \arctan\left(\frac{i x}{\sqrt{-e^{(2 i a)}}}\right)}{\sqrt{-e^{(2 i a)}}} + \frac{i}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^2,x, algorithm="giac")
```

```
[Out] -2*arctan(I*x/sqrt(-e^(2*I*a)))/sqrt(-e^(2*I*a)) + I/x
```

maple [A] time = 0.05, size = 24, normalized size = 0.83

$$\frac{i}{x} + 2i \arctan\left(x \, e^{-ia}\right) e^{-ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))/x^2,x)
```

```
[Out] I/x+2*I*arctan(x*exp(-I*a))*exp(-I*a)
```

maxima [B] time = 0.46, size = 127, normalized size = 4.38

$$\frac{2 x(-i \cos(a) - \sin(a)) \arctan\left(\frac{2 x \cos(a)}{x^2+\cos(a)^2-2 x \sin(a)+\sin(a)^2}, \frac{x^2-\cos(a)^2-\sin(a)^2}{x^2+\cos(a)^2-2 x \sin(a)+\sin(a)^2}\right) + x(\cos(a) - i \sin(a)) \log\left(\frac{x^2+}{x^2+}\right.}{2 x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*(2*x*(-I*cos(a) - sin(a))*arctan2(2*x*cos(a)/(x^2 + cos(a)^2 - 2*x*sin(
a) + sin(a)^2), (x^2 - cos(a)^2 - sin(a)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) +
sin(a)^2)) + x*(cos(a) - I*sin(a))*log((x^2 + cos(a)^2 + 2*x*sin(a) + sin(a
)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)) + 2*I)/x
```

mupad [B] time = 2.27, size = 27, normalized size = 0.93

$$\frac{\mathrm{atan}\left(\frac{x}{\sqrt{e^{a\,2i}}}\right) 2i}{\sqrt{e^{a\,2i}}} + \frac{1i}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)/x^2,x)
```

```
[Out] (atan(x/exp(a*2i)^(1/2))*2i)/exp(a*2i)^(1/2) + 1i/x
```

sympy [A] time = 0.23, size = 27, normalized size = 0.93

$$\left(\log\left(x - ie^{ia}\right) - \log\left(x + ie^{ia}\right)\right)e^{-ia} + \frac{i}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))/x**2,x)
[Out] (log(x - I*exp(I*a)) - log(x + I*exp(I*a)))*exp(-I*a) + I/x
```

3.141 $\int \frac{\tan(a+i\log(x))}{x^3}\,dx$

Optimal. Leaf size=35

$$\frac{i}{2x^2}-ie^{-2ia}\log\left(1+\frac{e^{2ia}}{x^2}\right)$$

```
[Out] 1/2*I/x^2-I*ln(1+exp(2*I*a)/x^2)/exp(2*I*a)
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan(a+i\log(x))}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + I*Log[x]]/x^3,x]
```

```
[Out] Defer[Int][Tan[a + I*Log[x]]/x^3, x]
```

Rubi steps

$$\int \frac{\tan(a+i\log(x))}{x^3}\,dx=\int \frac{\tan(a+i\log(x))}{x^3}\,dx$$

Mathematica [B] time = 0.04, size = 132, normalized size = 3.77

$$\cos(2a)\left(-\tan^{-1}\left(\frac{(x^2+1)\cos(a)}{\sin(a)-x^2\sin(a)}\right)\right)+i\sin(2a)\tan^{-1}\left(\frac{(x^2+1)\cos(a)}{\sin(a)-x^2\sin(a)}\right)-\frac{1}{2}i\cos(2a)\log\left(2x^2\cos(2a)+x^4+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + I*Log[x]]/x^3,x]
```

```
[Out] (I/2)/x^2 - ArcTan[((1 + x^2)*Cos[a])/(Sin[a] - x^2*Sin[a])]*Cos[2*a] + (2*
I)*Cos[2*a]*Log[x] - (I/2)*Cos[2*a]*Log[1 + x^4 + 2*x^2*Cos[2*a]] + I*ArcTa
n[((1 + x^2)*Cos[a])/(Sin[a] - x^2*Sin[a])]*Sin[2*a] + 2*Log[x]*Sin[2*a] -
(Log[1 + x^4 + 2*x^2*Cos[2*a]]*Sin[2*a])/2
```

fricas [A] time = 0.46, size = 37, normalized size = 1.06

$$\frac{\left(-2i\,x^2\log\left(x^2+e^{(2i\,a)}\right)+4i\,x^2\log(x)+i\,e^{(2i\,a)}\right)e^{(-2i\,a)}}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^3,x, algorithm="fricas")
```

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

giac [A] time = 0.53, size = 33, normalized size = 0.94

$$-i\,e^{(-2i\,a)}\log\left(-i\,x^2 - i\,e^{(2i\,a)}\right) + 2i\,e^{(-2i\,a)}\log(x) + \frac{i}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^3,x, algorithm="giac")
```

```
[Out] -I*e^(-2*I*a)*log(-I*x^2 - I*e^(2*I*a)) + 2*I*e^(-2*I*a)*log(x) + 1/2*I/x^2
```

maple [A] time = 0.06, size = 36, normalized size = 1.03

$$\frac{i}{2x^2} + 2i\mathrm{e}^{-2ia}\ln(x) - i\mathrm{e}^{-2ia}\ln\left(\mathrm{e}^{2ia} + x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))/x^3,x)
```

```
[Out] 1/2*I/x^2+2*I*exp(-2*I*a)*ln(x)-I*exp(-2*I*a)*ln(exp(2*I*a)+x^2)
```

maxima [B] time = 0.36, size = 96, normalized size = 2.74

$$-\frac{x^2(i\,\cos(2\,a) + \sin(2\,a))\log\left(x^4 + 2\,x^2\cos(2\,a) + \cos(2\,a)^2 + \sin(2\,a)^2\right) - \left((2\,\cos(2\,a) - 2i\,\sin(2\,a))\arctan\left(\right.\right.}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^3,x, algorithm="maxima")
```

```
[Out] -1/2*(x^2*(I*cos(2*a) + sin(2*a))*log(x^4 + 2*x^2*cos(2*a) + cos(2*a)^2 + s
in(2*a)^2) - ((2*cos(2*a) - 2*I*sin(2*a))*arctan2(sin(2*a), x^2 + cos(2*a))
 + 4*(I*cos(2*a) + sin(2*a))*log(x))*x^2 - I)/x^2
```

mupad [B] time = 2.29, size = 35, normalized size = 1.00

$$-\mathrm{e}^{-a\,2\mathrm{i}}\,\ln\left(x^2 + \mathrm{e}^{a\,2\mathrm{i}}\right)1\mathrm{i} + \mathrm{e}^{-a\,2\mathrm{i}}\,\ln(x)\,2\mathrm{i} + \frac{1\mathrm{i}}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)/x^3,x)
```

```
[Out] exp(-a*2i)*log(x)*2i - exp(-a*2i)*log(exp(a*2i) + x^2)*1i + 1i/(2*x^2)
```

sympy [A]   time = 0.35, size = 39, normalized size = 1.11

$$2ie^{-2ia}\log(x) - ie^{-2ia}\log\left(x^2 + e^{2ia}\right) + \frac{i}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))/x**3,x)
```

```
[Out] 2*I*exp(-2*I*a)*log(x) - I*exp(-2*I*a)*log(x**2 + exp(2*I*a)) + I/(2*x**2)
```

3.142 $\int \frac{\tan(a+i\log(x))}{x^4}\,dx$

Optimal. Leaf size=45

$$-\frac{2ie^{-2ia}}{x}-2ie^{-3ia}\tan^{-1}\left(e^{-ia}x\right)+\frac{i}{3x^3}$$

[Out] 1/3*I/x^3-2*I/exp(2*I*a)/x-2*I*arctan(x/exp(I*a))/exp(3*I*a)

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan(a+i\log(x))}{x^4}\,dx$$

Verification is Not applicable to the result.

[In] Int[Tan[a + I*Log[x]]/x^4,x]

[Out] Defer[Int][Tan[a + I*Log[x]]/x^4, x]

Rubi steps

$$\int \frac{\tan(a+i\log(x))}{x^4}\,dx=\int \frac{\tan(a+i\log(x))}{x^4}\,dx$$

Mathematica [A] time = 0.03, size = 70, normalized size = 1.56

$$-\frac{2\sin(2a)}{x}-\frac{2i\cos(2a)}{x}-2i\cos(3a)\tan^{-1}(x\cos(a)-ix\sin(a))-2\sin(3a)\tan^{-1}(x\cos(a)-ix\sin(a))+\frac{i}{3x^3}$$

Antiderivative was successfully verified.

[In] Integrate[Tan[a + I*Log[x]]/x^4,x]

[Out] (I/3)/x^3 - ((2*I)*Cos[2*a])/x - (2*I)*ArcTan[x*Cos[a] - I*x*Sin[a]]*Cos[3*a] - (2*Sin[2*a])/x - 2*ArcTan[x*Cos[a] - I*x*Sin[a]]*Sin[3*a]

fricas [A] time = 0.48, size = 53, normalized size = 1.18

$$\frac{\left(3\,x^3\log\left(x+i\,e^{(i\,a)}\right)-3\,x^3\log\left(x-i\,e^{(i\,a)}\right)-6i\,x^2e^{(i\,a)}+i\,e^{(3i\,a)}\right)e^{(-3i\,a)}}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^4,x, algorithm="fricas")
```

```
[Out] 1/3*(3*x^3*log(x + I*e^(I*a)) - 3*x^3*log(x - I*e^(I*a)) - 6*I*x^2*e^(I*a)
+ I*e^(3*I*a))*e^(-3*I*a)/x^3
```

giac [A] time = 0.29, size = 28, normalized size = 0.62

$$-2i\,\arctan\left(xe^{(-i\,a)}\right)e^{(-3i\,a)}-\frac{2i\,e^{(-2i\,a)}}{x}+\frac{i}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^4,x, algorithm="giac")
```

```
[Out] -2*I*arctan(x*e^(-I*a))*e^(-3*I*a) - 2*I*e^(-2*I*a)/x + 1/3*I/x^3
```

maple [A] time = 0.06, size = 35, normalized size = 0.78

$$\frac{i}{3x^3}-\frac{2i\mathrm{e}^{-2ia}}{x}-2i\arctan\left(x\,\mathrm{e}^{-ia}\right)\mathrm{e}^{-3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))/x^4,x)
```

```
[Out] 1/3*I/x^3-2*I*exp(-2*I*a)/x-2*I*arctan(x*exp(-I*a))*exp(-3*I*a)
```

maxima [B] time = 0.46, size = 157, normalized size = 3.49

$$-\frac{6\,x^3(-i\,\cos\left(3\,a\right)-\sin\left(3\,a\right))\arctan\left(\frac{2\,x\cos(a)}{x^2+\cos(a)^2-2\,x\sin(a)+\sin(a)^2},\frac{x^2-\cos(a)^2-\sin(a)^2}{x^2+\cos(a)^2-2\,x\sin(a)+\sin(a)^2}\right)+x^3(3\,\cos\left(3\,a\right)-3i\,\sin}{6\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))/x^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*x^3*(-I*cos(3*a) - sin(3*a))*arctan2(2*x*cos(a)/(x^2 + cos(a)^2 - 2
*x*sin(a) + sin(a)^2), (x^2 - cos(a)^2 - sin(a)^2)/(x^2 + cos(a)^2 - 2*x*si
n(a) + sin(a)^2)) + x^3*(3*cos(3*a) - 3*I*sin(3*a))*log((x^2 + cos(a)^2 + 2
*x*sin(a) + sin(a)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)) + 12*x^2*(I
*cos(2*a) + sin(2*a)) - 2*I)/x^3
```

mupad [B] time = 2.30, size = 40, normalized size = 0.89

$$-\frac{\mathrm{atan}\left(\frac{x}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}\right)2\mathrm{i}}{\left(\mathrm{e}^{a\,2\mathrm{i}}\right)^{3/2}}-\frac{x^2\,\mathrm{e}^{-a\,2\mathrm{i}}\,2\mathrm{i}-\frac{1}{3}\mathrm{i}}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)/x^4,x)
```

```
[Out] - (atan(x/exp(a*2i)^(1/2))*2i)/exp(a*2i)^(3/2) - (x^2*exp(-a*2i)*2i - 1i/3)
/x^3
```

sympy [A] time = 0.29, size = 53, normalized size = 1.18

$$\left(-\log\left(x - ie^{ia}\right) + \log\left(x + ie^{ia}\right)\right)e^{-3ia} + \frac{\left(-6ix^2 + ie^{2ia}\right)e^{-2ia}}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))/x**4,x)
```

```
[Out] (-log(x - I*exp(I*a)) + log(x + I*exp(I*a)))*exp(-3*I*a) + (-6*I*x**2 + I*e
xp(2*I*a))*exp(-2*I*a)/(3*x**3)
```

3.143 $\int x^3 \tan^2(a + i\log(x))\,dx$

Optimal. Leaf size=63

$$2e^{2ia}x^2 - \frac{2e^{6ia}}{x^2 + e^{2ia}} - 4e^{4ia}\log\left(x^2 + e^{2ia}\right) - \frac{x^4}{4}$$

```
[Out] 2*exp(2*I*a)*x^2-1/4*x^4-2*exp(6*I*a)/(exp(2*I*a)+x^2)-4*exp(4*I*a)*ln(exp(
2*I*a)+x^2)
```

Rubi [F] time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3 \tan^2(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^3*Tan[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][x^3*Tan[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int x^3 \tan^2(a + i\log(x))\,dx = \int x^3 \tan^2(a + i\log(x))\,dx$$

Mathematica [B] time = 0.18, size = 155, normalized size = 2.46

$$2ix^2\sin(2a) + 2x^2\cos(2a) - \frac{2(\cos(5a) + i\sin(5a))}{\left(x^2+1\right)\cos(a) - i\left(x^2-1\right)\sin(a)} - 4i\cos(4a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cot(a)}{x^2-1}\right) + 4\sin(4a)\tan^{-}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Tan[a + I*Log[x]]^2,x]
```

```
[Out] -1/4*x^4 + 2*x^2*Cos[2*a] - (4*I)*ArcTan[((1 + x^2)*Cot[a])/(-1 + x^2)]*Cos
[4*a] - 2*Cos[4*a]*Log[1 + x^4 + 2*x^2*Cos[2*a]] + (2*I)*x^2*Sin[2*a] + 4*A
rcTan[((1 + x^2)*Cot[a])/(-1 + x^2)]*Sin[4*a] - (2*I)*Log[1 + x^4 + 2*x^2*C
os[2*a]]*Sin[4*a] - (2*(Cos[5*a] + I*Sin[5*a]))/((1 + x^2)*Cos[a] - I*(-1 +
 x^2)*Sin[a])
```

fricas [A] time = 0.69, size = 64, normalized size = 1.02

$$-\frac{x^6 - 7x^4e^{(2ia)} - 8x^2e^{(4ia)} + 16\left(x^2e^{(4ia)} + e^{(6ia)}\right)\log\left(x^2 + e^{(2ia)}\right) + 8e^{(6ia)}}{4\left(x^2 + e^{(2ia)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*tan(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] -1/4*(x^6 - 7*x^4*e^(2*I*a) - 8*x^2*e^(4*I*a) + 16*(x^2*e^(4*I*a) + e^(6*I*
a))*log(x^2 + e^(2*I*a)) + 8*e^(6*I*a))/(x^2 + e^(2*I*a))
```

giac [B] time = 0.76, size = 261, normalized size = 4.14

$$-\frac{x^6}{4\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}+\frac{3x^4e^{(2ia)}}{2\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}-\frac{4x^2e^{(4ia)}\log\left(-x^2-e^{(2ia)}\right)}{x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}}+\frac{17x^2e^{(4ia)}}{4\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}-\frac{8e^{(6ia)}\mathrm{lc}}{x^2+\frac{e}{}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*tan(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -1/4*x^6/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) + 3/2*x^4*e^(2*I*a)/(x^2 + e^(
4*I*a)/x^2 + 2*e^(2*I*a)) - 4*x^2*e^(4*I*a)*log(-x^2 - e^(2*I*a))/(x^2 + e^
(4*I*a)/x^2 + 2*e^(2*I*a)) + 17/4*x^2*e^(4*I*a)/(x^2 + e^(4*I*a)/x^2 + 2*e^
(2*I*a)) - 8*e^(6*I*a)*log(-x^2 - e^(2*I*a))/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*
I*a)) + e^(6*I*a)/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) - 4*e^(8*I*a)*log(-x^
2 - e^(2*I*a))/((x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a))*x^2) - 3/2*e^(8*I*a)/((
x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a))*x^2)
```

maple [A] time = 0.06, size = 52, normalized size = 0.83

$$-\frac{9x^4}{4}+\frac{2x^4}{1+\frac{e^{2ia}}{x^2}}+4e^{2ia}x^2-4e^{4ia}\ln\left(e^{2ia}+x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*tan(a+I*ln(x))^2,x)
```

```
[Out] -9/4*x^4+2*x^4/(1+exp(2*I*a)/x^2)+4*exp(2*I*a)*x^2-4*exp(4*I*a)*ln(exp(2*I*
a)+x^2)
```

maxima [B] time = 0.37, size = 231, normalized size = 3.67

$$-\frac{x^6-x^4(7\cos(2a)+7i\sin(2a))-\left(16(-i\cos(4a)+\sin(4a))\arctan\left(\sin(2a),x^2+\cos(2a)\right)+8\cos(4a)+\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*tan(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(x^6 - x^4*(7*cos(2*a) + 7*I*sin(2*a)) - (16*(-I*cos(4*a) + sin(4*a))*arct
an2(sin(2*a), x^2 + cos(2*a)) + 8*cos(4*a) + 8*I*sin(4*a))*x^2 - (16*(-I*co
s(2*a) + sin(2*a))*cos(4*a) + (16*cos(2*a) + 16*I*sin(2*a))*sin(4*a))*arcta
n2(sin(2*a), x^2 + cos(2*a)) + (x^2*(8*cos(4*a) + 8*I*sin(4*a)) + (8*cos(2*
a) + 8*I*sin(2*a))*cos(4*a) - 8*(-I*cos(2*a) + sin(2*a))*sin(4*a))*log(x^4
+ 2*x^2*cos(2*a) + cos(2*a)^2 + sin(2*a)^2) + 8*cos(6*a) + 8*I*sin(6*a))/(4
*x^2 + 4*cos(2*a) + 4*I*sin(2*a))
```

mupad [B] time = 2.25, size = 51, normalized size = 0.81

$$-\frac{2\,\mathrm{e}^{a\,6\mathrm{i}}}{x^2+\mathrm{e}^{a\,2\mathrm{i}}}-4\,\mathrm{e}^{a\,4\mathrm{i}}\,\ln\left(x^2+\mathrm{e}^{a\,2\mathrm{i}}\right)+2\,x^2\,\mathrm{e}^{a\,2\mathrm{i}}-\frac{x^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*tan(a + log(x)*1i)^2,x)
```

```
[Out] 2*x^2*exp(a*2i) - 4*exp(a*4i)*log(exp(a*2i) + x^2) - (2*exp(a*6i))/(exp(a*2
i) + x^2) - x^4/4
```

sympy [A] time = 0.32, size = 54, normalized size = 0.86

$$-\frac{x^4}{4}+2x^2e^{2ia}-4e^{4ia}\log\left(x^2+e^{2ia}\right)-\frac{2e^{6ia}}{x^2+e^{2ia}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*tan(a+I*ln(x))**2,x)
```

```
[Out] -x**4/4 + 2*x**2*exp(2*I*a) - 4*exp(4*I*a)*log(x**2 + exp(2*I*a)) - 2*exp(6
*I*a)/(x**2 + exp(2*I*a))
```

3.144 $\int x^2 \tan^2(a + i\log(x))\,dx$

Optimal. Leaf size=62

$$-\frac{2e^{2ia}x^3}{x^2+e^{2ia}}+6e^{2ia}x-6e^{3ia}\tan^{-1}\left(e^{-ia}x\right)-\frac{x^3}{3}$$

```
[Out] 6*exp(2*I*a)*x-1/3*x^3-2*exp(2*I*a)*x^3/(exp(2*I*a)+x^2)-6*exp(3*I*a)*arcta
n(x/exp(I*a))
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^2 \tan^2(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^2*Tan[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][x^2*Tan[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int x^2 \tan^2(a + i\log(x))\,dx = \int x^2 \tan^2(a + i\log(x))\,dx$$

Mathematica [A] time = 0.13, size = 100, normalized size = 1.61

$$\frac{2x(\cos(3a)+i\sin(3a))}{\left(x^2+1\right)\cos(a)-i\left(x^2-1\right)\sin(a)}+4ix\sin(2a)+4x\cos(2a)-6\cos(3a)\tan^{-1}(x(\cos(a)-i\sin(a)))-6i\sin(3a)\tan^{-1}($$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Tan[a + I*Log[x]]^2,x]
```

```
[Out] -1/3*x^3 + 4*x*Cos[2*a] - 6*ArcTan[x*(Cos[a] - I*Sin[a])]*Cos[3*a] + (4*I)*
x*Sin[2*a] + (2*x*(Cos[3*a] + I*Sin[3*a]))/((1 + x^2)*Cos[a] - I*(-1 + x^2)
*Sin[a]) - (6*I)*ArcTan[x*(Cos[a] - I*Sin[a])]*Sin[3*a]
```

fricas [A] time = 0.50, size = 86, normalized size = 1.39

$$-\frac{x^5-11\,x^3e^{(2i\,a)}-18\,xe^{(4i\,a)}-\left(-9i\,x^2e^{(3i\,a)}-9i\,e^{(5i\,a)}\right)\log\left(x+i\,e^{(i\,a)}\right)-\left(9i\,x^2e^{(3i\,a)}+9i\,e^{(5i\,a)}\right)\log\left(x-i\,e^{(i\,a)}\right)}{3\left(x^2+e^{(2i\,a)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*tan(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] -1/3*(x^5 - 11*x^3*e^(2*I*a) - 18*x*e^(4*I*a) - (-9*I*x^2*e^(3*I*a) - 9*I*e
^(5*I*a))*log(x + I*e^(I*a)) - (9*I*x^2*e^(3*I*a) + 9*I*e^(5*I*a))*log(x -
I*e^(I*a)))/(x^2 + e^(2*I*a))
```

giac [B] time = 0.56, size = 141, normalized size = 2.27

$$-\frac{x^5}{3\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}+\frac{10x^3e^{(2ia)}}{3\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}-6\arctan\left(xe^{(-ia)}\right)e^{(3ia)}+\frac{35xe^{(4ia)}}{3\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}+\frac{2xe^{(4ia)}}{x^2+e^{(2ia)}}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*tan(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -1/3*x^5/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) + 10/3*x^3*e^(2*I*a)/(x^2 + e^
(4*I*a)/x^2 + 2*e^(2*I*a)) - 6*arctan(x*e^(-I*a))*e^(3*I*a) + 35/3*x*e^(4*I
*a)/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) + 2*x*e^(4*I*a)/(x^2 + e^(2*I*a)) +
 8*e^(6*I*a)/((x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a))*x)
```

maple [A] time = 0.05, size = 48, normalized size = 0.77

$$-\frac{7x^3}{3}+\frac{2x^3}{1+\frac{e^{2ia}}{x^2}}+6\,e^{2ia}x-6\arctan\left(x\,e^{-ia}\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*tan(a+I*ln(x))^2,x)
```

```
[Out] -7/3*x^3+2*x^3/(1+exp(2*I*a)/x^2)+6*exp(2*I*a)*x-6*arctan(x*exp(-I*a))*exp(
3*I*a)
```

maxima [B] time = 0.47, size = 269, normalized size = 4.34

$$-\frac{2x^5-x^3(22\cos(2a)+22i\sin(2a))-x(36\cos(4a)+36i\sin(4a))-\left(x^2(18\cos(3a)+18i\sin(3a))+(18\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*tan(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(2*x^5 - x^3*(22*cos(2*a) + 22*I*sin(2*a)) - x*(36*cos(4*a) + 36*I*sin(4*a
)) - (x^2*(18*cos(3*a) + 18*I*sin(3*a)) + (18*cos(2*a) + 18*I*sin(2*a))*cos
```

```
(3*a) - 18*(-I*cos(2*a) + sin(2*a))*sin(3*a))*arctan2(2*x*cos(a)/(x^2 + cos
(a)^2 - 2*x*sin(a) + sin(a)^2), (x^2 - cos(a)^2 - sin(a)^2)/(x^2 + cos(a)^2
 - 2*x*sin(a) + sin(a)^2)) + (9*x^2*(-I*cos(3*a) + sin(3*a)) + 9*(-I*cos(2*
a) + sin(2*a))*cos(3*a) + (9*cos(2*a) + 9*I*sin(2*a))*sin(3*a))*log((x^2 +
cos(a)^2 + 2*x*sin(a) + sin(a)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2))
)/(6*x^2 + 6*cos(2*a) + 6*I*sin(2*a))
```

mupad [B] time = 2.23, size = 52, normalized size = 0.84

$$-6\left(e^{a\,2i}\right)^{3/2}\operatorname{atan}\left(\frac{x}{\sqrt{e^{a\,2i}}}\right)-\frac{x^3}{3}+4\,x\,e^{a\,2i}+\frac{2\,x\,e^{a\,4i}}{x^2+e^{a\,2i}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*tan(a + log(x)*1i)^2,x)
```

```
[Out] 4*x*exp(a*2i) - x^3/3 - 6*exp(a*2i)^(3/2)*atan(x/exp(a*2i)^(1/2)) + (2*x*ex
p(a*4i))/(exp(a*2i) + x^2)
```

sympy [A] time = 0.32, size = 66, normalized size = 1.06

$$-\frac{x^3}{3}+4xe^{2ia}+\frac{2xe^{4ia}}{x^2+e^{2ia}}-3\left(-i\log\left(x-ie^{ia}\right)+i\log\left(x+ie^{ia}\right)\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*tan(a+I*ln(x))**2,x)
```

```
[Out] -x**3/3 + 4*x*exp(2*I*a) + 2*x*exp(4*I*a)/(x**2 + exp(2*I*a)) - 3*(-I*log(x
 - I*exp(I*a)) + I*log(x + I*exp(I*a)))*exp(3*I*a)
```

3.145 $\int x \tan^2(a + i \log(x))\,dx$

Optimal. Leaf size=51

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

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

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} =$ 0.000, Rules used = {}

$$\int x \tan^2(a + i \log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x*Tan[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][x*Tan[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int x \tan^2(a + i \log(x))\,dx = \int x \tan^2(a + i \log(x))\,dx$$

Mathematica [B] time = 0.12, size = 135, normalized size = 2.65

$$\frac{2\cos(3a) + 2i\sin(3a)}{\left(x^2+1\right)\cos(a) - i\left(x^2-1\right)\sin(a)} + 2i\cos(2a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cot(a)}{x^2-1}\right) - 2\sin(2a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cot(a)}{x^2-1}\right) + \cos(2a$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Tan[a + I*Log[x]]^2,x]
```

```
[Out] -1/2*x^2 + (2*I)*ArcTan[((1 + x^2)*Cot[a])/(-1 + x^2)]*Cos[2*a] + Cos[2*a]*
Log[1 + x^4 + 2*x^2*Cos[2*a]] - 2*ArcTan[((1 + x^2)*Cot[a])/(-1 + x^2)]*Sin
[2*a] + I*Log[1 + x^4 + 2*x^2*Cos[2*a]]*Sin[2*a] + (2*Cos[3*a] + (2*I)*Sin[
3*a])/((1 + x^2)*Cos[a] - I*(-1 + x^2)*Sin[a])
```

fricas [A] time = 0.48, size = 54, normalized size = 1.06

$$-\frac{x^4 + x^2 e^{(2i\,a)} - 4\left(x^2 e^{(2i\,a)} + e^{(4i\,a)}\right)\log\left(x^2 + e^{(2i\,a)}\right) - 4\,e^{(4i\,a)}}{2\left(x^2 + e^{(2i\,a)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*log(x))^2,x, algorithm="fricas")
```

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

giac [B] time = 0.57, size = 221, normalized size = 4.33

$$-\frac{x^4}{2\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}+\frac{2x^2e^{(2ia)}\log\left(x^2+e^{(2ia)}\right)}{x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}}-\frac{5x^2e^{(2ia)}}{2\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)}+\frac{4e^{(4ia)}\log\left(x^2+e^{(2ia)}\right)}{x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}}-\frac{3}{2\left(x^2+\frac{e^{(4}}{x}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -1/2*x^4/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) + 2*x^2*e^(2*I*a)*log(x^2 + e^
(2*I*a))/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) - 5/2*x^2*e^(2*I*a)/(x^2 + e^(
4*I*a)/x^2 + 2*e^(2*I*a)) + 4*e^(4*I*a)*log(x^2 + e^(2*I*a))/(x^2 + e^(4*I*
a)/x^2 + 2*e^(2*I*a)) - 3/2*e^(4*I*a)/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) +
 2*e^(6*I*a)*log(x^2 + e^(2*I*a))/((x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a))*x^2)
 + 1/2*e^(6*I*a)/((x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a))*x^2)
```

maple [A] time = 0.05, size = 42, normalized size = 0.82

$$-\frac{5x^2}{2}+\frac{2x^2}{1+\frac{e^{2ia}}{x^2}}+2\,e^{2ia}\ln\left(e^{2ia}+x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*tan(a+I*ln(x))^2,x)
```

```
[Out] -5/2*x^2+2*x^2/(1+exp(2*I*a)/x^2)+2*exp(2*I*a)*ln(exp(2*I*a)+x^2)
```

maxima [B] time = 0.35, size = 193, normalized size = 3.78

$$-\frac{x^4+\left(4\left(-i\cos\left(2a\right)+\sin\left(2a\right)\right)\arctan\left(\sin\left(2a\right),x^2+\cos\left(2a\right)\right)+\cos\left(2a\right)+i\sin\left(2a\right)\right)x^2-\left(4i\cos\left(2a\right)^2-8\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(x^4 + (4*(-I*cos(2*a) + sin(2*a))*arctan2(sin(2*a), x^2 + cos(2*a)) + cos
(2*a) + I*sin(2*a))*x^2 - (4*I*cos(2*a)^2 - 8*cos(2*a)*sin(2*a) - 4*I*sin(2
```

```
*a)^2)*arctan2(sin(2*a), x^2 + cos(2*a)) - (x^2*(2*cos(2*a) + 2*I*sin(2*a))
 + 2*cos(2*a)^2 + 4*I*cos(2*a)*sin(2*a) - 2*sin(2*a)^2)*log(x^4 + 2*x^2*cos
(2*a) + cos(2*a)^2 + sin(2*a)^2) - 4*cos(4*a) - 4*I*sin(4*a))/(2*x^2 + 2*co
s(2*a) + 2*I*sin(2*a))
```

mupad [B] time = 2.21, size = 41, normalized size = 0.80

$$\frac{2\,\mathrm{e}^{a\,4\mathrm{i}}}{x^2+\mathrm{e}^{a\,2\mathrm{i}}}+2\,\mathrm{e}^{a\,2\mathrm{i}}\,\ln\left(x^2+\mathrm{e}^{a\,2\mathrm{i}}\right)-\frac{x^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*tan(a + log(x)*1i)^2,x)
```

```
[Out] (2*exp(a*4i))/(exp(a*2i) + x^2) + 2*exp(a*2i)*log(exp(a*2i) + x^2) - x^2/2
```

sympy [A] time = 0.29, size = 42, normalized size = 0.82

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*tan(a+I*ln(x))**2,x)
```

```
[Out] -x**2/2 + 2*exp(2*I*a)*log(x**2 + exp(2*I*a)) + 2*exp(4*I*a)/(x**2 + exp(2*
I*a))
```

3.146 $\int \tan^2(a + i\log(x))\,dx$

Optimal. Leaf size=46

$$-\frac{2e^{2ia}x}{x^2+e^{2ia}}+2e^{ia}\tan^{-1}\left(e^{-ia}x\right)-x$$

```
[Out] -x-2*exp(2*I*a)*x/(exp(2*I*a)+x^2)+2*exp(I*a)*arctan(x/exp(I*a))
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan^2(a+i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][Tan[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int \tan^2(a+i\log(x))\,dx=\int \tan^2(a+i\log(x))\,dx$$

Mathematica [A] time = 0.09, size = 70, normalized size = 1.52

$$\frac{-x\left(x^2+3\right)\cos(a)+ix\left(x^2-3\right)\sin(a)}{\left(x^2+1\right)\cos(a)-i\left(x^2-1\right)\sin(a)}+2(\cos(a)+i\sin(a))\tan^{-1}(x(\cos(a)-i\sin(a)))$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + I*Log[x]]^2,x]
```

```
[Out] 2*ArcTan[x*(Cos[a] - I*Sin[a])]*(Cos[a] + I*Sin[a]) + (-(x*(3 + x^2)*Cos[a]
) + I*x*(-3 + x^2)*Sin[a])/((1 + x^2)*Cos[a] - I*(-1 + x^2)*Sin[a])
```

fricas [B] time = 0.42, size = 77, normalized size = 1.67

$$-\frac{x^3+3\,xe^{(2ia)}-\left(i\,x^2e^{(ia)}+i\,e^{(3ia)}\right)\log\left(x+i\,e^{(ia)}\right)-\left(-i\,x^2e^{(ia)}-i\,e^{(3ia)}\right)\log\left(x-i\,e^{(ia)}\right)}{x^2+e^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] -(x^3 + 3*x*e^(2*I*a) - (I*x^2*e^(I*a) + I*e^(3*I*a))*log(x + I*e^(I*a)) -
(-I*x^2*e^(I*a) - I*e^(3*I*a))*log(x - I*e^(I*a)))/(x^2 + e^(2*I*a))
```

giac [B] time = 0.39, size = 114, normalized size = 2.48

$$-\frac{x^3}{x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}}+2\left(\arctan\left(xe^{(-ia)}\right)e^{(-ia)}-\frac{x}{x^2+e^{(2ia)}}\right)e^{(2ia)}-\frac{6xe^{(2ia)}}{x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}}-\frac{5e^{(4ia)}}{\left(x^2+\frac{e^{(4ia)}}{x^2}+2e^{(2ia)}\right)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -x^3/(x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a)) + 2*(arctan(x*e^(-I*a))*e^(-I*a) -
 x/(x^2 + e^(2*I*a)))*e^(2*I*a) - 6*x*e^(2*I*a)/(x^2 + e^(4*I*a)/x^2 + 2*e^
(2*I*a)) - 5*e^(4*I*a)/((x^2 + e^(4*I*a)/x^2 + 2*e^(2*I*a))*x)
```

maple [A] time = 0.04, size = 36, normalized size = 0.78

$$-3x+\frac{2x}{1+\frac{e^{2ia}}{x^2}}+2\arctan\left(x\,e^{-ia}\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))^2,x)
```

```
[Out] -3*x+2*x/(1+exp(2*I*a)/x^2)+2*arctan(x*exp(-I*a))*exp(I*a)
```

maxima [B] time = 0.46, size = 226, normalized size = 4.91

$$-\frac{2x^3+x(6\cos(2a)+6i\sin(2a))+\left(x^2(2\cos(a)+2i\sin(a))+(2\cos(a)+2i\sin(a))\cos(2a)-2(-i\cos(a)\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(2*x^3 + x*(6*cos(2*a) + 6*I*sin(2*a)) + (x^2*(2*cos(a) + 2*I*sin(a)) + (2
*cos(a) + 2*I*sin(a))*cos(2*a) - 2*(-I*cos(a) + sin(a))*sin(2*a))*arctan2(2
*x*cos(a)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2), (x^2 - cos(a)^2 - sin(a
)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)) + (x^2*(I*cos(a) - sin(a)) +
 (I*cos(a) - sin(a))*cos(2*a) - (cos(a) + I*sin(a))*sin(2*a))*log((x^2 + co
s(a)^2 + 2*x*sin(a) + sin(a)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)))/
(2*x^2 + 2*cos(2*a) + 2*I*sin(2*a))
```

mupad [B] time = 2.21, size = 42, normalized size = 0.91

$$-x+2\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}\,\mathrm{atan}\left(\frac{x}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}\right)-\frac{2\,x\,\mathrm{e}^{a\,2\mathrm{i}}}{x^2+\mathrm{e}^{a\,2\mathrm{i}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)^2,x)
```

```
[Out] 2*exp(a*2i)^(1/2)*atan(x/exp(a*2i)^(1/2)) - x - (2*x*exp(a*2i))/(exp(a*2i)
+ x^2)
```

sympy [A] time = 0.27, size = 51, normalized size = 1.11

$$-x-\frac{2xe^{2ia}}{x^2+e^{2ia}}-\left(i\log\left(x-ie^{ia}\right)-i\log\left(x+ie^{ia}\right)\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))**2,x)
```

```
[Out] -x - 2*x*exp(2*I*a)/(x**2 + exp(2*I*a)) - (I*log(x - I*exp(I*a)) - I*log(x
+ I*exp(I*a)))*exp(I*a)
```

3.147 $\int \frac{\tan^2(a+i\log(x))}{x}\,dx$

Optimal. Leaf size=18

$$-\log(x) - i\tan(a + i\log(x))$$

```
[Out] -ln(x)-I*tan(a+I*ln(x))
```

Rubi [A] time = 0.02, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {3473, 8}

$$-\log(x) - i\tan(a + i\log(x))$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + I*Log[x]]^2/x,x]
```

```
[Out] -Log[x] - I*Tan[a + I*Log[x]]
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{\tan^2(a+i\log(x))}{x}\,dx &= \text{Subst}\left(\int \tan^2(a+ix)\,dx, x, \log(x)\right)\\
&= -i\tan(a+i\log(x)) - \text{Subst}(\int 1\,dx, x, \log(x))\\
&= -\log(x) - i\tan(a+i\log(x))
\end{aligned}$$

Mathematica [A] time = 0.04, size = 28, normalized size = 1.56

$$i\tan^{-1}(\tan(a+i\log(x))) - i\tan(a+i\log(x))$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + I*Log[x]]^2/x,x]
```

```
[Out] I*ArcTan[Tan[a + I*Log[x]]] - I*Tan[a + I*Log[x]]
```

fricas [B] time = 0.50, size = 30, normalized size = 1.67

$$-\frac{\left(x^2 + e^{(2i\,a)}\right)\log(x) + 2\,e^{(2i\,a)}}{x^2 + e^{(2i\,a)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x,x, algorithm="fricas")
```

```
[Out] -((x^2 + e^(2*I*a))*log(x) + 2*e^(2*I*a))/(x^2 + e^(2*I*a))
```

giac [B] time = 0.25, size = 38, normalized size = 2.11

$$\frac{i\,\tan(a)^2 + i}{\left(\frac{i\left(x^2-1\right)\tan(a)}{x^2+1} - 1\right)\tan(a)} - \log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x,x, algorithm="giac")
```

```
[Out] (I*tan(a)^2 + I)/((I*(x^2 - 1)*tan(a)/(x^2 + 1) - 1)*tan(a)) - log(x)
```

maple [A] time = 0.01, size = 23, normalized size = 1.28

$$-i\tan\left(a + i\ln(x)\right) + i\left(a + i\ln(x)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))^2/x,x)
```

```
[Out] -I*tan(a+I*ln(x))+I*(a+I*ln(x))
```

maxima [A] time = 0.43, size = 17, normalized size = 0.94

$$i\,a - \log(x) - i\,\tan\left(a + i\,\log(x)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x,x, algorithm="maxima")
```

```
[Out] I*a - log(x) - I*tan(a + I*log(x))
```

mupad [B] time = 2.38, size = 16, normalized size = 0.89

$$-\ln(x) - \tan\left(a + \ln(x)\,1\mathrm{i}\right)\,1\mathrm{i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)^2/x,x)
```

```
[Out] - tan(a + log(x)*1i)*1i - log(x)
```

sympy **[A]** time = 0.30, size = 22, normalized size = 1.22

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))**2/x,x)
```

```
[Out] -log(x) - 2*exp(2*I*a)/(x**2 + exp(2*I*a))
```

3.148 $\int \frac{\tan^2(a+i\log(x))}{x^2}\,dx$

Optimal. Leaf size=60

$$\frac{3x}{x^2+e^{2ia}}+\frac{e^{2ia}}{x\left(x^2+e^{2ia}\right)}+2e^{-ia}\tan^{-1}\left(e^{-ia}x\right)$$

```
[Out] exp(2*I*a)/x/(exp(2*I*a)+x^2)+3*x/(exp(2*I*a)+x^2)+2*arctan(x/exp(I*a))/exp
(I*a)
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan^2(a+i\log(x))}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + I*Log[x]]^2/x^2,x]
```

```
[Out] Defer[Int][Tan[a + I*Log[x]]^2/x^2, x]
```

Rubi steps

$$\int \frac{\tan^2(a+i\log(x))}{x^2}\,dx=\int \frac{\tan^2(a+i\log(x))}{x^2}\,dx$$

Mathematica [A] time = 0.11, size = 72, normalized size = 1.20

$$\frac{2x(\cos(a)-i\sin(a))}{\left(x^2+1\right)\cos(a)-i\left(x^2-1\right)\sin(a)}+2\cos(a)\tan^{-1}(x(\cos(a)-i\sin(a)))-2i\sin(a)\tan^{-1}(x(\cos(a)-i\sin(a)))+\frac{1}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + I*Log[x]]^2/x^2,x]
```

```
[Out] x^(-1) + 2*ArcTan[x*(Cos[a] - I*Sin[a])]*Cos[a] - (2*I)*ArcTan[x*(Cos[a] -
I*Sin[a])]*Sin[a] + (2*x*(Cos[a] - I*Sin[a]))/((1 + x^2)*Cos[a] - I*(-1 + x
^2)*Sin[a])
```

fricas [A] time = 0.58, size = 78, normalized size = 1.30

$$\frac{3\,x^2e^{(i\,a)}+\left(i\,x^3+i\,xe^{(2i\,a)}\right)\log\left(x+i\,e^{(i\,a)}\right)+\left(-i\,x^3-i\,xe^{(2i\,a)}\right)\log\left(x-i\,e^{(i\,a)}\right)+e^{(3i\,a)}}{x^3e^{(i\,a)}+xe^{(3i\,a)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x^2,x, algorithm="fricas")
```

```
[Out] (3*x^2*e^(I*a) + (I*x^3 + I*x*e^(2*I*a))*log(x + I*e^(I*a)) + (-I*x^3 - I*x
*e^(2*I*a))*log(x - I*e^(I*a)) + e^(3*I*a))/(x^3*e^(I*a) + x*e^(3*I*a))
```

giac [A] time = 0.56, size = 73, normalized size = 1.22

$$2\left(\arctan\left(xe^{(-i\,a)}\right)e^{(-3i\,a)} + \frac{xe^{(-2i\,a)}}{x^2 + e^{(2i\,a)}}\right)e^{(2i\,a)} + \frac{5}{x\left(\frac{e^{(2i\,a)}}{x^2} + 1\right)} + \frac{e^{(2i\,a)}}{x^3\left(\frac{e^{(2i\,a)}}{x^2} + 1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x^2,x, algorithm="giac")
```

```
[Out] 2*(arctan(x*e^(-I*a))*e^(-3*I*a) + x*e^(-2*I*a)/(x^2 + e^(2*I*a)))*e^(2*I*a
) + 5/(x*(e^(2*I*a)/x^2 + 1)) + e^(2*I*a)/(x^3*(e^(2*I*a)/x^2 + 1))
```

maple [A] time = 0.05, size = 38, normalized size = 0.63

$$\frac{1}{x} + \frac{2}{x\left(1 + \frac{e^{2ia}}{x^2}\right)} + 2\arctan\left(x\,e^{-ia}\right)e^{-ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))^2/x^2,x)
```

```
[Out] 1/x+2/x/(1+exp(2*I*a)/x^2)+2*arctan(x*exp(-I*a))*exp(-I*a)
```

maxima [B] time = 0.47, size = 231, normalized size = 3.85

$$\frac{6\,x^2 - \left(x^3(2\,\cos(a) - 2i\,\sin(a)) + ((2\,\cos(a) - 2i\,\sin(a))\cos(2\,a) + 2\,(i\,\cos(a) + \sin(a))\sin(2\,a))x\right)\arctan\left(\frac{}{x^2}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x^2,x, algorithm="maxima")
```

```
[Out] (6*x^2 - (x^3*(2*cos(a) - 2*I*sin(a)) + ((2*cos(a) - 2*I*sin(a))*cos(2*a) +
 2*(I*cos(a) + sin(a))*sin(2*a))*x)*arctan2(2*x*cos(a)/(x^2 + cos(a)^2 - 2*
x*sin(a) + sin(a)^2), (x^2 - cos(a)^2 - sin(a)^2)/(x^2 + cos(a)^2 - 2*x*sin
(a) + sin(a)^2)) + (x^3*(-I*cos(a) - sin(a)) + ((-I*cos(a) - sin(a))*cos(2*
a) + (cos(a) - I*sin(a))*sin(2*a))*x)*log((x^2 + cos(a)^2 + 2*x*sin(a) + si
n(a)^2)/(x^2 + cos(a)^2 - 2*x*sin(a) + sin(a)^2)) + 2*cos(2*a) + 2*I*sin(2*
a))/(2*x^3 + x*(2*cos(2*a) + 2*I*sin(2*a)))
```

mupad [B] time = 2.20, size = 45, normalized size = 0.75

$$\frac{2\,\mathrm{atan}\left(\frac{x}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}\right)}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}+\frac{3\,x^2+\mathrm{e}^{a\,2\mathrm{i}}}{x^3+\mathrm{e}^{a\,2\mathrm{i}}\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)^2/x^2,x)
```

```
[Out] (2*atan(x/exp(a*2i)^(1/2)))/exp(a*2i)^(1/2) + (exp(a*2i) + 3*x^2)/(x^3 + x*
exp(a*2i))
```

sympy [A] time = 0.37, size = 54, normalized size = 0.90

$$-\frac{-3x^2-e^{2ia}}{x^3+xe^{2ia}}-\left(i\log\left(x-ie^{ia}\right)-i\log\left(x+ie^{ia}\right)\right)e^{-ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))**2/x**2,x)
```

```
[Out] -(-3*x**2 - exp(2*I*a))/(x**3 + x*exp(2*I*a)) - (I*log(x - I*exp(I*a)) - I*
log(x + I*exp(I*a)))*exp(-I*a)
```

3.149 $\int \frac{\tan^2(a+i\log(x))}{x^3}\,dx$

Optimal. Leaf size=55

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

```
[Out] -2/exp(2*I*a)/(1+exp(2*I*a)/x^2)+1/2/x^2-2*ln(1+exp(2*I*a)/x^2)/exp(2*I*a)
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan^2(a+i\log(x))}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + I*Log[x]]^2/x^3,x]
```

```
[Out] Defer[Int][Tan[a + I*Log[x]]^2/x^3, x]
```

Rubi steps

$$\int \frac{\tan^2(a+i\log(x))}{x^3}\,dx=\int \frac{\tan^2(a+i\log(x))}{x^3}\,dx$$

Mathematica [B] time = 0.19, size = 150, normalized size = 2.73

$$\frac{2\cos(a)-2i\sin(a)}{\left(x^2+1\right)\cos(a)-i\left(x^2-1\right)\sin(a)}-2i\cos(2a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cot(a)}{x^2-1}\right)-2\sin(2a)\tan^{-1}\left(\frac{\left(x^2+1\right)\cot(a)}{x^2-1}\right)-\cos(2a$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + I*Log[x]]^2/x^3,x]
```

```
[Out] 1/(2*x^2) - (2*I)*ArcTan[((1 + x^2)*Cot[a])/(-1 + x^2)]*Cos[2*a] + 4*Cos[2*
a]*Log[x] - Cos[2*a]*Log[1 + x^4 + 2*x^2*Cos[2*a]] + (2*Cos[a] - (2*I)*Sin[
a])/((1 + x^2)*Cos[a] - I*(-1 + x^2)*Sin[a]) - 2*ArcTan[((1 + x^2)*Cot[a])/
(-1 + x^2)]*Sin[2*a] - (4*I)*Log[x]*Sin[2*a] + I*Log[1 + x^4 + 2*x^2*Cos[2*
a]]*Sin[2*a]
```

fricas [A] time = 0.49, size = 74, normalized size = 1.35

$$\frac{5\,x^2e^{(2i\,a)}-4\left(x^4+x^2e^{(2i\,a)}\right)\log\left(x^2+e^{(2i\,a)}\right)+8\left(x^4+x^2e^{(2i\,a)}\right)\log(x)+e^{(4i\,a)}}{2\left(x^4e^{(2i\,a)}+x^2e^{(4i\,a)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x^3,x, algorithm="fricas")
```

```
[Out] 1/2*(5*x^2*e^(2*I*a) - 4*(x^4 + x^2*e^(2*I*a))*log(x^2 + e^(2*I*a)) + 8*(x^
4 + x^2*e^(2*I*a))*log(x) + e^(4*I*a))/(x^4*e^(2*I*a) + x^2*e^(4*I*a))
```

giac [B] time = 0.77, size = 178, normalized size = 3.24

$$-\frac{2\,\log\left(-x^2-e^{(2i\,a)}\right)}{\frac{e^{(4i\,a)}}{x^2}+e^{(2i\,a)}}+\frac{4\,\log(x)}{\frac{e^{(4i\,a)}}{x^2}+e^{(2i\,a)}}-\frac{2}{\frac{e^{(4i\,a)}}{x^2}+e^{(2i\,a)}}-\frac{2\,e^{(2i\,a)}\log\left(-x^2-e^{(2i\,a)}\right)}{x^2\left(\frac{e^{(4i\,a)}}{x^2}+e^{(2i\,a)}\right)}+\frac{4\,e^{(2i\,a)}\log(x)}{x^2\left(\frac{e^{(4i\,a)}}{x^2}+e^{(2i\,a)}\right)}+\frac{e^{(2i\,a)}}{2\,x^2\left(\frac{e^{(4i\,a)}}{x^2}+e^{(2i\,a)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*log(x))^2/x^3,x, algorithm="giac")
```

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

maple [A] time = 0.06, size = 51, normalized size = 0.93

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+I*ln(x))^2/x^3,x)
```

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

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(tan(a+I*log(x))^2/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

mupad [B] time = 2.21, size = 56, normalized size = 1.02

$$-2\,\mathrm{e}^{-a\,2\mathrm{i}}\,\ln\left(x^2+\mathrm{e}^{a\,2\mathrm{i}}\right)+4\,\mathrm{e}^{-a\,2\mathrm{i}}\,\ln(x)+\frac{\frac{5\,x^2}{2}+\frac{\mathrm{e}^{a\,2\mathrm{i}}}{2}}{x^4+\mathrm{e}^{a\,2\mathrm{i}}\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)^2/x^3,x)
```

```
[Out] 4*exp(-a*2i)*log(x) - 2*exp(-a*2i)*log(exp(a*2i) + x^2) + (exp(a*2i)/2 + (5
*x^2)/2)/(x^2*exp(a*2i) + x^4)
```

sympy [A] time = 0.49, size = 61, normalized size = 1.11

$$-\frac{-5x^2-e^{2ia}}{2x^4+2x^2e^{2ia}}+4e^{-2ia}\log{(x)}-2e^{-2ia}\log{\left(x^2+e^{2ia}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+I*ln(x))**2/x**3,x)
```

```
[Out] -(-5*x**2 - exp(2*I*a))/(2*x**4 + 2*x**2*exp(2*I*a)) + 4*exp(-2*I*a)*log(x)
 - 2*exp(-2*I*a)*log(x**2 + exp(2*I*a))
```

3.150 $\int (ex)^m \tan(a + i\log(x))\,dx$

Optimal. Leaf size=71

$$\frac{2i(ex)^{m+1}\,{}_2F_1\left(1,\frac{1}{2}(-m-1);\frac{1-m}{2};-\frac{e^{2ia}}{x^2}\right)}{e(m+1)}-\frac{i(ex)^{m+1}}{e(m+1)}$$

```
[Out] -I*(e*x)^(1+m)/e/(1+m)+2*I*(e*x)^(1+m)*hypergeom([1, -1/2-1/2*m],[1/2-1/2*m
],-exp(2*I*a)/x^2)/e/(1+m)
```

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \tan(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Tan[a + I*Log[x]],x]
```

```
[Out] Defer[Int][(e*x)^m*Tan[a + I*Log[x]], x]
```

Rubi steps

$$\int (ex)^m \tan(a + i\log(x))\,dx = \int (ex)^m \tan(a + i\log(x))\,dx$$

Mathematica [A] time = 0.20, size = 124, normalized size = 1.75

$$\frac{x(\cos(a)-i\sin(a))(ex)^m\left((m+1)x^2(\sin(a)+i\cos(a))\,{}_2F_1\left(1,\frac{m+3}{2};\frac{m+5}{2};-x^2(\cos(2a)-i\sin(2a))\right)+(m+3)(\sin(a\ldots}{(m+1)(m+3)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Tan[a + I*Log[x]],x]
```

```
[Out] (x*(e*x)^m*(Cos[a] - I*Sin[a])*((3 + m)*Hypergeometric2F1[1, (1 + m)/2, (3
+ m)/2, -(x^2*(Cos[2*a] - I*Sin[2*a]))]*((-I)*Cos[a] + Sin[a]) + (1 + m)*x^
2*Hypergeometric2F1[1, (3 + m)/2, (5 + m)/2, -(x^2*(Cos[2*a] - I*Sin[2*a]))
]*(I*Cos[a] + Sin[a])))/((1 + m)*(3 + m))
```

fricas [F] time = 0.50, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\left(i\,x^2 - i\,e^{(2i\,a)}\right)e^{\left(m\log(e)+m\log(x)\right)}}{x^2 + e^{(2i\,a)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x)),x, algorithm="fricas")
[Out] integral((I*x^2 - I*e^(2*I*a))*e^(m*log(e) + m*log(x))/(x^2 + e^(2*I*a)), x
)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a + i\,\log(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x)),x, algorithm="giac")
[Out] integrate((e*x)^m*tan(a + I*log(x)), x)
```

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a + i\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(a+I*ln(x)),x)
[Out] int((e*x)^m*tan(a+I*ln(x)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a + i\,\log(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x)),x, algorithm="maxima")
[Out] integrate((e*x)^m*tan(a + I*log(x)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(a + \ln(x)\,1\mathrm{i}\right)\,(e\,x)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)*(e*x)^m,x)
```

```
[Out] int(tan(a + log(x)*1i)*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a + i\log\left(x\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*tan(a+I*ln(x)),x)
```

```
[Out] Integral((e*x)**m*tan(a + I*log(x)), x)
```

3.151 $\int (ex)^m \tan^2(a+i\log(x))\,dx$

Optimal. Leaf size=77

$$-2x(ex)^m\,{}_2F_1\left(1,\frac{1}{2}(-m-1);\frac{1-m}{2};-\frac{e^{2ia}}{x^2}\right)+\frac{2x(ex)^m}{1+\frac{e^{2ia}}{x^2}}-\frac{x(ex)^m}{m+1}$$

```
[Out] -x*(e*x)^m/(1+m)+2*x*(e*x)^m/(1+exp(2*I*a)/x^2)-2*x*(e*x)^m*hypergeom([1, -1/2-1/2*m],[1/2-1/2*m],-exp(2*I*a)/x^2)
```

Rubi [F] time = 0.09, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \tan^2(a+i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Tan[a + I*Log[x]]^2,x]
[Out] Defer[Int][(e*x)^m*Tan[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int (ex)^m \tan^2(a+i\log(x))\,dx=\int (ex)^m \tan^2(a+i\log(x))\,dx$$

Mathematica [A] time = 0.16, size = 86, normalized size = 1.12

$$\frac{x(ex)^m\left(4\,{}_2F_1\left(1,\frac{m+1}{2};\frac{m+3}{2};-x^2(\cos(2a)-i\sin(2a))\right)-4\,{}_2F_1\left(2,\frac{m+1}{2};\frac{m+3}{2};-x^2(\cos(2a)-i\sin(2a))\right)-1\right)}{m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Tan[a + I*Log[x]]^2,x]
[Out] (x*(e*x)^m*(-1 + 4*Hypergeometric2F1[1, (1 + m)/2, (3 + m)/2, -(x^2*(Cos[2*a] - I*Sin[2*a]))] - 4*Hypergeometric2F1[2, (1 + m)/2, (3 + m)/2, -(x^2*(Cos[2*a] - I*Sin[2*a]))]))/(1 + m)
```

fricas [F] time = 0.73, size = 0, normalized size = 0.00

$$\text{integral}\left(-\frac{\left(x^4-2\,x^2e^{(2i\,a)}+e^{(4i\,a)}\right)e^{\left(m\log(e)+m\log(x)\right)}}{x^4+2\,x^2e^{(2i\,a)}+e^{(4i\,a)}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] integral(-(x^4 - 2*x^2*e^(2*I*a) + e^(4*I*a))*e^(m*log(e) + m*log(x))/(x^4
+ 2*x^2*e^(2*I*a) + e^(4*I*a)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a+i\log(x)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*tan(a + I*log(x))^2, x)
```

maple [F] time = 0.05, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\tan^2(a+i\ln(x))\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(a+I*ln(x))^2,x)
```

```
[Out] int((e*x)^m*tan(a+I*ln(x))^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a+i\log(x)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m*tan(a + I*log(x))^2, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(a+\ln(x)\,1\mathrm{i}\right)^2 (e\,x)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)^2*(e*x)^m,x)
```

```
[Out] int(tan(a + log(x)*1i)^2*(e*x)^m, x)
```

sympy [**F**] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan^2 \left(a + i \log (x)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*tan(a+I*ln(x))**2,x)
```

```
[Out] Integral((e*x)**m*tan(a + I*log(x))**2, x)
```

3.152 $\int (ex)^m \tan^3(a + i\log(x))\,dx$

Optimal. Leaf size=184

$$-\frac{i\left(m^2+2m+3\right)x(ex)^m\,{}_2F_1\left(1,\frac{1}{2}(-m-1);\frac{1-m}{2};-\frac{e^{2ia}}{x^2}\right)}{m+1}+\frac{ie^{-2ia}x\left(\frac{e^{4ia}(1-m)}{x^2}+e^{2ia}(m+3)\right)(ex)^m}{2\left(1+\frac{e^{2ia}}{x^2}\right)}+\frac{ix\left(1-\frac{e^{2ia}}{x^2}\right)^2(ex)^m}{2\left(1+\frac{e^{2ia}}{x^2}\right)^2}$$

```
[Out] -1/2*I*(1-m)*m*x*(e*x)^m/(1+m)+1/2*I*(1-exp(2*I*a)/x^2)^2*x*(e*x)^m/(1+exp(
2*I*a)/x^2)^2+1/2*I*(exp(2*I*a)*(3+m)+exp(4*I*a)*(1-m)/x^2)*x*(e*x)^m/exp(2
*I*a)/(1+exp(2*I*a)/x^2)-I*(m^2+2*m+3)*x*(e*x)^m*hypergeom([1, -1/2-1/2*m],
[1/2-1/2*m],-exp(2*I*a)/x^2)/(1+m)
```

Rubi [F] time = 0.09, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \tan^3(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Tan[a + I*Log[x]]^3,x]
```

```
[Out] Defer[Int][(e*x)^m*Tan[a + I*Log[x]]^3, x]
```

Rubi steps

$$\int (ex)^m \tan^3(a + i\log(x))\,dx = \int (ex)^m \tan^3(a + i\log(x))\,dx$$

Mathematica [A] time = 0.23, size = 125, normalized size = 0.68

$$\frac{ix(ex)^m\left(6\,{}_2F_1\left(1,\frac{m+1}{2};\frac{m+3}{2};-x^2(\cos(2a)-i\sin(2a))\right)-12\,{}_2F_1\left(2,\frac{m+1}{2};\frac{m+3}{2};-x^2(\cos(2a)-i\sin(2a))\right)+8\,{}_2F_1\left(3,\right.\right.}{m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Tan[a + I*Log[x]]^3,x]
```

```
[Out] (I*x*(e*x)^m*(-1 + 6*Hypergeometric2F1[1, (1 + m)/2, (3 + m)/2, -(x^2*(Cos[
2*a] - I*Sin[2*a]))] - 12*Hypergeometric2F1[2, (1 + m)/2, (3 + m)/2, -(x^2*
(Cos[2*a] - I*Sin[2*a]))] + 8*Hypergeometric2F1[3, (1 + m)/2, (3 + m)/2, -(
x^2*(Cos[2*a] - I*Sin[2*a]))]))/(1 + m)
```

fricas [F] time = 0.50, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(\frac{\left(-i\,x^{6}+3i\,x^{4}e^{(2i\,a)}-3i\,x^{2}e^{(4i\,a)}+i\,e^{(6i\,a)}\right)e^{\left(m\log(e)+m\log(x)\right)}}{x^{6}+3\,x^{4}e^{(2i\,a)}+3\,x^{2}e^{(4i\,a)}+e^{(6i\,a)}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x))^3,x, algorithm="fricas")
```

```
[Out] integral((-I*x^6 + 3*I*x^4*e^(2*I*a) - 3*I*x^2*e^(4*I*a) + I*e^(6*I*a))*e^(
m*log(e) + m*log(x))/(x^6 + 3*x^4*e^(2*I*a) + 3*x^2*e^(4*I*a) + e^(6*I*a)),
 x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a + i\,\log(x)\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x))^3,x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*tan(a + I*log(x))^3, x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\tan^3 (a + i\ln(x))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(a+I*ln(x))^3,x)
```

```
[Out] int((e*x)^m*tan(a+I*ln(x))^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(a + i\,\log(x)\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+I*log(x))^3,x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m*tan(a + I*log(x))^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(a + \ln(x)\,1\mathrm{i}\right)^3 (e\,x)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x)*1i)^3*(e*x)^m,x)
```

```
[Out] int(tan(a + log(x)*1i)^3*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan^3 \left(a + i \log (x)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*tan(a+I*ln(x))**3,x)
```

```
[Out] Integral((e*x)**m*tan(a + I*log(x))**3, x)
```

3.153 $\int \tan^p(a+b\log(x))\,dx$

Optimal. Leaf size=142

$$x\left(1-e^{2ia}x^{2ib}\right)^{-p}\left(\frac{i\left(1-e^{2ia}x^{2ib}\right)}{1+e^{2ia}x^{2ib}}\right)^p\left(1+e^{2ia}x^{2ib}\right)^pF_1\left(-\frac{i}{2b};-p,p;1-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)$$

```
[Out] x*(I*(1-exp(2*I*a)*x^(2*I*b))/(1+exp(2*I*a)*x^(2*I*b)))^p*(1+exp(2*I*a)*x^(
2*I*b))^p*AppellF1(-1/2*I/b,-p,p,1-1/2*I/b,exp(2*I*a)*x^(2*I*b),-exp(2*I*a)
*x^(2*I*b))/((1-exp(2*I*a)*x^(2*I*b))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan^p(a+b\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + b*Log[x]]^p,x]
```

```
[Out] Defer[Int][Tan[a + b*Log[x]]^p, x]
```

Rubi steps

$$\int \tan^p(a+b\log(x))\,dx=\int \tan^p(a+b\log(x))\,dx$$

Mathematica [B] time = 0.69, size = 330, normalized size = 2.32

$$\frac{(2b-i)x\left(-\frac{i\left(-1+e^{2ia}x^{2ib}\right)}{1+e^{2ia}x^{2ib}}\right)^pF_1\left(-\frac{i}{2b};-p,p;1-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x}{-2e^{2ia}bpx^{2ib}F_1\left(1-\frac{i}{2b};1-p,p;2-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)-2e^{2ia}bpx^{2ib}F_1\left(1-\frac{i}{2b};-p,p+1;2-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Tan[a + b*Log[x]]^p,x]
```

```
[Out] ((-I + 2*b)*x*(((-I)*(-1 + E^((2*I)*a)*x^((2*I)*b)))/(1 + E^((2*I)*a)*x^((2
*I)*b)))^p*AppellF1[(-1/2*I)/b, -p, p, 1 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b)
, -(E^((2*I)*a)*x^((2*I)*b))])/(-2*b*E^((2*I)*a)*p*x^((2*I)*b)*AppellF1[1 -
 (I/2)/b, 1 - p, p, 2 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*I)*a)*x^(
```

```
(2*I)*b))] - 2*b*E^((2*I)*a)*p*x^((2*I)*b)*AppellF1[1 - (I/2)/b, -p, 1 + p,
 2 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*I)*a)*x^((2*I)*b))] + (-I +
2*b)*AppellF1[(-1/2*I)/b, -p, p, 1 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -(E^
((2*I)*a)*x^((2*I)*b))])
```

fricas [F] time = 0.46, size = 0, normalized size = 0.00

$$\text{integral}\left(\tan\left(b\log(x)+a\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(x))^p,x, algorithm="fricas")
[Out] integral(tan(b*log(x) + a)^p, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(x))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.33, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a+b\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(x))^p,x)
[Out] int(tan(a+b*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan\left(b\log(x)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(x))^p,x, algorithm="maxima")
[Out] integrate(tan(b*log(x) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\tan\left(a+b\,\ln(x)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + b*log(x))^p,x)
[Out] int(tan(a + b*log(x))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a+b\log\left(x\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*ln(x))**p,x)
[Out] Integral(tan(a + b*log(x))**p, x)
```

3.154 $\int (ex)^m \tan^p(a+b\log(x))\,dx$

Optimal. Leaf size=162

$$\frac{(ex)^{m+1}\left(1-e^{2ia}x^{2ib}\right)^{-p}\left(\frac{i\left(1-e^{2ia}x^{2ib}\right)}{1+e^{2ia}x^{2ib}}\right)^p\left(1+e^{2ia}x^{2ib}\right)^p F_1\left(-\frac{i(m+1)}{2b};-p,p;1-\frac{i(m+1)}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)}{e(m+1)}$$

```
[Out] (e*x)^(1+m)*(I*(1-exp(2*I*a)*x^(2*I*b))/(1+exp(2*I*a)*x^(2*I*b)))^p*(1+exp(
2*I*a)*x^(2*I*b))^p*AppellF1(-1/2*I*(1+m)/b,-p,p,1-1/2*I*(1+m)/b,exp(2*I*a)
*x^(2*I*b),-exp(2*I*a)*x^(2*I*b))/e/(1+m)/((1-exp(2*I*a)*x^(2*I*b))^p)
```

Rubi [F] time = 0.13, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \tan^p(a+b\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Tan[a + b*Log[x]]^p,x]
```

```
[Out] Defer[Int][(e*x)^m*Tan[a + b*Log[x]]^p, x]
```

Rubi steps

$$\int (ex)^m \tan^p(a+b\log(x))\,dx = \int (ex)^m \tan^p(a+b\log(x))\,dx$$

Mathematica [A] time = 0.67, size = 157, normalized size = 0.97

$$\frac{x(ex)^m\left(1-e^{2ia}x^{2ib}\right)^{-p}\left(-\frac{i\left(-1+e^{2ia}x^{2ib}\right)}{1+e^{2ia}x^{2ib}}\right)^p\left(1+e^{2ia}x^{2ib}\right)^p F_1\left(-\frac{i(m+1)}{2b};-p,p;1-\frac{i(m+1)}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)}{m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Tan[a + b*Log[x]]^p,x]
```

```
[Out] (x*(e*x)^m*(((-I)*(-1 + E^((2*I)*a)*x^((2*I)*b)))/(1 + E^((2*I)*a)*x^((2*I)
*b)))^p*(1 + E^((2*I)*a)*x^((2*I)*b))^p*AppellF1[((-1/2*I)*(1 + m))/b, -p,
p, 1 - ((I/2)*(1 + m))/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*I)*a)*x^((2*I)*b
))])/((1 + m)*(1 - E^((2*I)*a)*x^((2*I)*b))^p)
```

fricas [F] time = 0.50, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^{m}\tan\left(b\log(x)+a\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+b*log(x))^p,x, algorithm="fricas")
[Out] integral((e*x)^m*tan(b*log(x) + a)^p, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+b*log(x))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int (ex)^{m}\left(\tan^{p}\left(a+b\ln(x)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(a+b*ln(x))^p,x)
[Out] int((e*x)^m*tan(a+b*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^{m}\tan\left(b\log(x)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(a+b*log(x))^p,x, algorithm="maxima")
[Out] integrate((e*x)^m*tan(b*log(x) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(a+b\,\ln(x)\right)^{p}\,(e\,x)^{m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + b*log(x))^p*(e*x)^m,x)
```

```
[Out] int(tan(a + b*log(x))^p*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan^p\left(a + b\log(x)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*tan(a+b*ln(x))**p,x)
```

```
[Out] Integral((e*x)**m*tan(a + b*log(x))**p, x)
```

3.155 $\int \tan^p(a+\log(x))\,dx$

Optimal. Leaf size=120

$$x\left(1-e^{2ia}x^{2i}\right)^{-p}\left(\frac{i\left(1-e^{2ia}x^{2i}\right)}{1+e^{2ia}x^{2i}}\right)^p\left(1+e^{2ia}x^{2i}\right)^p F_1\left(-\frac{i}{2};-p,p;1-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)$$

```
[Out] (I*(1-exp(2*I*a)*x^(2*I))/(1+exp(2*I*a)*x^(2*I)))^p*(1+exp(2*I*a)*x^(2*I))^
p*x*AppellF1(-1/2*I,-p,p,1-1/2*I,exp(2*I*a)*x^(2*I),-exp(2*I*a)*x^(2*I))/((
1-exp(2*I*a)*x^(2*I))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan^p(a+\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + Log[x]]^p,x]
```

```
[Out] Defer[Int][Tan[a + Log[x]]^p, x]
```

Rubi steps

$$\int \tan^p(a+\log(x))\,dx=\int \tan^p(a+\log(x))\,dx$$

Mathematica [A] time = 0.53, size = 240, normalized size = 2.00

$$\frac{(1+2i)x\left(-\frac{i\left(-1+e^{2ia}x^{2i}\right)}{1+e^{2ia}x^{2i}}\right)^p F_1\left(-\frac{i}{2};-p,p;1-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)}{(1+2i)F_1\left(-\frac{i}{2};-p,p;1-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)-2ie^{2ia}px^{2i}\left(F_1\left(1-\frac{i}{2};1-p,p;2-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)+F_1\left(1-\frac{i}{2};-\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Tan[a + Log[x]]^p,x]
```

```
[Out] ((1 + 2*I)*(((-I)*(-1 + E^((2*I)*a)*x^(2*I)))/(1 + E^((2*I)*a)*x^(2*I)))^p*
x*AppellF1[-1/2*I, -p, p, 1 - I/2, E^((2*I)*a)*x^(2*I), -(E^((2*I)*a)*x^(2*
I))])/((1 + 2*I)*AppellF1[-1/2*I, -p, p, 1 - I/2, E^((2*I)*a)*x^(2*I), -(E^
((2*I)*a)*x^(2*I))] - (2*I)*E^((2*I)*a)*p*x^(2*I)*(AppellF1[1 - I/2, 1 - p,
```

```
p, 2 - I/2, E^((2*I)*a)*x^(2*I), -(E^((2*I)*a)*x^(2*I))] + AppellF1[1 - I/
2, -p, 1 + p, 2 - I/2, E^((2*I)*a)*x^(2*I), -(E^((2*I)*a)*x^(2*I))]))
```

fricas [F] time = 0.68, size = 0, normalized size = 0.00

$$\text{integral}\left(\tan\left(a+\log(x)\right)^{p}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+log(x))^p,x, algorithm="fricas")
```

```
[Out] integral(tan(a + log(x))^p, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+log(x))^p,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.43, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a+\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+ln(x))^p,x)
```

```
[Out] int(tan(a+ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan\left(a+\log(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+log(x))^p,x, algorithm="maxima")
```

```
[Out] integrate(tan(a + log(x))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\tan\left(a+\ln(x)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + log(x))^p,x)
[Out] int(tan(a + log(x))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a + \log\left(x\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+ln(x))**p,x)
[Out] Integral(tan(a + log(x))**p, x)
```

3.156 $\int \tan^p(a+2\log(x))\,dx$

Optimal. Leaf size=120

$$x\left(1-e^{2ia}x^{4i}\right)^{-p}\left(\frac{i\left(1-e^{2ia}x^{4i}\right)}{1+e^{2ia}x^{4i}}\right)^{p}\left(1+e^{2ia}x^{4i}\right)^{p}F_1\left(-\frac{i}{4};-p,p;1-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)$$

```
[Out] (I*(1-exp(2*I*a)*x^(4*I))/(1+exp(2*I*a)*x^(4*I)))^p*(1+exp(2*I*a)*x^(4*I))^
p*x*AppellF1(-1/4*I,-p,p,1-1/4*I,exp(2*I*a)*x^(4*I),-exp(2*I*a)*x^(4*I))/((
1-exp(2*I*a)*x^(4*I))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan^p(a+2\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + 2*Log[x]]^p,x]
```

```
[Out] Defer[Int][Tan[a + 2*Log[x]]^p, x]
```

Rubi steps

$$\int \tan^p(a+2\log(x))\,dx=\int \tan^p(a+2\log(x))\,dx$$

Mathematica [A] time = 0.51, size = 240, normalized size = 2.00

$$\frac{(1+4i)x\left(-\frac{i\left(-1+e^{2ia}x^{4i}\right)}{1+e^{2ia}x^{4i}}\right)^{p}F_1\left(-\frac{i}{4};-p,p;1-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)}{(1+4i)F_1\left(-\frac{i}{4};-p,p;1-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)-4ie^{2ia}px^{4i}\left(F_1\left(1-\frac{i}{4};1-p,p;2-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)+F_1\left(1-\frac{i}{4};-p\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Tan[a + 2*Log[x]]^p,x]
```

```
[Out] ((1 + 4*I)*(((-I)*(-1 + E^((2*I)*a)*x^(4*I)))/(1 + E^((2*I)*a)*x^(4*I)))^p*
x*AppellF1[-1/4*I, -p, p, 1 - I/4, E^((2*I)*a)*x^(4*I), -(E^((2*I)*a)*x^(4*
I))])/((1 + 4*I)*AppellF1[-1/4*I, -p, p, 1 - I/4, E^((2*I)*a)*x^(4*I), -(E^
((2*I)*a)*x^(4*I))] - (4*I)*E^((2*I)*a)*p*x^(4*I)*(AppellF1[1 - I/4, 1 - p,
```

```
 p, 2 - I/4, E^((2*I)*a)*x^(4*I), -(E^((2*I)*a)*x^(4*I))] + AppellF1[1 - I/
4, -p, 1 + p, 2 - I/4, E^((2*I)*a)*x^(4*I), -(E^((2*I)*a)*x^(4*I))]))
```

fricas [F] time = 0.51, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(\tan\left(a+2\,\log(x)\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+2*log(x))^p,x, algorithm="fricas")
[Out] integral(tan(a + 2*log(x))^p, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+2*log(x))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.32, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a+2\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+2*ln(x))^p,x)
[Out] int(tan(a+2*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan\left(a+2\,\log(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+2*log(x))^p,x, algorithm="maxima")
[Out] integrate(tan(a + 2*log(x))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\tan\left(a+2\,\ln(x)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + 2*log(x))^p,x)
```

```
[Out] int(tan(a + 2*log(x))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a+2\log\left(x\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+2*ln(x))**p,x)
```

```
[Out] Integral(tan(a + 2*log(x))**p, x)
```

3.157 $\int \tan^p(a+3\log(x))\,dx$

Optimal. Leaf size=120

$$x\left(1-e^{2ia}x^{6i}\right)^{-p}\left(\frac{i\left(1-e^{2ia}x^{6i}\right)}{1+e^{2ia}x^{6i}}\right)^p\left(1+e^{2ia}x^{6i}\right)^p F_1\left(-\frac{i}{6};-p,p;1-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)$$

```
[Out] (I*(1-exp(2*I*a)*x^(6*I))/(1+exp(2*I*a)*x^(6*I)))^p*(1+exp(2*I*a)*x^(6*I))^
p*x*AppellF1(-1/6*I,-p,p,1-1/6*I,exp(2*I*a)*x^(6*I),-exp(2*I*a)*x^(6*I))/((
1-exp(2*I*a)*x^(6*I))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan^p(a+3\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[a + 3*Log[x]]^p,x]
```

```
[Out] Defer[Int][Tan[a + 3*Log[x]]^p, x]
```

Rubi steps

$$\int \tan^p(a+3\log(x))\,dx=\int \tan^p(a+3\log(x))\,dx$$

Mathematica [A] time = 0.50, size = 240, normalized size = 2.00

$$\frac{(1+6i)x\left(-\frac{i\left(-1+e^{2ia}x^{6i}\right)}{1+e^{2ia}x^{6i}}\right)^p F_1\left(-\frac{i}{6};-p,p;1-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)}{(1+6i)F_1\left(-\frac{i}{6};-p,p;1-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)-6ie^{2ia}px^{6i}\left(F_1\left(1-\frac{i}{6};1-p,p;2-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)+F_1\left(1-\frac{i}{6};\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Tan[a + 3*Log[x]]^p,x]
```

```
[Out] ((1 + 6*I)*(((-I)*(-1 + E^((2*I)*a)*x^(6*I)))/(1 + E^((2*I)*a)*x^(6*I)))^p*
x*AppellF1[-1/6*I, -p, p, 1 - I/6, E^((2*I)*a)*x^(6*I), -(E^((2*I)*a)*x^(6*
I))])/((1 + 6*I)*AppellF1[-1/6*I, -p, p, 1 - I/6, E^((2*I)*a)*x^(6*I), -(E^
((2*I)*a)*x^(6*I))] - (6*I)*E^((2*I)*a)*p*x^(6*I)*(AppellF1[1 - I/6, 1 - p,
```

```
 p, 2 - I/6, E^((2*I)*a)*x^(6*I), -(E^((2*I)*a)*x^(6*I))] + AppellF1[1 - I/
6, -p, 1 + p, 2 - I/6, E^((2*I)*a)*x^(6*I), -(E^((2*I)*a)*x^(6*I))]))
```

fricas [F] time = 0.46, size = 0, normalized size = 0.00

$$\text{integral}\left(\tan\left(a+3\log(x)\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+3*log(x))^p,x, algorithm="fricas")
[Out] integral(tan(a + 3*log(x))^p, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+3*log(x))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.30, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a+3\ln(x)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+3*ln(x))^p,x)
[Out] int(tan(a+3*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan\left(a+3\log(x)\right)^{p}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+3*log(x))^p,x, algorithm="maxima")
[Out] integrate(tan(a + 3*log(x))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(a+3\ln(x)\right)^{p}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + 3*log(x))^p,x)
```

```
[Out] int(tan(a + 3*log(x))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(a + 3\log\left(x\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+3*ln(x))**p,x)
```

```
[Out] Integral(tan(a + 3*log(x))**p, x)
```

3.158 $\int x^3 \tan \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$

Optimal. Leaf size=71

$$\frac{1}{2} i x^4 \, _2F_1\left(1,-\frac{2 i}{b d n};1-\frac{2 i}{b d n};-e^{2 i a d} \left(c x^n\right)^{2 i b d}\right)-\frac{i x^4}{4}$$

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

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3 \tan \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x^3*Tan[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

$$\int x^3 \tan \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx=\int x^3 \tan \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Mathematica [B] time = 6.34, size = 146, normalized size = 2.06

$$\frac{x^4 \left(2 i e^{2 i d \left(a+b \log \left(c x^n\right)\right)} \, _2F_1\left(1,1-\frac{2 i}{b d n};2-\frac{2 i}{b d n};-e^{2 i d \left(a+b \log \left(c x^n\right)\right)}\right)+(b d n-2 i) \, _2F_1\left(1,-\frac{2 i}{b d n};1-\frac{2 i}{b d n};-e^{2 i d \left(a+b \log \left(c x^n\right)\right)}\right)\right)}{-8-4 i b d n}$$

Antiderivative was successfully verified.

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

```
[Out] (x^4*((2*I)*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (2*I)/(
b*d*n), 2 - (2*I)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (-2*I + b*d*n
)*Hypergeometric2F1[1, (-2*I)/(b*d*n), 1 - (2*I)/(b*d*n), -E^((2*I)*d*(a +
b*Log[c*x^n]))]))/(-8 - (4*I)*b*d*n)
```

fricas [F] time = 0.43, size = 0, normalized size = 0.00

$${\rm integral}\left(x^{3} \tan \left(b d \log \left(c x^{n}\right) + a d\right), x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.36, size = 0, normalized size = 0.00

$$\int x^3 \tan (d (a + b \ln (c x^n)))\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*tan(d*(a+b*ln(c*x^n))),x)
[Out] int(x^3*tan(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \tan \left(\left(b \log (c x^n) + a\right) d\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^3 \tan (d\ (a + b\ \ln (c x^n)))\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \tan \left(ad + bd \log \left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**3*tan(a*d + b*d*log(c*x**n)), x)
```

3.159 $\int x^2 \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=75

$$\frac{2}{3}ix^3\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)-\frac{ix^3}{3}$$

```
[Out] -1/3*I*x^3+2/3*I*x^3*hypergeom([1, -3/2*I/b/d/n],[1-3/2*I/b/d/n],-exp(2*I*a
*d)*(c*x^n)^(2*I*b*d))
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x^2*Tan[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

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

Mathematica [B] time = 5.91, size = 155, normalized size = 2.07

$$\frac{x^3\left(3ie^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{3i}{2bdn};2-\frac{3i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(2bdn-3i)\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};-e^{2id\left(a+b\log\right.}\right.\right.}{-9-6ibdn}$$

Antiderivative was successfully verified.

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

```
[Out] (x^3*((3*I)*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - ((3*I)/
2)/(b*d*n), 2 - ((3*I)/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (-3*I
 + 2*b*d*n)*Hypergeometric2F1[1, ((-3*I)/2)/(b*d*n), 1 - ((3*I)/2)/(b*d*n),
 -E^((2*I)*d*(a + b*Log[c*x^n]))]))/(-9 - (6*I)*b*d*n)
```

fricas [F] time = 0.43, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\tan\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^2*tan(b*d*log(c*x^n) + a*d), x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 1.13, size = 0, normalized size = 0.00

$$\int x^{2} \tan \left(d \left(a+b \ln \left(c \,x^{n}\right)\right)\right)d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x^2*tan(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \tan \left({\left(b \log \left(c x^{n}\right) + a\right)} d\right)\,{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^2*tan((b*log(c*x^n) + a)*d), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\,\mathrm{tan}\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \tan \left(ad + bd \log \left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2*tan(a*d + b*d*log(c*x**n)), x)
```

3.160 $\int x \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=69

$$ix^2\,{}_2F_1\left(1,-\frac{i}{bdn};1-\frac{i}{bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)-\frac{ix^2}{2}$$

```
[Out] -1/2*I*x^2+I*x^2*hypergeom([1, -I/b/d/n],[1-I/b/d/n],-exp(2*I*a*d)*(c*x^n)^
(2*I*b*d))
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x*Tan[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

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

Mathematica [B] time = 6.01, size = 146, normalized size = 2.12

$$\frac{x^2\left(ie^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{i}{bdn};2-\frac{i}{bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(bdn-i)\,{}_2F_1\left(1,-\frac{i}{bdn};1-\frac{i}{bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\right)}{-2-2ibdn}$$

Antiderivative was successfully verified.

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

```
[Out] (x^2*(I*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - I/(b*d*n),
2 - I/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (-I + b*d*n)*Hypergeometr
ic2F1[1, (-I)/(b*d*n), 1 - I/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))]))/(-
2 - (2*I)*b*d*n)
```

fricas [F] time = 0.47, size = 0, normalized size = 0.00

$$\text{integral}\left(x\tan\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.01, size = 0, normalized size = 0.00

$$\int x \tan \left(d \left(a+b \ln \left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*tan(d*(a+b*ln(c*x^n))),x)
[Out] int(x*tan(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \tan \left(\left(b \log \left(c x^{n}\right)+a\right) d\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x \tan \left(d\,\left(a+b\,\ln \left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\tan\left(ad+bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x*tan(a*d + b*d*log(c*x**n)), x)
```

3.161 $\int \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=67

$$2ix\,{}_2F_1\left(1,-\frac{i}{2bdn};1-\frac{i}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)-ix$$

```
[Out] -I*x+2*I*x*hypergeom([1, -1/2*I/b/d/n],[1-1/2*I/b/d/n],-exp(2*I*a*d)*(c*x^n
)^(2*I*b*d))
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

$$\int \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [B] time = 11.22, size = 151, normalized size = 2.25

$$\frac{x\left((1+2ibdn)\,{}_2F_1\left(1,-\frac{i}{2bdn};1-\frac{i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{i}{2bdn};2-\frac{i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\right)}{2bdn-i}$$

Antiderivative was successfully verified.

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

```
[Out] (x*(-(E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (I/2)/(b*d*n)
, 2 - (I/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))]) + (1 + (2*I)*b*d*n)*
Hypergeometric2F1[1, (-1/2*I)/(b*d*n), 1 - (I/2)/(b*d*n), -E^((2*I)*d*(a +
b*Log[c*x^n]))]))/(-I + 2*b*d*n)
```

fricas [F] time = 0.46, size = 0, normalized size = 0.00

$$\text{integral}\left(\tan\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.88, size = 0, normalized size = 0.00

$$\int \tan\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n))),x)
[Out] int(tan(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan \left(d \left(a + b \log \left(c x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(tan(d*(a + b*log(c*x**n))), x)
```

3.162 $\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x}\,dx$

Optimal. Leaf size=26

$$-\frac{\log\left(\cos\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}$$

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

Rubi [A] time = 0.02, antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {3475}

$$-\frac{\log\left(\cos\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}$$

Antiderivative was successfully verified.

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

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

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \tan(d(a+bx))\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= -\frac{\log\left(\cos\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}\end{aligned}$$

Mathematica [A] time = 0.05, size = 25, normalized size = 0.96

$$-\frac{\log\left(\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\right)}{bdn}$$

Antiderivative was successfully verified.

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

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

fricas [A] time = 0.45, size = 35, normalized size = 1.35

$$-\frac{\log\left(\frac{1}{2}\cos\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)+\frac{1}{2}\right)}{2\,bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [A] time = 0.00, size = 30, normalized size = 1.15

$$\frac{\ln\left(1+\tan^{2}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right)}{2nbd}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))/x,x)
[Out] 1/2/n/b/d*ln(1+tan(d*(a+b*ln(c*x^n)))^2)
```

maxima [A] time = 0.32, size = 24, normalized size = 0.92

$$\frac{\log\left(\sec\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)\right)}{bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [B] time = 3.78, size = 38, normalized size = 1.46

$$\ln(x)\,1\mathrm{i}-\frac{\ln\left(\mathrm{e}^{a\,d\,2\mathrm{i}}\,\left(c\,x^{n}\right)^{b\,d\,2\mathrm{i}}+1\right)}{b\,d\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [A] time = 4.13, size = 44, normalized size = 1.69

$$\begin{cases} \log(x)\tan(ad) & \text{for } b = 0 \\ 0 & \text{for } d = 0 \\ \log(x)\tan\left(ad + bd\log(c)\right) & \text{for } n = 0 \\ -\frac{\log\left(\cos\left(ad+bd\log(cx^n)\right)\right)}{bdn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*tan(a*d), Eq(b, 0)), (0, Eq(d, 0)), (log(x)*tan(a*d + b*d
*log(c)), Eq(n, 0)), (-log(cos(a*d + b*d*log(c*x**n)))/(b*d*n), True))
```

3.163 $\int \frac{\tan\left(d\left(a+b\log(cx^n)\right)\right)}{x^2}\,dx$

Optimal. Leaf size=71

$$\frac{i}{x}-\frac{2i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{x}$$

```
[Out] I/x-2*I*hypergeom([1, 1/2*I/b/d/n],[1+1/2*I/b/d/n],-exp(2*I*a*d)*(c*x^n)^(2
*I*b*d))/x
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])]/x^2, x]
```

Rubi steps

$$\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx=\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx$$

Mathematica [B] time = 4.14, size = 153, normalized size = 2.15

$$\frac{(1-2ibdn)\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};-e^{2id\left(a+b\log(cx^n)\right)}\right)-e^{2id\left(a+b\log(cx^n)\right)}\,{}_2F_1\left(1,1+\frac{i}{2bdn};2+\frac{i}{2bdn};-e^{2id\left(a+b\log(cx^n)\right)}\right)}{x(2bdn+i)}$$

Antiderivative was successfully verified.

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

```
[Out] (-(E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + (I/2)/(b*d*n), 2
 + (I/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))]) + (1 - (2*I)*b*d*n)*Hyp
ergeometric2F1[1, (I/2)/(b*d*n), 1 + (I/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[
c*x^n]))])/((I + 2*b*d*n)*x)
```

fricas [F] time = 0.42, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\tan\left(bd\log\left(cx^n\right)+ad\right)}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.16, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))/x^2,x)
[Out] int(tan(d*(a+b*ln(c*x^n)))/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(ad + bd\log\left(cx^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(tan(a*d + b*d*log(c*x**n))/x**2, x)
```

3.164 $\int \frac{\tan\left(d\left(a+b\log(cx^n)\right)\right)}{x^3}\,dx$

Optimal. Leaf size=69

$$\frac{i}{2x^2}-\frac{i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{x^2}$$

```
[Out] 1/2*I/x^2-I*hypergeom([1, I/b/d/n],[1+I/b/d/n],-exp(2*I*a*d)*(c*x^n)^(2*I*b
*d))/x^2
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])]/x^3, x]
```

Rubi steps

$$\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx=\int \frac{\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx$$

Mathematica [B] time = 3.76, size = 147, normalized size = 2.13

$$\frac{(1-ibdn)\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};-e^{2id\left(a+b\log(cx^n)\right)}\right)-e^{2id\left(a+b\log(cx^n)\right)}\,{}_2F_1\left(1,1+\frac{i}{bdn};2+\frac{i}{bdn};-e^{2id\left(a+b\log(cx^n)\right)}\right)}{2x^2(bdn+i)}$$

Antiderivative was successfully verified.

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

```
[Out] (-(E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + I/(b*d*n), 2 + I
/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))]) + (1 - I*b*d*n)*Hypergeometric2
F1[1, I/(b*d*n), 1 + I/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))])/(2*(I + b
*d*n)*x^2)
```

fricas [F] time = 0.47, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\tan\left(bd\log\left(cx^{n}\right)+ad\right)}{x^{3}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.34, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))/x^3,x)
[Out] int(tan(d*(a+b*ln(c*x^n)))/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\tan\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(tan(d*(a + b*log(c*x^n)))/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(ad + bd\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(tan(a*d + b*d*log(c*x**n))/x**3, x)
```

3.165 $\int x^3 \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=159

$$-\frac{2ix^4\,{}_2F_1\left(1,-\frac{2i}{bdn};1-\frac{2i}{bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix^4\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x^4(-bdn+4i)}{4bdn}$$

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

Rubi [F] time = 0.09, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^3*Tan[d*(a + b*Log[c*x^n])]^2,x]
```

```
[Out] Defer[Int][x^3*Tan[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int x^3\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int x^3\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 6.52, size = 179, normalized size = 1.13

$$-\frac{x^4\left((bdn-2i)\left(4i\,{}_2F_1\left(1,-\frac{2i}{bdn};1-\frac{2i}{bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-4\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)+bdn\right)-8e^{2id\left(a+b\log\left(cx^n\right)\right)}\right.}{4bdn(bdn-2i)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Tan[d*(a + b*Log[c*x^n])]^2,x]
```

```
[Out] -1/4*(x^4*(-8*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (2*I)
/(b*d*n), 2 - (2*I)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (-2*I + b*d
*n)*(b*d*n + (4*I)*Hypergeometric2F1[1, (-2*I)/(b*d*n), 1 - (2*I)/(b*d*n),
-E^((2*I)*d*(a + b*Log[c*x^n]))] - 4*Tan[d*(a + b*Log[c*x^n])])))/(b*d*n*(-
2*I + b*d*n))
```

fricas [F] time = 0.43, size = 0, normalized size = 0.00

$$\text{integral}\left(x^3\tan\left(bd\log\left(cx^n\right)+ad\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*tan(d*(a+b*log(c*x^n)))^2,x, algorithm="fricas")
[Out] integral(x^3*tan(b*d*log(c*x^n) + a*d)^2, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*tan(d*(a+b*log(c*x^n)))^2,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.28, size = 0, normalized size = 0.00

$$\int x^3\left(\tan^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*tan(d*(a+b*ln(c*x^n)))^2,x)
[Out] int(x^3*tan(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*tan(d*(a+b*log(c*x^n)))^2,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\tan\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*tan(d*(a + b*log(c*x^n)))^2,x)
```

```
[Out] int(x^3*tan(d*(a + b*log(c*x^n)))^2, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*tan(d*(a+b*ln(c*x**n)))**2,x)
```

```
[Out] Timed out
```

3.166 $\int x^2 \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=163

$$-\frac{2ix^3\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix^3\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x^3(-bdn+3i)}{3bdn}$$

```
[Out] 1/3*(3*I-b*d*n)*x^3/b/d/n+I*x^3*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/(1
+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*x^3*hypergeom([1, -3/2*I/b/d/n],[1-3/2
*I/b/d/n],-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n
```

Rubi [F] time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x^2*Tan[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

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

Mathematica [A] time = 6.41, size = 189, normalized size = 1.16

$$-\frac{x^3\left((2bdn-3i)\left(3i\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-3\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)+bdn\right)-9e^{2id\left(a+b\log\left(cx^n\right.\right.}\right.}{3bdn(2bdn-3i)}$$

Antiderivative was successfully verified.

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

```
[Out] -1/3*(x^3*(-9*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - ((3*I
)/2)/(b*d*n), 2 - ((3*I)/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (-3
*I + 2*b*d*n)*(b*d*n + (3*I)*Hypergeometric2F1[1, ((-3*I)/2)/(b*d*n), 1 - (
(3*I)/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] - 3*Tan[d*(a + b*Log[c*x
^n])])))/(b*d*n*(-3*I + 2*b*d*n))
```

fricas [F] time = 0.45, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\tan\left(bd\log\left(cx^n\right)+ad\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.61, size = 0, normalized size = 0.00

$$\int x^2\left(\tan^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*tan(d*(a+b*ln(c*x^n)))^2,x)
[Out] int(x^2*tan(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\tan\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \tan^2 \left(ad + bd \log \left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*tan(d*(a+b*ln(c*x**n)))**2,x)
[Out] Integral(x**2*tan(a*d + b*d*log(c*x**n))**2, x)
```

3.167 $\int x \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=159

$$-\frac{2ix^2\,{}_2F_1\left(1,-\frac{i}{bdn};1-\frac{i}{bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix^2\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x^2(-bdn+2i)}{2bdn}$$

```
[Out] 1/2*(2*I-b*d*n)*x^2/b/d/n+I*x^2*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/(1
+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*x^2*hypergeom([1, -I/b/d/n],[1-I/b/d/n
],-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n
```

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x*Tan[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

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

Mathematica [A] time = 6.43, size = 179, normalized size = 1.13

$$-\frac{x^2\left((bdn-i)\left(2i\,{}_2F_1\left(1,-\frac{i}{bdn};1-\frac{i}{bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-2\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)+bdn\right)-2e^{2id\left(a+b\log\left(cx^n\right)\right)}\,2\right.}{2bdn(bdn-i)}$$

Antiderivative was successfully verified.

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

```
[Out] -1/2*(x^2*(-2*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - I/(b*
d*n), 2 - I/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (-I + b*d*n)*(b*d*n
 + (2*I)*Hypergeometric2F1[1, (-I)/(b*d*n), 1 - I/(b*d*n), -E^((2*I)*d*(a +
 b*Log[c*x^n]))] - 2*Tan[d*(a + b*Log[c*x^n])])))/(b*d*n*(-I + b*d*n))
```

fricas [F] time = 0.45, size = 0, normalized size = 0.00

$$\text{integral}\left(x\tan\left(bd\log\left(cx^{n}\right)+ad\right)^{2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.19, size = 0, normalized size = 0.00

$$\int x\left(\tan^{2}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*tan(d*(a+b*ln(c*x^n)))^2,x)
[Out] int(x*tan(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\tan\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)^{2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\tan^2\left(ad + bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x*tan(a*d + b*d*log(c*x**n))**2, x)
```

3.168 $\int \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=154

$$-\frac{2ix\,{}_2F_1\left(1,-\frac{i}{2bdn};1-\frac{i}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x(-bdn+i)}{bdn}$$

```
[Out] (I-b*d*n)*x/b/d/n+I*x*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/(1+exp(2*I*a
*d)*(c*x^n)^(2*I*b*d))-2*I*x*hypergeom([1, -1/2*I/b/d/n],[1-1/2*I/b/d/n],-e
xp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 11.73, size = 185, normalized size = 1.20

$$\frac{xe^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{i}{2bdn};2-\frac{i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-x(2bdn-i)\left(i\,{}_2F_1\left(1,-\frac{i}{2bdn};1-\frac{i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right.\right.}{bdn(2bdn-i)}$$

Antiderivative was successfully verified.

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

```
[Out] (E^((2*I)*d*(a + b*Log[c*x^n]))*x*Hypergeometric2F1[1, 1 - (I/2)/(b*d*n), 2
 - (I/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] - (-I + 2*b*d*n)*x*(b*d*
n + I*Hypergeometric2F1[1, (-1/2*I)/(b*d*n), 1 - (I/2)/(b*d*n), -E^((2*I)*d
*(a + b*Log[c*x^n]))] - Tan[d*(a + b*Log[c*x^n])]))/(b*d*n*(-I + 2*b*d*n))
```

fricas [F] time = 0.45, size = 0, normalized size = 0.00

$$\text{integral}\left(\tan\left(bd\log\left(cx^{n}\right)+ad\right)^{2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.15, size = 0, normalized size = 0.00

$$\int \tan^{2}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))^2,x)
[Out] int(tan(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)^{2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(tan(d*(a + b*log(c*x**n)))**2, x)
```

3.169 $\int \frac{\tan^2(d(a+b\log(cx^n)))}{x}\,dx$

Optimal. Leaf size=29

$$\frac{\tan\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\log(x)$$

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

Rubi [A] time = 0.03, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {3473, 8}

$$\frac{\tan\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\log(x)$$

Antiderivative was successfully verified.

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

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

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \tan^2(d(a+bx))\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= \frac{\tan\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\frac{\text{Subst}\left(\int 1\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= -\log(x)+\frac{\tan\left(ad+bd\log\left(cx^n\right)\right)}{bdn}\end{aligned}$$

Mathematica [A] time = 0.08, size = 51, normalized size = 1.76

$$\frac{\tan\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\frac{\tan^{-1}\left(\tan\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}$$

Antiderivative was successfully verified.

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

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

fricas [B] time = 0.62, size = 85, normalized size = 2.93

$$-\frac{bdn\cos\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)\log(x)+bdn\log(x)-\sin\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)}{bdn\cos\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)+bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [A] time = 0.01, size = 50, normalized size = 1.72

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

maxima [B] time = 0.68, size = 320, normalized size = 11.03

$$-\frac{\left(bd\cos\left(2\,bd\log(c)\right)^{2}+bd\sin\left(2\,bd\log(c)\right)^{2}\right)n\cos\left(2\,bd\log\left(x^{n}\right)+2\,ad\right)^{2}\log(x)+\left(bd\cos\left(2\,bd\log(c)\right)^{2}+bd\right.}{2\,bdn\cos\left(2\,bd\log(c)\right)\cos\left(2\,bd\log\left(x^{n}\right)+2\,ad\right)-2\,bdn\sin\left(2\,bd\log(c\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 3.84, size = 39, normalized size = 1.34

$$-\ln(x)+\frac{2\mathrm{i}}{b\,d\,n\,\left(\mathrm{e}^{a\,d\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,d\,2\mathrm{i}}+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan^{2}\left(ad+bd\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(tan(a*d + b*d*log(c*x**n))**2/x, x)
```

3.170 $\int \frac{\tan^2(d(a+b\log(cx^n)))}{x^2} dx$

Optimal. Leaf size=157

$$-\frac{2i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx}+\frac{i\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{1+\frac{i}{bdn}}{x}$$

```
[Out] (1+I/b/d/n)/x+I*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x/(1+exp(2*I*a*d)*
(c*x^n)^(2*I*b*d))-2*I*hypergeom([1, 1/2*I/b/d/n],[1+1/2*I/b/d/n],-exp(2*I*
a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x
```

Rubi [F] time = 0.06, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])]^2/x^2, x]
```

Rubi steps

$$\int \frac{\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx=\int \frac{\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx$$

Mathematica [A] time = 4.29, size = 184, normalized size = 1.17

$$\frac{(2bdn+i)\left(-i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)+bdn\right)-e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1\right.}{bdnx(2bdn+i)}$$

Antiderivative was successfully verified.

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

```
[Out] (-(E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + (I/2)/(b*d*n), 2
 + (I/2)/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))]) + (I + 2*b*d*n)*(b*d*n
- I*Hypergeometric2F1[1, (I/2)/(b*d*n), 1 + (I/2)/(b*d*n), -E^((2*I)*d*(a +
 b*Log[c*x^n]))] + Tan[d*(a + b*Log[c*x^n])]))/(b*d*n*(I + 2*b*d*n)*x)
```

fricas [F] time = 0.42, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\tan\left(bd\log\left(cx^n\right)+ad\right)^2}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.23, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))^2/x^2,x)
[Out] int(tan(d*(a+b*ln(c*x^n)))^2/x^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan^2\left(ad + bd\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(tan(a*d + b*d*log(c*x**n))**2/x**2, x)
```

3.171 $\int \frac{\tan^2(d(a+b\log(cx^n)))}{x^3} dx$

Optimal. Leaf size=156

$$-\frac{2i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx^2}+\frac{i\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx^2\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{1+\frac{2i}{bdn}}{2x^2}$$

```
[Out] 1/2*(1+2*I/b/d/n)/x^2+I*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x^2/(1+exp
(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*hypergeom([1, I/b/d/n],[1+I/b/d/n],-exp(2*
I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x^2
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Tan[d*(a + b*Log[c*x^n])]^2/x^3,x]
```

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])]^2/x^3, x]
```

Rubi steps

$$\int \frac{\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx=\int \frac{\tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx$$

Mathematica [A] time = 3.91, size = 179, normalized size = 1.15

$$\frac{(bdn+i)\left(-2i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};-e^{2id\left(a+b\log(cx^n)\right)}\right)+2\tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)+bdn\right)-2e^{2id\left(a+b\log(cx^n)\right)}\,{}_2F_1\left(1\right.}{2bdnx^2(bdn+i)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[d*(a + b*Log[c*x^n])]^2/x^3,x]
```

```
[Out] (-2*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + I/(b*d*n), 2 +
I/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] + (I + b*d*n)*(b*d*n - (2*I)*Hy
pergeometric2F1[1, I/(b*d*n), 1 + I/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n])
)] + 2*Tan[d*(a + b*Log[c*x^n])]))/(2*b*d*n*(I + b*d*n)*x^2)
```

fricas [F] time = 0.54, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\tan\left(bd\log\left(cx^{n}\right)+ad\right)^{2}}{x^{3}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(d*(a+b*log(c*x^n)))^2/x^3,x, algorithm="fricas")
[Out] integral(tan(b*d*log(c*x^n) + a*d)^2/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)^{2}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(d*(a+b*log(c*x^n)))^2/x^3,x, algorithm="giac")
[Out] integrate(tan((b*log(c*x^n) + a)*d)^2/x^3, x)
```

maple [F] time = 0.28, size = 0, normalized size = 0.00

$$\int \frac{\tan^{2}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))^2/x^3,x)
[Out] int(tan(d*(a+b*ln(c*x^n)))^2/x^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(d*(a+b*log(c*x^n)))^2/x^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\tan\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)^{2}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a + b*log(c*x^n)))^2/x^3,x)
```

```
[Out] int(tan(d*(a + b*log(c*x^n)))^2/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan^2\left(ad + bd\log\left(cx^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(d*(a+b*ln(c*x**n)))**2/x**3,x)
```

```
[Out] Integral(tan(a*d + b*d*log(c*x**n))**2/x**3, x)
```

3.172 $\int \frac{\tan^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=43

$$\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn}+\frac{\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

```
[Out] ln(cos(a+b*ln(c*x^n)))/b/n+1/2*tan(a+b*ln(c*x^n))^2/b/n
```

Rubi [A] time = 0.03, antiderivative size = 43, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3473, 3475}

$$\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn}+\frac{\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] Log[Cos[a + b*Log[c*x^n]]]/(b*n) + Tan[a + b*Log[c*x^n]]^2/(2*b*n)
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \tan^3(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= \frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn}-\frac{\text{Subst}\left(\int \tan(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= \frac{\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}+\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn}\end{aligned}$$

Mathematica [A] time = 0.15, size = 38, normalized size = 0.88

$$\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)+2\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] (2*Log[Cos[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]^2)/(2*b*n)
```

fricas [A] time = 0.45, size = 69, normalized size = 1.60

$$\frac{\left(\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)+1\right)\log\left(\frac{1}{2}\,\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)+\frac{1}{2}\right)+2}{2\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)+bn\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*((cos(2*b*n*log(x) + 2*b*log(c) + 2*a) + 1)*log(1/2*cos(2*b*n*log(x) +
2*b*log(c) + 2*a) + 1/2) + 2)/(b*n*cos(2*b*n*log(x) + 2*b*log(c) + 2*a) + b
*n)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [A] time = 0.01, size = 47, normalized size = 1.09

$$\frac{\tan^2\left(a+b\ln\left(c\,x^n\right)\right)}{2bn}-\frac{\ln\left(1+\tan^2\left(a+b\ln\left(c\,x^n\right)\right)\right)}{2nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(c*x^n))^3/x,x)
```

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

maxima [B] time = 0.38, size = 1242, normalized size = 28.88

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(8*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 +
8*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 + 4*((c
os(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*l
og(x^n) + 2*a) + (cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b
*log(c)))*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) + 4*cos(2*b*log(
c))*cos(2*b*log(x^n) + 2*a) + ((cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(
4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*l
og(x^n) + 2*a)^2 + (cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n)
 + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*
a)^2 + 2*(2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(
c)))*cos(2*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b
*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos(4*b*log(c)))*cos(4*
b*log(x^n) + 4*a) + 4*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 2*(2*(cos(2
*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x
^n) + 2*a) - 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*l
og(c)))*sin(2*b*log(x^n) + 2*a) + sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a)
- 4*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)*log((cos(2*a)^2 + sin(2*a)
^2)*cos(2*b*log(c))^2 + (cos(2*a)^2 + sin(2*a)^2)*sin(2*b*log(c))^2 + 2*(co
s(2*b*log(c))*cos(2*a) - sin(2*b*log(c))*sin(2*a))*cos(2*b*log(x^n)) + cos(
2*b*log(x^n))^2 - 2*(cos(2*a)*sin(2*b*log(c)) + cos(2*b*log(c))*sin(2*a))*s
in(2*b*log(x^n)) + sin(2*b*log(x^n))^2) - 4*((cos(2*b*log(c))*sin(4*b*log(c
)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - (cos(4*b*lo
g(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) +
 2*a))*sin(4*b*log(x^n) + 4*a) - 4*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a))
/((b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 +
 4*b*n*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + 4*(b*cos(2*b*log(c))^2 + b
*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2*a)^2 + (b*cos(4*b*log(c))^2 + b*
sin(4*b*log(c))^2)*n*sin(4*b*log(x^n) + 4*a)^2 - 4*b*n*sin(2*b*log(c))*sin(
2*b*log(x^n) + 2*a) + 4*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2
*b*log(x^n) + 2*a)^2 + b*n + 2*(b*n*cos(4*b*log(c)) + 2*(b*cos(4*b*log(c))*
cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2
*a) + 2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(
c)))*n*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*(2*(b*cos(2*b*l
og(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x
^n) + 2*a) + b*n*sin(4*b*log(c)) - 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b
*sin(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^
n) + 4*a))
```

mupad [B] time = 4.72, size = 105, normalized size = 2.44

$$-\ln(x)\,1\mathrm{i}-\frac{2}{b\,n\,\left(2\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+\mathrm{e}^{a\,4\mathrm{i}}\,(c\,x^n)^{b\,4\mathrm{i}}+1\right)}+\frac{2}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+1\right)}+\frac{\ln\left(\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+1\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [A] time = 3.82, size = 70, normalized size = 1.63

$$\begin{cases} \log\left(x\right)\tan^{3}\left(a\right) & \text{for}\: b = 0 \wedge \left(b = 0 \vee n = 0\right) \\ \log\left(x\right)\tan^{3}\left(a + b\log\left(c\right)\right) & \text{for}\: n = 0 \\ -\frac{\log\left(\tan^{2}\left(a + bn\log\left(x\right) + b\log\left(c\right)\right) + 1\right)}{2bn} + \frac{\tan^{2}\left(a + bn\log\left(x\right) + b\log\left(c\right)\right)}{2bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*tan(a)**3, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*tan
(a + b*log(c))**3, Eq(n, 0)), (-log(tan(a + b*n*log(x) + b*log(c))**2 + 1)/
(2*b*n) + tan(a + b*n*log(x) + b*log(c))**2/(2*b*n), True))
```

3.173 $\int \frac{\tan^4(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=45

$$\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}+\log(x)$$

```
[Out] ln(x)-tan(a+b*ln(c*x^n))/b/n+1/3*tan(a+b*ln(c*x^n))^3/b/n
```

Rubi [A] time = 0.04, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3473, 8}

$$\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}+\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] Log[x] - Tan[a + b*Log[c*x^n]]/(b*n) + Tan[a + b*Log[c*x^n]]^3/(3*b*n)
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{\tan^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \tan^4(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= \frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\text{Subst}\left(\int \tan^2(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= -\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}+\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\text{Subst}\left(\int 1\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= \log(x)-\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}+\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}
\end{aligned}$$

Mathematica [A] time = 0.09, size = 62, normalized size = 1.38

$$\frac{\tan^{-1}\left(\tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}+\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] ArcTan[Tan[a + b*Log[c*x^n]]]/(b*n) - Tan[a + b*Log[c*x^n]]/(b*n) + Tan[a +
 b*Log[c*x^n]]^3/(3*b*n)
```

fricas [B] time = 0.52, size = 140, normalized size = 3.11

$$\frac{3\,bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2\log(x)+6\,bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)\log(x)+3\,bn\log(x)-}{3\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2+2\,bn\cos\left(2\,bn\,\mathrm{lo}\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^4/x,x, algorithm="fricas")
```

```
[Out] 1/3*(3*b*n*cos(2*b*n*log(x) + 2*b*log(c) + 2*a)^2*log(x) + 6*b*n*cos(2*b*n*
log(x) + 2*b*log(c) + 2*a)*log(x) + 3*b*n*log(x) - 2*(2*cos(2*b*n*log(x) +
2*b*log(c) + 2*a) + 1)*sin(2*b*n*log(x) + 2*b*log(c) + 2*a))/(b*n*cos(2*b*n
*log(x) + 2*b*log(c) + 2*a)^2 + 2*b*n*cos(2*b*n*log(x) + 2*b*log(c) + 2*a)
+ b*n)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^4/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.01, size = 61, normalized size = 1.36

$$\frac{\tan^3\left(a+b\ln\left(c\,x^n\right)\right)}{3bn}-\frac{\tan\left(a+b\ln\left(c\,x^n\right)\right)}{bn}+\frac{\arctan\left(\tan\left(a+b\ln\left(c\,x^n\right)\right)\right)}{nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(c*x^n))^4/x,x)
```

```
[Out] 1/3*tan(a+b*ln(c*x^n))^3/b/n-tan(a+b*ln(c*x^n))/b/n+1/n/b*arctan(tan(a+b*ln
(c*x^n)))
```

maxima [B] time = 0.43, size = 2171, normalized size = 48.24

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^4/x,x, algorithm="maxima")
```

```
[Out] 1/3*(3*(b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a
)^2*log(x) + 27*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x
^n) + 4*a)^2*log(x) + 27*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*cos(
2*b*log(x^n) + 2*a)^2*log(x) + 3*(b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2
)*n*log(x)*sin(6*b*log(x^n) + 6*a)^2 + 27*(b*cos(4*b*log(c))^2 + b*sin(4*b*
log(c))^2)*n*log(x)*sin(4*b*log(x^n) + 4*a)^2 + 27*(b*cos(2*b*log(c))^2 + b
*sin(2*b*log(c))^2)*n*log(x)*sin(2*b*log(x^n) + 2*a)^2 + 3*b*n*log(x) + 2*(
3*b*n*cos(6*b*log(c))*log(x) + 3*(3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*
sin(6*b*log(c))*sin(4*b*log(c)))*n*log(x) - 2*cos(4*b*log(c))*sin(6*b*log(c
)) + 2*cos(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 3*(3*(b*c
os(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*log(x
) - 2*cos(2*b*log(c))*sin(6*b*log(c)) + 2*cos(6*b*log(c))*sin(2*b*log(c)))*
cos(2*b*log(x^n) + 2*a) + 3*(3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6
*b*log(c))*sin(4*b*log(c)))*n*log(x) + 2*cos(6*b*log(c))*cos(4*b*log(c)) +
2*sin(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 3*(3*(b*cos(2*
b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*log(x) + 2
*cos(6*b*log(c))*cos(2*b*log(c)) + 2*sin(6*b*log(c))*sin(2*b*log(c)))*sin(2
*b*log(x^n) + 2*a) - 4*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) + 6*(3*b*n*
cos(4*b*log(c))*log(x) + 9*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*l
og(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a)*log(x) + 9*(b*cos(2*b*log
(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*log(x)*sin(2*b*
log(x^n) + 2*a) - 2*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 6*(3*b*n*cos
(2*b*log(c))*log(x) - 2*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 2*(3*b*n
*log(x)*sin(6*b*log(c)) + 3*(3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6
*b*log(c))*sin(4*b*log(c)))*n*log(x) + 2*cos(6*b*log(c))*cos(4*b*log(c)) +
2*sin(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 3*(3*(b*cos(2*
b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*log(x) + 2
*cos(6*b*log(c))*cos(2*b*log(c)) + 2*sin(6*b*log(c))*sin(2*b*log(c)))*cos(2
*b*log(x^n) + 2*a) - 3*(3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*lo
g(c))*sin(4*b*log(c)))*n*log(x) - 2*cos(4*b*log(c))*sin(6*b*log(c)) + 2*cos
(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 3*(3*(b*cos(6*b*log
(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*log(x) - 2*cos(
2*b*log(c))*sin(6*b*log(c)) + 2*cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*lo
g(x^n) + 2*a) + 4*cos(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - 6*(9*(b*cos(2*
b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*lo
```

```
g(x^n) + 2*a)*log(x) + 3*b*n*log(x)*sin(4*b*log(c)) - 9*(b*cos(4*b*log(c))*
cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*log(x)*sin(2*b*log(x
^n) + 2*a) + 2*cos(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 6*(3*b*n*log(x)*s
in(2*b*log(c)) + 2*cos(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))/((b*cos(6*b*lo
g(c))^2 + b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*l
og(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 + 6*b*n*cos(2*b
*log(c))*cos(2*b*log(x^n) + 2*a) + 9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c
))^2)*n*cos(2*b*log(x^n) + 2*a)^2 + (b*cos(6*b*log(c))^2 + b*sin(6*b*log(c)
)^2)*n*sin(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c
))^2)*n*sin(4*b*log(x^n) + 4*a)^2 - 6*b*n*sin(2*b*log(c))*sin(2*b*log(x^n)
+ 2*a) + 9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) +
 2*a)^2 + b*n + 2*(b*n*cos(6*b*log(c)) + 3*(b*cos(6*b*log(c))*cos(4*b*log(c
)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) + 3*(b*co
s(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*
b*log(x^n) + 2*a) + 3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c)
)*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) + 3*(b*cos(2*b*log(c))*sin(6*b
*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*co
s(6*b*log(x^n) + 6*a) + 6*(b*n*cos(4*b*log(c)) + 3*(b*cos(4*b*log(c))*cos(2
*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) +
 3*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*
n*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*(3*(b*cos(4*b*log(c)
)*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) +
 4*a) + 3*(b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*lo
g(c)))*n*cos(2*b*log(x^n) + 2*a) + b*n*sin(6*b*log(c)) - 3*(b*cos(6*b*log(c
))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n)
+ 4*a) - 3*(b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*l
og(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(3*(b*cos(2*
b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*lo
g(x^n) + 2*a) + b*n*sin(4*b*log(c)) - 3*(b*cos(4*b*log(c))*cos(2*b*log(c))
+ b*sin(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log
(x^n) + 4*a))
```

mupad [B] time = 8.04, size = 183, normalized size = 4.07

$$\ln(x) - \frac{\frac{4\mathrm{i}}{3\,b\,n} + \frac{\mathrm{e}^{a\,4\mathrm{i}}\,(c\,x^n)^{b\,4\mathrm{i}}\,4\mathrm{i}}{3\,b\,n}}{3\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}} + 3\,\mathrm{e}^{a\,4\mathrm{i}}\,(c\,x^n)^{b\,4\mathrm{i}} + \mathrm{e}^{a\,6\mathrm{i}}\,(c\,x^n)^{b\,6\mathrm{i}} + 1} - \frac{4\mathrm{i}}{3\,b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}} + 1\right)} - \frac{\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}\,4}{3\,b\,n\,\left(2\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}} + \mathrm{e}^{a\,4}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + b*log(c*x^n))^4/x,x)
```

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

sympy [A] time = 9.30, size = 66, normalized size = 1.47

$$\begin{cases} \log{(x)}\tan^{4}{(a)} & \text{for } b=0 \wedge (b=0 \vee n=0) \\ \log{(x)}\tan^{4}{\left(a+b\log{(c)}\right)} & \text{for } n=0 \\ \log{(x)}+\frac{\tan^{3}{\left(a+bn\log{(x)}+b\log{(c)}\right)}}{3bn}-\frac{\tan{\left(a+bn\log{(x)}+b\log{(c)}\right)}}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*ln(c*x**n))**4/x,x)
```

```
[Out] Piecewise((log(x)*tan(a)**4, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*tan
(a + b*log(c))**4, Eq(n, 0)), (log(x) + tan(a + b*n*log(x) + b*log(c))**3/(
3*b*n) - tan(a + b*n*log(x) + b*log(c))/(b*n), True))
```

3.174 $\int \frac{\tan^5(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=67

$$\frac{\tan^4\left(a+b\log\left(cx^n\right)\right)}{4bn}-\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn}-\frac{\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

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

Rubi [A] time = 0.04, antiderivative size = 67, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3473, 3475}

$$\frac{\tan^4\left(a+b\log\left(cx^n\right)\right)}{4bn}-\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn}-\frac{\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + b*Log[c*x^n]]^5/x,x]
```

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

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\tan^5\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \tan^5(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{\tan^4\left(a+b\log\left(cx^n\right)\right)}{4bn} - \frac{\text{Subst}\left(\int \tan^3(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn} + \frac{\tan^4\left(a+b\log\left(cx^n\right)\right)}{4bn} + \frac{\text{Subst}\left(\int \tan(a+bx)\,dx, x, \log\right.}{n}$$
$$= -\frac{\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn} - \frac{\tan^2\left(a+b\log\left(cx^n\right)\right)}{2bn} + \frac{\tan^4\left(a+b\log\left(cx^n\right)\right)}{4bn}$$

Mathematica [A] time = 0.16, size = 55, normalized size = 0.82

$$-\frac{-\tan^4\left(a+b\log\left(cx^n\right)\right)+2\tan^2\left(a+b\log\left(cx^n\right)\right)+4\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{4bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + b*Log[c*x^n]]^5/x,x]
```

```
[Out] -1/4*(4*Log[Cos[a + b*Log[c*x^n]]] + 2*Tan[a + b*Log[c*x^n]]^2 - Tan[a + b*
Log[c*x^n]]^4)/(b*n)
```

fricas [B] time = 0.45, size = 129, normalized size = 1.93

$$-\frac{\left(\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2+2\,\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)+1\right)\log\left(\frac{1}{2}\,\cos\left(2\,bn\log(x)+2\,b\right.\right.}{2\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2+2\,bn\cos\left(2\,bn\log(x)+2\,b\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^5/x,x, algorithm="fricas")
```

```
[Out] -1/2*((cos(2*b*n*log(x) + 2*b*log(c) + 2*a)^2 + 2*cos(2*b*n*log(x) + 2*b*lo
g(c) + 2*a) + 1)*log(1/2*cos(2*b*n*log(x) + 2*b*log(c) + 2*a) + 1/2) + 4*co
s(2*b*n*log(x) + 2*b*log(c) + 2*a) + 2)/(b*n*cos(2*b*n*log(x) + 2*b*log(c)
+ 2*a)^2 + 2*b*n*cos(2*b*n*log(x) + 2*b*log(c) + 2*a) + b*n)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^5/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.00, size = 68, normalized size = 1.01

$$\frac{\tan^4(a+b\ln(c\,x^n))}{4bn}-\frac{\tan^2(a+b\ln(c\,x^n))}{2bn}+\frac{\ln\left(1+\tan^2(a+b\ln(c\,x^n))\right)}{2nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(c*x^n))^5/x,x)
```

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

maxima [B] time = 0.49, size = 4466, normalized size = 66.66

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^5/x,x, algorithm="maxima")
```

```
[Out] -1/2*(32*(cos(6*b*log(c))^2 + sin(6*b*log(c))^2)*cos(6*b*log(x^n) + 6*a)^2
+ 48*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(4*b*log(x^n) + 4*a)^2 + 32
*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 + 32*(co
s(6*b*log(c))^2 + sin(6*b*log(c))^2)*sin(6*b*log(x^n) + 6*a)^2 + 48*(cos(4*
b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n) + 4*a)^2 + 32*(cos(2*b*lo
g(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 + 8*((cos(8*b*log(c)
)*cos(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a
) + (cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)))*cos
(4*b*log(x^n) + 4*a) + (cos(8*b*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))*s
in(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + (cos(6*b*log(c))*sin(8*b*log(c))
- cos(8*b*log(c))*sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + (cos(4*b*log(c
))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*
a) + (cos(2*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)))*si
n(2*b*log(x^n) + 2*a))*cos(8*b*log(x^n) + 8*a) + 8*(10*(cos(6*b*log(c))*cos
(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 8
*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*cos(2*
b*log(x^n) + 2*a) + 10*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*s
in(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 8*(cos(2*b*log(c))*sin(6*b*log(c)
) - cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos(6*b*log(
c)))*cos(6*b*log(x^n) + 6*a) + 8*(10*(cos(4*b*log(c))*cos(2*b*log(c)) + sin
(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 10*(cos(2*b*log(c))
*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a)
 + cos(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 8*cos(2*b*log(c))*cos(2*b*log
```

```
(x^n) + 2*a) + ((cos(8*b*log(c))^2 + sin(8*b*log(c))^2)*cos(8*b*log(x^n) +
8*a)^2 + 16*(cos(6*b*log(c))^2 + sin(6*b*log(c))^2)*cos(6*b*log(x^n) + 6*a)
^2 + 36*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(4*b*log(x^n) + 4*a)^2 +
 16*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 + (co
s(8*b*log(c))^2 + sin(8*b*log(c))^2)*sin(8*b*log(x^n) + 8*a)^2 + 16*(cos(6*
b*log(c))^2 + sin(6*b*log(c))^2)*sin(6*b*log(x^n) + 6*a)^2 + 36*(cos(4*b*lo
g(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n) + 4*a)^2 + 16*(cos(2*b*log(c)
)^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 + 2*(4*(cos(8*b*log(c))*
cos(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a)
+ 6*(cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)))*cos
(4*b*log(x^n) + 4*a) + 4*(cos(8*b*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))
*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 4*(cos(6*b*log(c))*sin(8*b*log(
c)) - cos(8*b*log(c))*sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + 6*(cos(4*b
*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n
) + 4*a) + 4*(cos(2*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log
(c)))*sin(2*b*log(x^n) + 2*a) + cos(8*b*log(c)))*cos(8*b*log(x^n) + 8*a) +
8*(6*(cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*co
s(4*b*log(x^n) + 4*a) + 4*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c)
)*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 6*(cos(4*b*log(c))*sin(6*b*log
(c)) - cos(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4*(cos(2*
b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^
n) + 2*a) + cos(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) + 12*(4*(cos(4*b*log(c
))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*
a) + 4*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*
sin(2*b*log(x^n) + 2*a) + cos(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 8*cos(
2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 2*(4*(cos(6*b*log(c))*sin(8*b*log(c))
 - cos(8*b*log(c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) + 6*(cos(4*b*lo
g(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) +
 4*a) + 4*(cos(2*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)
))*cos(2*b*log(x^n) + 2*a) - 4*(cos(8*b*log(c))*cos(6*b*log(c)) + sin(8*b*l
og(c))*sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - 6*(cos(8*b*log(c))*cos(4*
b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 4*(c
os(8*b*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))*sin(2*b*log(c)))*sin(2*b*l
og(x^n) + 2*a) + sin(8*b*log(c)))*sin(8*b*log(x^n) + 8*a) - 8*(6*(cos(4*b*l
og(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n)
+ 4*a) + 4*(cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c
)))*cos(2*b*log(x^n) + 2*a) - 6*(cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*
log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 4*(cos(6*b*log(c))*cos(2
*b*log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin
(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - 12*(4*(cos(2*b*log(c))*sin(4*b*log(
c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 4*(cos(4*b
*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n
) + 2*a) + sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 8*sin(2*b*log(c))*sin
(2*b*log(x^n) + 2*a) + 1)*log((cos(2*a)^2 + sin(2*a)^2)*cos(2*b*log(c))^2 +
 (cos(2*a)^2 + sin(2*a)^2)*sin(2*b*log(c))^2 + 2*(cos(2*b*log(c))*cos(2*a)
```

```
- sin(2*b*log(c))*sin(2*a))*cos(2*b*log(x^n)) + cos(2*b*log(x^n))^2 - 2*(co
s(2*a)*sin(2*b*log(c)) + cos(2*b*log(c))*sin(2*a))*sin(2*b*log(x^n)) + sin(
2*b*log(x^n))^2) - 8*((cos(6*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*si
n(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) + (cos(4*b*log(c))*sin(8*b*log(c)) -
 cos(8*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + (cos(2*b*log(c)
)*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a
) - (cos(8*b*log(c))*cos(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)))*sin
(6*b*log(x^n) + 6*a) - (cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*s
in(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - (cos(8*b*log(c))*cos(2*b*log(c))
+ sin(8*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*sin(8*b*log(x^n
) + 8*a) - 8*(10*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b
*log(c)))*cos(4*b*log(x^n) + 4*a) + 8*(cos(2*b*log(c))*sin(6*b*log(c)) - co
s(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 10*(cos(6*b*log(c)
)*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a
) - 8*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*s
in(2*b*log(x^n) + 2*a) + sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - 8*(10*(
cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*
log(x^n) + 2*a) - 10*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin
(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(4*b*log(c)))*sin(4*b*log(x^n) +
 4*a) - 8*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/((b*cos(8*b*log(c))^2 +
b*sin(8*b*log(c))^2)*n*cos(8*b*log(x^n) + 8*a)^2 + 16*(b*cos(6*b*log(c))^2
+ b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a)^2 + 36*(b*cos(4*b*log(c))^
2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 + 8*b*n*cos(2*b*log(c)
)*cos(2*b*log(x^n) + 2*a) + 16*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*
n*cos(2*b*log(x^n) + 2*a)^2 + (b*cos(8*b*log(c))^2 + b*sin(8*b*log(c))^2)*n
*sin(8*b*log(x^n) + 8*a)^2 + 16*(b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2)
*n*sin(6*b*log(x^n) + 6*a)^2 + 36*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^
2)*n*sin(4*b*log(x^n) + 4*a)^2 - 8*b*n*sin(2*b*log(c))*sin(2*b*log(x^n) + 2
*a) + 16*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) + 2
*a)^2 + b*n + 2*(b*n*cos(8*b*log(c)) + 4*(b*cos(8*b*log(c))*cos(6*b*log(c))
 + b*sin(8*b*log(c))*sin(6*b*log(c)))*n*cos(6*b*log(x^n) + 6*a) + 6*(b*cos(
8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*
log(x^n) + 4*a) + 4*(b*cos(8*b*log(c))*cos(2*b*log(c)) + b*sin(8*b*log(c))*
sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) + 4*(b*cos(6*b*log(c))*sin(8*b*l
og(c)) - b*cos(8*b*log(c))*sin(6*b*log(c)))*n*sin(6*b*log(x^n) + 6*a) + 6*(
b*cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)))*n*si
n(4*b*log(x^n) + 4*a) + 4*(b*cos(2*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*lo
g(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(8*b*log(x^n) + 8*a) +
 8*(b*n*cos(6*b*log(c)) + 6*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*
log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) + 4*(b*cos(6*b*log(c))*c
os(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*
a) + 6*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c
)))*n*sin(4*b*log(x^n) + 4*a) + 4*(b*cos(2*b*log(c))*sin(6*b*log(c)) - b*co
s(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(6*b*log(x^n)
+ 6*a) + 12*(b*n*cos(4*b*log(c)) + 4*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b
```

```
*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) + 4*(b*cos(2*b*
log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(
x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*(4*(b*cos(6*b*log(c))*sin(8*b*log(
c)) - b*cos(8*b*log(c))*sin(6*b*log(c)))*n*cos(6*b*log(x^n) + 6*a) + 6*(b*c
os(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)))*n*cos(4
*b*log(x^n) + 4*a) + 4*(b*cos(2*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c
))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) + b*n*sin(8*b*log(c)) - 4*(b*
cos(8*b*log(c))*cos(6*b*log(c)) + b*sin(8*b*log(c))*sin(6*b*log(c)))*n*sin(
6*b*log(x^n) + 6*a) - 6*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(
c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) - 4*(b*cos(8*b*log(c))*cos(2
*b*log(c)) + b*sin(8*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*
sin(8*b*log(x^n) + 8*a) - 8*(6*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6
*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) + 4*(b*cos(2*b*log(c)
)*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) +
 2*a) + b*n*sin(6*b*log(c)) - 6*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(
6*b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) - 4*(b*cos(6*b*log(c
))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n)
+ 2*a))*sin(6*b*log(x^n) + 6*a) - 12*(4*(b*cos(2*b*log(c))*sin(4*b*log(c))
- b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) + b*n*sin(4*
b*log(c)) - 4*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*
b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a))
```

mupad [B] time = 6.59, size = 247, normalized size = 3.69

$$\ln(x)\,1\mathrm{i}+\frac{8}{b\,n\,\left(2\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+\mathrm{e}^{a\,4\mathrm{i}}\,(c\,x^n)^{b\,4\mathrm{i}}+1\right)}-\frac{4}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+1\right)}+\frac{4}{b\,n\,\left(4\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+6\,\mathrm{e}^{a\,4\mathrm{i}}\,(c\,x^n)^{b\,4\mathrm{i}}+\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + b*log(c*x^n))^5/x,x)
```

```
[Out] log(x)*1i + 8/(b*n*(2*exp(a*2i)*(c*x^n)^(b*2i) + exp(a*4i)*(c*x^n)^(b*4i) +
 1)) - 4/(b*n*(exp(a*2i)*(c*x^n)^(b*2i) + 1)) + 4/(b*n*(4*exp(a*2i)*(c*x^n)
^(b*2i) + 6*exp(a*4i)*(c*x^n)^(b*4i) + 4*exp(a*6i)*(c*x^n)^(b*6i) + exp(a*8
i)*(c*x^n)^(b*8i) + 1)) - log(exp(a*2i)*(c*x^n)^(b*2i) + 1)/(b*n) - 8/(b*n*
(3*exp(a*2i)*(c*x^n)^(b*2i) + 3*exp(a*4i)*(c*x^n)^(b*4i) + exp(a*6i)*(c*x^n
)^(b*6i) + 1))
```

sympy [A] time = 21.87, size = 92, normalized size = 1.37

$$\begin{cases} \log(x)\tan^5(a) & \text{for } b=0 \wedge (b=0 \vee n=0) \\ \log(x)\tan^5\left(a+b\log(c)\right) & \text{for } n=0 \\ \frac{\log\left(\tan^2\left(a+bn\log(x)+b\log(c)\right)+1\right)}{2bn}+\frac{\tan^4\left(a+bn\log(x)+b\log(c)\right)}{4bn}-\frac{\tan^2\left(a+bn\log(x)+b\log(c)\right)}{2bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*ln(c*x**n))**5/x,x)
```

```
[Out] Piecewise((log(x)*tan(a)**5, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*tan
(a + b*log(c))**5, Eq(n, 0)), (log(tan(a + b*n*log(x) + b*log(c))**2 + 1)/(
2*b*n) + tan(a + b*n*log(x) + b*log(c))**4/(4*b*n) - tan(a + b*n*log(x) + b
*log(c))**2/(2*b*n), True))
```

3.175 $\int (ex)^m \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=101

$$\frac{2i(ex)^{m+1}\,{}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(m+1)}-\frac{i(ex)^{m+1}}{e(m+1)}$$

```
[Out] -I*(e*x)^(1+m)/e/(1+m)+2*I*(e*x)^(1+m)*hypergeom([1, -1/2*I*(1+m)/b/d/n],[1
-1/2*I*(1+m)/b/d/n],-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/e/(1+m)
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Tan[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

$$\int (ex)^m \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \tan\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 14.69, size = 186, normalized size = 1.84

$$\frac{ix(ex)^m\left({}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};-e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)-\frac{(m+1)e^{2iad}\left(cx^n\right)^{2ibd}\,{}_2F_1\left(1,-\frac{i(m+2ibdn+1)}{2bdn};-\frac{i(m+4ibdn+1)}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{2ibdn+m+1}\right)}{m+1}$$

Antiderivative was successfully verified.

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

```
[Out] (I*x*(e*x)^m*(Hypergeometric2F1[1, ((-1/2*I)*(1 + m))/(b*d*n), 1 - ((I/2)*(
1 + m))/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))] - (E^((2*I)*a*d)*(1 + m)*
(c*x^n)^((2*I)*b*d)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m + (2*I)*b*d*n))/(
b*d*n), ((-1/2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n), -(E^((2*I)*a*d)*(c*x^n)^(
(2*I)*b*d))])/(1 + m + (2*I)*b*d*n)))/(1 + m)
```

fricas [F] time = 0.41, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m \tan\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.52, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(d*(a+b*ln(c*x^n))),x)
[Out] int((e*x)^m*tan(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)\,{\left(e\,x\right)}^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan\left(ad + bd\log\left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((e*x)**m*tan(a*d + b*d*log(c*x**n)), x)
```

3.176 $\int (ex)^m \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=196

$$-\frac{2i(ex)^{m+1}\,{}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bden}+\frac{i(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bden\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{(ex)^{m+1}(-bdn+i(m+1))}{bde(m+1)n}$$

```
[Out] (I*(1+m)-b*d*n)*(e*x)^(1+m)/b/d/e/(1+m)/n+I*(e*x)^(1+m)*(1-exp(2*I*a*d)*(c*
x^n)^(2*I*b*d))/b/d/e/n/(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*(e*x)^(1+m)*
hypergeom([1, -1/2*I*(1+m)/b/d/n],[1-1/2*I*(1+m)/b/d/n],-exp(2*I*a*d)*(c*x^
n)^(2*I*b*d))/b/d/e/n
```

Rubi [F] time = 0.08, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Tan[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int (ex)^m \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \tan^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [B] time = 17.55, size = 550, normalized size = 2.81

$$-\frac{(m+1)x^{-m}(ex)^m\sec\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)\left(\frac{x^{m+1}\sin(bdn\log(x))\sec\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{m+1}-\frac{i\cos\left(d\left(a+b\left(\log\left(cx^n\right)-n\log\right.\right.\right.}{}\right.}{}$$

Antiderivative was successfully verified.

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

```
[Out] -((x*(e*x)^m)/(1 + m)) + (x*(e*x)^m*Sec[d*(a + b*(-(n*Log[x]) + Log[c*x^n])
)]*Sec[b*d*n*Log[x] + d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Sin[b*d*n*Log[x
```

```
]])/(b*d*n) - ((1 + m)*(e*x)^m*Sec[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*((
x^(1 + m)*Sec[d*(a + b*Log[c*x^n])]*Sin[b*d*n*Log[x]])/(1 + m) - (I*Cos[d*(
a + b*(-(n*Log[x]) + Log[c*x^n]))]*(-(E^((a + 2*a*m + b*(1 + m)*n*Log[x] +
b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 + m + (2*I)*b*d*n)*Hyperg
eometric2F1[1, ((-1/2*I)*(1 + m))/(b*d*n), 1 - ((I/2)*(1 + m))/(b*d*n), -E^
((2*I)*d*(a + b*Log[c*x^n]))]) + E^((a*(1 + 2*m + (2*I)*b*d*n))/(b*n) + (1
+ m + (2*I)*b*d*n)*Log[x] + ((1 + 2*m + (2*I)*b*d*n)*(-(n*Log[x]) + Log[c*x
^n]))/n)*(1 + m)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m + (2*I)*b*d*n))/(b*d
*n), ((-1/2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n
]))] - I*E^((a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Lo
g[c*x^n]))/(b*n))*(1 + m + (2*I)*b*d*n)*Tan[d*(a + b*Log[c*x^n])]))/(E^(((1
 + 2*m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*(1 + m + (2*I)*b
*d*n))))/(b*d*n*x^m)
```

fricas [F] time = 0.45, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m\tan\left(bd\log\left(cx^n\right)+ad\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int (ex)^m\left(\tan^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(d*(a+b*ln(c*x^n)))^2,x)
[Out] int((e*x)^m*tan(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,\left(e\,x\right)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan^2\left(ad + bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((e*x)**m*tan(a*d + b*d*log(c*x**n))**2, x)
```

3.177 $\int (ex)^m \tan^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=351

$$\frac{i(ex)^{m+1}\left(-2b^2d^2n^2+m^2+2m+1\right)\,{}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{b^2d^2e(m+1)n^2}-\frac{ie^{-2iad}(ex)^{m+1}\left(\frac{e^{2iad}(-2ibdn+m+1)}{n}-\right.}{2b^2d^2en\left(1+e^{2iad}\left(\right.\right.}$$

```
[Out] -1/2*(I*(1+m)-b*d*n)*(1+m+2*I*b*d*n)*(e*x)^(1+m)/b^2/d^2/e/(1+m)/n^2-1/2*(e
*x)^(1+m)*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^2/b/d/e/n/(1+exp(2*I*a*d)*(c*x
^n)^(2*I*b*d))^2-1/2*I*(e*x)^(1+m)*(exp(2*I*a*d)*(1+m-2*I*b*d*n)/n-exp(4*I*
a*d)*(1+m+2*I*b*d*n)*(c*x^n)^(2*I*b*d)/n)/b^2/d^2/e/exp(2*I*a*d)/n/(1+exp(2
*I*a*d)*(c*x^n)^(2*I*b*d))+I*(-2*b^2*d^2*n^2+m^2+2*m+1)*(e*x)^(1+m)*hyperge
om([1, -1/2*I*(1+m)/b/d/n],[1-1/2*I*(1+m)/b/d/n],-exp(2*I*a*d)*(c*x^n)^(2*I
*b*d))/b^2/d^2/e/(1+m)/n^2
```

Rubi [F] time = 0.08, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Tan[d*(a + b*Log[c*x^n])]^3, x]
```

Rubi steps

$$\int (ex)^m \tan^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \tan^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 17.99, size = 642, normalized size = 1.83

$$-\frac{x^{-m}(ex)^m\left(2b^2d^2n^2-m^2-2m-1\right)\sec\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)\left(\frac{x^{m+1}\sin(bdn\log(x))\sec\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{m+1}-\frac{i\,\mathrm{co}}{}\right.}{}$$

Warning: Unable to verify antiderivative.

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

```
[Out] (x*(e*x)^m*Sec[b*d*n*Log[x] + d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]^2)/(2*b
*d*n) - ((1 + m)*x*(e*x)^m*Sec[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Sec[b*
d*n*Log[x] + d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Sin[b*d*n*Log[x]])/(2*b^
2*d^2*n^2) - ((-1 - 2*m - m^2 + 2*b^2*d^2*n^2)*(e*x)^m*Sec[d*(a + b*(-(n*Lo
g[x]) + Log[c*x^n]))]*((x^(1 + m)*Sec[d*(a + b*Log[c*x^n])]*Sin[b*d*n*Log[x
]])/(1 + m) - (I*Cos[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*(-(E^((a + 2*a*m
 + b*(1 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 +
 m + (2*I)*b*d*n)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m))/(b*d*n), 1 - ((I/
2)*(1 + m))/(b*d*n), -E^((2*I)*d*(a + b*Log[c*x^n]))]) + E^((a*(1 + 2*m + (
2*I)*b*d*n))/(b*n) + (1 + m + (2*I)*b*d*n)*Log[x] + ((1 + 2*m + (2*I)*b*d*n
)*(-(n*Log[x]) + Log[c*x^n]))/n)*(1 + m)*Hypergeometric2F1[1, ((-1/2*I)*(1
+ m + (2*I)*b*d*n))/(b*d*n), ((-1/2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n), -E^(
(2*I)*d*(a + b*Log[c*x^n]))] - I*E^((a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1
+ 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 + m + (2*I)*b*d*n)*Tan[d*(a +
b*Log[c*x^n])]))/(E^(((1 + 2*m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*
(1 + m)*(1 + m + (2*I)*b*d*n))))/(2*b^2*d^2*n^2*x^m) - (x*(e*x)^m*Tan[d*(a
+ b*(-(n*Log[x]) + Log[c*x^n]))])/(1 + m)
```

fricas [F] time = 0.44, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m \tan\left(bd\log\left(cx^n\right) + ad\right)^3, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\tan^3\left(d\left(a + b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((e*x)^m*tan(d*(a+b*ln(c*x^n)))^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \tan\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^3\,{\left(e\,x\right)}^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \tan^3\left(ad + bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*tan(d*(a+b*ln(c*x**n)))**3,x)
[Out] Integral((e*x)**m*tan(a*d + b*d*log(c*x**n))**3, x)
```

3.178 $\int \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=190

$$x\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\left(\frac{i\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{1+e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p F_1\left(-\frac{i}{2bdn};-p,p;1-\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},-$$

```
[Out] x*(I*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d)))
^p*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p*AppellF1(-1/2*I/b/d/n,-p,p,1-1/2*I/
b/d/n,exp(2*I*a*d)*(c*x^n)^(2*I*b*d),-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/((1-e
xp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p)
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Tan[d*(a + b*Log[c*x^n])]^p, x]
```

Rubi steps

$$\int \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [B] time = 1.41, size = 458, normalized size = 2.41

$$\frac{x(2bdn-i)\left(-\frac{i\left(-1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{1+e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p F_1\left(-\right.}{-2bdnpe^{2iad}\left(cx^n\right)^{2ibd}F_1\left(1-\frac{i}{2bdn};1-p,p;2-\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},-e^{2iad}\left(cx^n\right)^{2ibd}\right)-2bdnpe^{2iad}\left(cx^n\right)^{2ibd}F_1\left(1-\right.}$$

Warning: Unable to verify antiderivative.

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

```
[Out] ((-I + 2*b*d*n)*x*(((-I)*(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))/(1 + E^(
(2*I)*a*d)*(c*x^n)^((2*I)*b*d)))^p*AppellF1[(-1/2*I)/(b*d*n), -p, p, 1 - (I
```

```
/2)/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2
*I)*b*d))])/(-2*b*d*E^((2*I)*a*d)*n*p*(c*x^n)^((2*I)*b*d)*AppellF1[1 - (I/2
)/(b*d*n), 1 - p, p, 2 - (I/2)/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d),
-(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))] - 2*b*d*E^((2*I)*a*d)*n*p*(c*x^n)^((2
*I)*b*d)*AppellF1[1 - (I/2)/(b*d*n), -p, 1 + p, 2 - (I/2)/(b*d*n), E^((2*I)
*a*d)*(c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))] + (-I + 2*
b*d*n)*AppellF1[(-1/2*I)/(b*d*n), -p, p, 1 - (I/2)/(b*d*n), E^((2*I)*a*d)*(
c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))])
```

fricas [F] time = 0.50, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(\tan\left(bd\log\left(cx^{n}\right)+ad\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(d*(a+b*log(c*x^n)))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int \tan^{p}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(d*(a+b*ln(c*x^n)))^p,x)
[Out] int(tan(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(tan((b*log(c*x^n) + a)*d)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \tan\left(d\ \left(a+b\ \ln\left(c\,x^n\right)\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(d*(a+b*ln(c*x**n)))**p,x)
[Out] Integral(tan(d*(a + b*log(c*x**n)))**p, x)
```

3.179 $\int (ex)^m \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=210

$$\frac{(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\left(\frac{i\left(1-e^{2iad}(cx^n)^{2ibd}\right)}{1+e^{2iad}(cx^n)^{2ibd}}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p F_1\left(-\frac{i(m+1)}{2bdn};-p,p;1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},-e\right.}{e(m+1)}$$

```
[Out] (e*x)^(1+m)*(I*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/(1+exp(2*I*a*d)*(c*x^n)^(
2*I*b*d)))^p*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p*AppellF1(-1/2*I*(1+m)/b/d
/n,-p,p,1-1/2*I*(1+m)/b/d/n,exp(2*I*a*d)*(c*x^n)^(2*I*b*d),-exp(2*I*a*d)*(c
*x^n)^(2*I*b*d))/e/(1+m)/((1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p)
```

Rubi [F] time = 0.10, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Tan[d*(a + b*Log[c*x^n])]^p, x]
```

Rubi steps

$$\int (ex)^m \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \tan^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 1.15, size = 205, normalized size = 0.98

$$\frac{x(ex)^m\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\left(-\frac{i\left(-1+e^{2iad}(cx^n)^{2ibd}\right)}{1+e^{2iad}(cx^n)^{2ibd}}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p F_1\left(-\frac{i(m+1)}{2bdn};-p,p;1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},\right.}{m+1}$$

Antiderivative was successfully verified.

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

```
[Out] (x*(e*x)^m*(((-I)*(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))/(1 + E^((2*I)*a
*d)*(c*x^n)^((2*I)*b*d)))^p*(1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p*Appel
```

```
1F1[((-1/2*I)*(1 + m))/(b*d*n), -p, p, 1 - ((I/2)*(1 + m))/(b*d*n), E^((2*I
)*a*d)*(c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))])/((1 + m)
*(1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p)
```

fricas [F] time = 0.45, size = 0, normalized size = 0.00

$$\text{integral}\left(\left(ex\right)^{m}\tan\left(bd\log\left(cx^{n}\right)+ad\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*tan(d*(a+b*log(c*x^n)))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int \left(ex\right)^{m}\left(\tan^{p}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*tan(d*(a+b*ln(c*x^n)))^p,x)
[Out] int((e*x)^m*tan(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \left(ex\right)^{m}\tan\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int {\tan\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}^p\,{\left(e\,x\right)}^m \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(tan(d*(a + b*log(c*x^n)))^p*(e*x)^m, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.180 $\int \frac{\tan^{\frac{5}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=201

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}+\frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\log\left(\right.}{}$$

```
[Out] -1/2*arctan(-1+2^(1/2)*tan(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)-1/2*arctan(1+2
^(1/2)*tan(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)-1/4*ln(1-2^(1/2)*tan(a+b*ln(c*
x^n))^(1/2)+tan(a+b*ln(c*x^n)))/b/n*2^(1/2)+1/4*ln(1+2^(1/2)*tan(a+b*ln(c*x
^n))^(1/2)+tan(a+b*ln(c*x^n)))/b/n*2^(1/2)+2/3*tan(a+b*ln(c*x^n))^(3/2)/b/n
```

Rubi [A] time = 0.14, antiderivative size = 201, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3473, 3476, 329, 297, 1162, 617, 204, 1165, 628}

$$\frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{\log\left(\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - ArcTan[1 +
Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - Log[1 - Sqrt[2]*Sqrt[T
an[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) + Log[1 + Sq
rt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
+ (2*Tan[a + b*Log[c*x^n]]^(3/2))/(3*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 297

```
Int[(x_)^2/((a_) + (b_.)*(x_)^4), x_Symbol] :> With[{r = Numerator[Rt[a/b,
2]], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*s), Int[(r + s*x^2)/(a + b*x^4
), x], x] - Dist[1/(2*s), Int[(r - s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a,
 b}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &
& AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
```

```
IntegerQ[n]
```

Rubi steps

$$\int \frac{\tan^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \tan^{\frac{5}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} - \frac{\text{Subst}\left(\int \sqrt{\tan(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} - \frac{\text{Subst}\left(\int \frac{\sqrt{x}}{1+x^2}\,dx, x, \tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$
$$= \frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} - \frac{2\,\text{Subst}\left(\int \frac{x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$
$$= \frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} - \frac{\text{Subst}}{}$$
$$= \frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} - \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} - \frac{\text{S}}{}$$
$$= -\frac{\log\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+\tan\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} + \frac{\log\left(1+\sqrt{2}\sqrt{\text{t}}\right.}{}$$
$$= \frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} - \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right.}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.25, size = 50, normalized size = 0.25

$$-\frac{2\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\left({}_2F_1\left(\frac{3}{4},1;\frac{7}{4};-\tan^2\left(a+b\log\left(cx^n\right)\right)\right)-1\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + b*Log[c*x^n]]^(5/2)/x,x]

[Out] (-2*(-1 + Hypergeometric2F1[3/4, 1, 7/4, -Tan[a + b*Log[c*x^n]]^2])*Tan[a +
 b*Log[c*x^n]]^(3/2))/(3*b*n)
```

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(tan(a+b*log(c*x^n))^(5/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^(5/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.04, size = 161, normalized size = 0.80

$$\frac{2\left(\tan^{\frac{3}{2}}(a+b\ln(c\,x^n))\right)}{3bn}-\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x^n))\right)\right)\sqrt{2}}{2bn}-\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x^n\right.\right.}{2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(c*x^n))^(5/2)/x,x)
```

```
[Out] 2/3*tan(a+b*ln(c*x^n))^(3/2)/b/n-1/2*arctan(1+2^(1/2)*tan(a+b*ln(c*x^n))^(1
/2))/b/n*2^(1/2)-1/2*arctan(-1+2^(1/2)*tan(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2
)-1/4/b/n*2^(1/2)*ln((1-2^(1/2)*tan(a+b*ln(c*x^n))^(1/2)+tan(a+b*ln(c*x^n))
)/(1+2^(1/2)*tan(a+b*ln(c*x^n))^(1/2)+tan(a+b*ln(c*x^n))))
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^(5/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(tan(b*log(c*x^n) + a)^(5/2)/x, x)
```

mupad [B] time = 3.39, size = 79, normalized size = 0.39

$$\frac{2\tan\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}}{3\,b\,n}-\frac{{\left(-1\right)}^{1/4}\,\mathrm{atan}\left({\left(-1\right)}^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}+\frac{{\left(-1\right)}^{1/4}\,\mathrm{atanh}\left({\left(-1\right)}^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + b*log(c*x^n))^(5/2)/x,x)
```

```
[Out] (2*tan(a + b*log(c*x^n))^(3/2))/(3*b*n) - ((-1)^(1/4)*atan((-1)^(1/4)*tan(a
 + b*log(c*x^n))^(1/2)))/(b*n) + ((-1)^(1/4)*atanh((-1)^(1/4)*tan(a + b*log
(c*x^n))^(1/2)))/(b*n)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*ln(c*x**n))**(5/2)/x,x)
```

```
[Out] Timed out
```

3.181 $\int \frac{\tan^{\frac{3}{2}}\left(a+b\log(cx^n)\right)}{x}\,dx$

Optimal. Leaf size=199

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}+\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\right.}{2\sqrt{2}\,b}$$

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

Rubi [A] time = 0.13, antiderivative size = 199, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3473, 3476, 329, 211, 1165, 628, 1162, 617, 204}

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}+\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\right.}{2\sqrt{2}\,b}$$

Antiderivative was successfully verified.

```
[In] Int[Tan[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - ArcTan[1 +
Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) + Log[1 - Sqrt[2]*Sqrt[T
an[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) - Log[1 + Sq
rt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
+ (2*Sqrt[Tan[a + b*Log[c*x^n]]])/(b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^4)^(-1), x_Symbol] :> With[{r = Numerator[Rt[a/b, 2]
], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*r), Int[(r - s*x^2)/(a + b*x^4),
 x], x] + Dist[1/(2*r), Int[(r + s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a, b
}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &&
AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
```

IntegerQ[n]

Rubi steps

$$\int \frac{\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \tan^{\frac{3}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\tan(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}\left(1+x^2\right)}\,dx, x, \tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= \frac{2\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{2\,\text{Subst}\left(\int \frac{1}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= \frac{2\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} - \frac{\text{Subst}\,(}{}$$

$$= \frac{2\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}\,x+x^2}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} - \frac{\text{Su}}{}$$

$$= \frac{\log\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+\tan\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} - \frac{\log\left(1+\sqrt{2}\sqrt{\tan(}\right.}{}$$

$$= \frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} - \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} -$$

Mathematica [A] time = 0.24, size = 175, normalized size = 0.88

$$\frac{2\sqrt{2}\,\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)-2\sqrt{2}\,\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)+\sqrt{2}\,\log\left(\tan\left(a+b\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[Tan[a + b*Log[c*x^n]]^(3/2)/x,x]

[Out] (2*Sqrt[2]*ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]] - 2*Sqrt[2]*ArcT
an[1 + Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]] + Sqrt[2]*Log[1 - Sqrt[2]*Sqrt[
Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]] - Sqrt[2]*Log[1 + Sqrt[2]*S
```

```
qrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]] + 8*Sqrt[Tan[a + b*Log[
c*x^n]]])/(4*b*n)
```

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(tan(a+b*log(c*x^n))^(3/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^(3/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.03, size = 161, normalized size = 0.81

$$\frac{2\left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)}{bn}-\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)\right)\sqrt{2}}{2bn}-\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x\right.\right.}{2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(c*x^n))^(3/2)/x,x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\tan\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] integrate(tan(b*log(c*x^n) + a)^(3/2)/x, x)

mupad [B] time = 3.31, size = 78, normalized size = 0.39

$$\frac{2\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}}{b\,n}+\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)\,1\mathrm{i}}{b\,n}+\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\right.\right.}\right.}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(tan(a + b*log(c*x^n))^(3/2)/x,x)

[Out] (2*tan(a + b*log(c*x^n))^(1/2))/(b*n) + ((-1)^(1/4)*atan((-1)^(1/4)*tan(a +
 b*log(c*x^n))^(1/2))*1i)/(b*n) + ((-1)^(1/4)*atanh((-1)^(1/4)*tan(a + b*lo
g(c*x^n))^(1/2))*1i)/(b*n)

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\tan^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(tan(a+b*ln(c*x**n))**(3/2)/x,x)

[Out] Integral(tan(a + b*log(c*x**n))**(3/2)/x, x)

3.182 $\int \frac{\sqrt{\tan(a+b\log(cx^n))}}{x} \, dx$

Optimal. Leaf size=176

$$-\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}+\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}+\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\right.}{2\ldots}$$

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

Rubi [A] time = 0.12, antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421, Rules used = {3476, 329, 297, 1162, 617, 204, 1165, 628}

$$-\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}+\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}+\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\right.}{2\ldots}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Tan[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] -(ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n)) + ArcTan[1
 + Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) + Log[1 - Sqrt[2]*Sqr
t[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) - Log[1 +
 Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*
n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 297

```
Int[(x_)^2/((a_) + (b_.)*(x_)^4), x_Symbol] :> With[{r = Numerator[Rt[a/b,
2]], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*s), Int[(r + s*x^2)/(a + b*x^4
), x], x] - Dist[1/(2*s), Int[(r - s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a,
 b}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &
& AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\sqrt{\tan \left(a+b \log \left(c x^n\right)\right)}}{x}\, dx &= \frac{\text{Subst}\left(\int \sqrt{\tan(a+bx)}\, dx, x, \log \left(c x^n\right)\right)}{n} \\
&= \frac{\text{Subst}\left(\int \frac{\sqrt{x}}{1+x^2}\, dx, x, \tan \left(a+b \log \left(c x^n\right)\right)\right)}{bn} \\
&= \frac{2\, \text{Subst}\left(\int \frac{x^2}{1+x^4}\, dx, x, \sqrt{\tan \left(a+b \log \left(c x^n\right)\right)}\right)}{bn} \\
&= -\frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\, dx, x, \sqrt{\tan \left(a+b \log \left(c x^n\right)\right)}\right)}{bn} + \frac{\text{Subst}\left(\int \frac{1+x^2}{1+x^4}\, dx, x, \sqrt{\tan \left(a \ldots\right.}\right.}{bn} \\
&= \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\, dx, x, \sqrt{\tan \left(a+b \log \left(c x^n\right)\right)}\right)}{2bn} + \frac{\text{Subst}\left(\int \frac{1}{1+\sqrt{2}x+x^2}\, dx, x, \ldots\right.}{2bn} \\
&= \frac{\log \left(1-\sqrt{2} \sqrt{\tan \left(a+b \log \left(c x^n\right)\right)}+\tan \left(a+b \log \left(c x^n\right)\right)\right)}{2 \sqrt{2}\, bn} - \frac{\log \left(1+\sqrt{2} \sqrt{\ldots}\right.}{\ldots} \\
&= -\frac{\tan^{-1}\left(1-\sqrt{2} \sqrt{\tan \left(a+b \log \left(c x^n\right)\right)}\right)}{\sqrt{2}\, bn} + \frac{\tan^{-1}\left(1+\sqrt{2} \sqrt{\tan \left(a+b \log \left(c x^n\right.\right.}\right.}{\sqrt{2}\, bn}
\end{aligned}
$$

Mathematica [C] time = 0.10, size = 48, normalized size = 0.27

$$
\frac{2 \tan^{\frac{3}{2}}\left(a+b \log \left(c x^n\right)\right) {}_2F_1\left(\frac{3}{4},1;\frac{7}{4};-\tan^2\left(a+b \log \left(c x^n\right)\right)\right)}{3bn}
$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Tan[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*Hypergeometric2F1[3/4, 1, 7/4, -Tan[a + b*Log[c*x^n]]^2]*Tan[a + b*Log[c
*x^n]]^(3/2))/(3*b*n)
```

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(tan(a+b*log(c*x^n))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*log(c*x^n))^(1/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.03, size = 140, normalized size = 0.80

$$\frac{\sqrt{2}\,\ln\left(\frac{1-\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)+\tan(a+b\ln(c\,x^{n}))}{1+\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)+\tan(a+b\ln(c\,x^{n}))}\right)}{4bn}+\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)\right)\sqrt{2}}{2bn}+\frac{\arctan\left(-1+\sqrt{2}\,\left(\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a+b*ln(c*x^n))^(1/2)/x,x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\tan\left(b\log\left(cx^{n}\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(tan(b*log(c*x^n) + a))/x, x)
```

mupad [B] time = 2.63, size = 131, normalized size = 0.74

$$\frac{\sqrt{2}\,\left(\mathrm{atan}\left(\sqrt{2}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,-1\right)+\mathrm{atan}\left(\sqrt{2}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,+1\right)\right)}{2\,b\,n}+\frac{\sqrt{2}\,\left(\ln\left(\sqrt{2}\,\sqrt{\tan\left(a+b\,\ln\right.}\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(tan(a + b*log(c*x^n))^(1/2)/x,x)
```

```
[Out] (2^(1/2)*(atan(2^(1/2)*tan(a + b*log(c*x^n))^(1/2) - 1) + atan(2^(1/2)*tan(
a + b*log(c*x^n))^(1/2) + 1)))/(2*b*n) + (2^(1/2)*(log(2^(1/2)*tan(a + b*lo
g(c*x^n))^(1/2) - tan(a + b*log(c*x^n)) - 1) - log(tan(a + b*log(c*x^n)) +
2^(1/2)*tan(a + b*log(c*x^n))^(1/2) + 1)))/(4*b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\tan\left(a + b\log\left(cx^n\right)\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(tan(a+b*ln(c*x**n))**(1/2)/x,x)
```

```
[Out] Integral(sqrt(tan(a + b*log(c*x**n)))/x, x)
```

3.183 $\int \frac{1}{x\sqrt{\tan\left(a+b\log(cx^n)\right)}}\,dx$

Optimal. Leaf size=176

$$-\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}+\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\sqrt{}\right.}{2\sqrt{2}}$$

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

Rubi [A] time = 0.12, antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421, Rules used = {3476, 329, 211, 1165, 628, 1162, 617, 204}

$$-\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}+\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\sqrt{}\right.}{2\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Tan[a + b*Log[c*x^n]]]),x]
```

```
[Out] -(ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n)) + ArcTan[1
 + Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - Log[1 - Sqrt[2]*Sqr
t[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) + Log[1 +
 Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*
n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^4)^(-1), x_Symbol] :> With[{r = Numerator[Rt[a/b, 2]
], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*r), Int[(r - s*x^2)/(a + b*x^4),
 x], x] + Dist[1/(2*r), Int[(r + s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a, b
}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &&
AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$\int \frac{1}{x\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\tan(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}\left(1+x^2\right)}\,dx, x, \tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= \frac{2\,\text{Subst}\left(\int \frac{1}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} + \frac{\text{Subst}\left(\int \frac{1+x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+\right.}\right.}{bn}$$

$$= \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}\,x+x^2}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} + \frac{\text{Subst}\left(\int \frac{1}{1+\sqrt{2}\,x+x^2}\,dx, x, \right.}{2bn}$$

$$= -\frac{\log\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+\tan\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} + \frac{\log\left(1+\sqrt{2}\right.}{}$$

$$= -\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} + \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right.\right.}\right.}{\sqrt{2}\,bn}$$

Mathematica [A] time = 0.13, size = 142, normalized size = 0.81

$$\frac{-2\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)+2\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)-\log\left(\tan\left(a+b\log\left(cx^n\right)\right)\right.}{2\sqrt{2}\,bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Tan[a + b*Log[c*x^n]]]),x]
```

```
[Out] (-2*ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]] + 2*ArcTan[1 + Sqrt[2]*
Sqrt[Tan[a + b*Log[c*x^n]]]] - Log[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]
+ Tan[a + b*Log[c*x^n]]] + Log[1 + Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Ta
n[a + b*Log[c*x^n]]])/(2*Sqrt[2]*b*n)
```

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/tan(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.03, size = 140, normalized size = 0.80

$$\frac{\sqrt{2}\ \ln\left(\frac{1+\sqrt{2}\ \left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)+\tan(a+b\ln(c\,x^{n}))}{1-\sqrt{2}\ \left(\sqrt{\tan}\,(a+b\ln(c\,x^{n}))\right)+\tan(a+b\ln(c\,x^{n}))}\right)}{4bn}+\frac{\arctan\left(1+\sqrt{2}\ \left(\sqrt{\tan}\ (a+b\ln(c\,x^{n}))\right)\right)\sqrt{2}}{2bn}+\frac{\arctan\left(-1+\sqrt{2}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/tan(a+b*ln(c*x^n))^(1/2),x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\tan\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/(x*sqrt(tan(b*log(c*x^n) + a))), x)
```

mupad [B] time = 2.96, size = 59, normalized size = 0.34

$$-\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\tan\left(a+b\ \ln\left(c\,x^{n}\right)\right)}\right)\,1\mathrm{i}}{b\,n}-\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\tan\left(a+b\ \ln\left(c\,x^{n}\right)\right)}\right)\,1\mathrm{i}}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*tan(a + b*log(c*x^n))^(1/2)),x)
```

```
[Out] - ((-1)^(1/4)*atan((-1)^(1/4)*tan(a + b*log(c*x^n))^(1/2))*1i)/(b*n) - ((-1
)^(1/4)*atanh((-1)^(1/4)*tan(a + b*log(c*x^n))^(1/2))*1i)/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\tan\left(a+b\log\left(cx^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(tan(a + b*log(c*x**n)))), x)
```

3.184 $\int \frac{1}{x\tan^{\frac{3}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=199

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\sqrt{\right.}}{2\sqrt{2}}$$

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

Rubi [A] time = 0.13, antiderivative size = 199, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3474, 3476, 329, 297, 1162, 617, 204, 1165, 628}

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{\log\left(\tan\left(a+b\log\left(cx^n\right)\right)-\sqrt{\right.}}{2\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Tan[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - ArcTan[1 +
Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - Log[1 - Sqrt[2]*Sqrt[T
an[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) + Log[1 + Sq
rt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
- 2/(b*n*Sqrt[Tan[a + b*Log[c*x^n]]])
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 297

```
Int[(x_)^2/((a_) + (b_.)*(x_)^4), x_Symbol] :> With[{r = Numerator[Rt[a/b,
2]], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*s), Int[(r + s*x^2)/(a + b*x^4
), x], x] - Dist[1/(2*s), Int[(r - s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a,
 b}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &
```

```
& AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3474

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*Tan[c + d*x]
)^(n + 1)/(b*d*(n + 1)), x] - Dist[1/b^2, Int[(b*Tan[c + d*x])^(n + 2), x],
 x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$\int \frac{1}{x\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\tan^{\frac{3}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2}{bn\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \sqrt{\tan(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2}{bn\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \frac{\sqrt{x}}{1+x^2}\,dx, x, \tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= -\frac{2}{bn\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}} - \frac{2\,\text{Subst}\left(\int \frac{x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= -\frac{2}{bn\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}} + \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} - \cdots$$

$$= -\frac{2}{bn\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right.}{2bn}\cdots$$

$$= -\frac{\log\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+\tan\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} + \frac{\log\left(1+\sqrt{2}\cdots\right.}{\cdots}$$

$$= \frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} - \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\cdots\right.}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.11, size = 46, normalized size = 0.23

$$-\frac{2\,{}_2F_1\left(-\frac{1}{4},1;\frac{3}{4};-\tan^2\left(a+b\log\left(cx^n\right)\right)\right)}{bn\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Tan[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (-2*Hypergeometric2F1[-1/4, 1, 3/4, -Tan[a + b*Log[c*x^n]]^2])/(b*n*Sqrt[Ta
n[a + b*Log[c*x^n]]])
```

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/tan(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.03, size = 161, normalized size = 0.81

$$-\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\tan}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\sqrt{2}}{2bn}-\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\tan}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\sqrt{2}}{2bn}-\frac{\sqrt{2}\,\ln\left(\frac{1-\sqrt{2}\,(\surd}{1+\sqrt{2}\,(\surd}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/tan(a+b*ln(c*x^n))^(3/2),x)
```

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

```
tan(a+b*ln(c*x^n))^(1/2)+tan(a+b*ln(c*x^n)))/(1+2^(1/2)*tan(a+b*ln(c*x^n))^
(1/2)+tan(a+b*ln(c*x^n))))-2/b/n/tan(a+b*ln(c*x^n))^(1/2)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \tan\left(b \log\left(cx^n\right) + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*tan(b*log(c*x^n) + a)^(3/2)), x)
```

mupad [B] time = 2.92, size = 79, normalized size = 0.40

$$\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}-\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}-\frac{2}{b\,n\,\sqrt{\tan\left(a+b\,\ln\left(\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*tan(a + b*log(c*x^n))^(3/2)),x)
```

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \tan^{\frac{3}{2}}\left(a + b \log\left(cx^n\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(1/(x*tan(a + b*log(c*x**n))**(3/2)), x)
```

3.185 $\int \frac{1}{x\tan^{\frac{5}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=201

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}+\frac{\log}{}$$

```
[Out] -1/2*arctan(-1+2^(1/2)*tan(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)-1/2*arctan(1+2
^(1/2)*tan(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)+1/4*ln(1-2^(1/2)*tan(a+b*ln(c*
x^n))^(1/2)+tan(a+b*ln(c*x^n)))/b/n*2^(1/2)-1/4*ln(1+2^(1/2)*tan(a+b*ln(c*x
^n))^(1/2)+tan(a+b*ln(c*x^n)))/b/n*2^(1/2)-2/3/b/n/tan(a+b*ln(c*x^n))^(3/2)
```

Rubi [A] time = 0.13, antiderivative size = 201, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3474, 3476, 329, 211, 1165, 628, 1162, 617, 204}

$$\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}-\frac{\tan^{-1}\left(\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+1\right)}{\sqrt{2}\,bn}-\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}+\frac{\log}{}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Tan[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] ArcTan[1 - Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - ArcTan[1 +
Sqrt[2]*Sqrt[Tan[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) + Log[1 - Sqrt[2]*Sqrt[T
an[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) - Log[1 + Sq
rt[2]*Sqrt[Tan[a + b*Log[c*x^n]]] + Tan[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
- 2/(3*b*n*Tan[a + b*Log[c*x^n]]^(3/2))
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^4)^(-1), x_Symbol] :> With[{r = Numerator[Rt[a/b, 2]
], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*r), Int[(r - s*x^2)/(a + b*x^4),
 x], x] + Dist[1/(2*r), Int[(r + s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a, b
}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &&
```

```
AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3474

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*Tan[c + d*x]
)^(n + 1)/(b*d*(n + 1)), x] - Dist[1/b^2, Int[(b*Tan[c + d*x])^(n + 2), x],
 x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$\int \frac{1}{x\tan^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\tan^{\frac{5}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\tan(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}\left(1+x^2\right)}\,dx, x, \tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= -\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{2\,\text{Subst}\left(\int \frac{1}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= -\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} - \frac{\text{Su}}{}$$

$$= -\frac{2}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn}$$

$$= \frac{\log\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}+\tan\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} - \frac{\log\left(1+\sqrt{2}\sqrt{\tan\right.}\right.}{}$$

$$= \frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} - \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\tan\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.20, size = 48, normalized size = 0.24

$$-\frac{2\,{}_2F_1\left(-\frac{3}{4},1;\frac{1}{4};-\tan^2\left(a+b\log\left(cx^n\right)\right)\right)}{3bn\tan^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Tan[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (-2*Hypergeometric2F1[-3/4, 1, 1/4, -Tan[a + b*Log[c*x^n]]^2])/(3*b*n*Tan[a
 + b*Log[c*x^n]]^(3/2))
```

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/tan(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.03, size = 161, normalized size = 0.80

$$-\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\tan}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\sqrt{2}}{2bn}-\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\tan}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\sqrt{2}}{2bn}-\frac{\sqrt{2}\,\ln\left(\frac{1+\sqrt{2}\,(}{1-\sqrt{2}\,(}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/tan(a+b*ln(c*x^n))^(5/2),x)
```

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

```
tan(a+b*ln(c*x^n))^(1/2)+tan(a+b*ln(c*x^n)))/(1-2^(1/2)*tan(a+b*ln(c*x^n))^
(1/2)+tan(a+b*ln(c*x^n))))-2/3/b/n/tan(a+b*ln(c*x^n))^(3/2)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \tan\left(b \log\left(cx^n\right) + a\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*tan(b*log(c*x^n) + a)^(5/2)), x)
```

mupad [B] time = 4.08, size = 78, normalized size = 0.39

$$-\frac{2}{3\,b\,n\,\tan\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}}+\frac{{\left(-1\right)}^{1/4}\,\mathrm{atan}\left({\left(-1\right)}^{1/4}\,\sqrt{\tan\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)\,1{}\mathrm{i}}{b\,n}+\frac{{\left(-1\right)}^{1/4}\,\mathrm{atanh}\left({\left(-1\right)}^{1/4}\,\sqrt{\tan\left(a+b\right.}\right.}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*tan(a + b*log(c*x^n))^(5/2)),x)
```

```
[Out] ((-1)^(1/4)*atan((-1)^(1/4)*tan(a + b*log(c*x^n))^(1/2))*1i)/(b*n) - 2/(3*b
*n*tan(a + b*log(c*x^n))^(3/2)) + ((-1)^(1/4)*atanh((-1)^(1/4)*tan(a + b*lo
g(c*x^n))^(1/2))*1i)/(b*n)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/tan(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.186 $\int x^3 \cot(a + i\log(x))\,dx$

Optimal. Leaf size=49

$$-ie^{2ia}x^2 - ie^{4ia}\log\left(-x^2 + e^{2ia}\right) - \frac{ix^4}{4}$$

```
[Out] -I*exp(2*I*a)*x^2-1/4*I*x^4-I*exp(4*I*a)*ln(exp(2*I*a)-x^2)
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3 \cot(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^3*Cot[a + I*Log[x]],x]
```

```
[Out] Defer[Int][x^3*Cot[a + I*Log[x]], x]
```

Rubi steps

$$\int x^3 \cot(a + i\log(x))\,dx = \int x^3 \cot(a + i\log(x))\,dx$$

Mathematica [B] time = 0.04, size = 137, normalized size = 2.80

$$x^2\sin(2a) - ix^2\cos(2a) - \cos(4a)\tan^{-1}\left(\frac{\left(x^2-1\right)\cos(a)}{x^2(-\sin(a)) - \sin(a)}\right) - i\sin(4a)\tan^{-1}\left(\frac{\left(x^2-1\right)\cos(a)}{x^2(-\sin(a)) - \sin(a)}\right) - \frac{1}{2}i\cos(4a$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Cot[a + I*Log[x]],x]
```

```
[Out] (-1/4*I)*x^4 - I*x^2*Cos[2*a] - ArcTan[((-1 + x^2)*Cos[a])/(-Sin[a] - x^2*S
in[a])]*Cos[4*a] - (I/2)*Cos[4*a]*Log[1 + x^4 - 2*x^2*Cos[2*a]] + x^2*Sin[2
*a] - I*ArcTan[((-1 + x^2)*Cos[a])/(-Sin[a] - x^2*Sin[a])]*Sin[4*a] + (Log[
1 + x^4 - 2*x^2*Cos[2*a]]*Sin[4*a])/2
```

fricas [A] time = 0.66, size = 32, normalized size = 0.65

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] -1/4*I*x^4 - I*x^2*e^(2*I*a) - I*e^(4*I*a)*log(x^2 - e^(2*I*a))
```

giac [A] time = 0.55, size = 50, normalized size = 1.02

$$-\frac{1}{4}ix^4 - ix^2e^{(2ia)} + \frac{1}{2}\pi e^{(4ia)} - ie^{(4ia)}\log\left(x + e^{(ia)}\right) - ie^{(4ia)}\log\left(-x + e^{(ia)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(a+I*log(x)),x, algorithm="giac")
```

```
[Out] -1/4*I*x^4 - I*x^2*e^(2*I*a) + 1/2*pi*e^(4*I*a) - I*e^(4*I*a)*log(x + e^(I*
a)) - I*e^(4*I*a)*log(-x + e^(I*a))
```

maple [A] time = 0.07, size = 39, normalized size = 0.80

$$-i e^{2ia}x^2 - \frac{ix^4}{4} - ie^{4ia}\ln\left(e^{2ia} - x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(a+I*ln(x)),x)
```

```
[Out] -I*exp(2*I*a)*x^2-1/4*I*x^4-I*exp(4*I*a)*ln(exp(2*I*a)-x^2)
```

maxima [B] time = 0.34, size = 136, normalized size = 2.78

$$-\frac{1}{4}ix^4 - x^2(i\cos(2a) - \sin(2a)) + \frac{1}{4}(4\cos(4a) + 4i\sin(4a))\arctan(\sin(a), x + \cos(a)) - \frac{1}{4}(4\cos(4a) + 4i\sin$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] -1/4*I*x^4 - x^2*(I*cos(2*a) - sin(2*a)) + 1/4*(4*cos(4*a) + 4*I*sin(4*a))*
arctan2(sin(a), x + cos(a)) - 1/4*(4*cos(4*a) + 4*I*sin(4*a))*arctan2(sin(a
), x - cos(a)) - 1/2*(I*cos(4*a) - sin(4*a))*log(x^2 + 2*x*cos(a) + cos(a)^
2 + sin(a)^2) - 1/2*(I*cos(4*a) - sin(4*a))*log(x^2 - 2*x*cos(a) + cos(a)^2
 + sin(a)^2)
```

mupad [B] time = 2.22, size = 38, normalized size = 0.78

$$-x^2\,e^{a\,2i}\,1i - \ln\left(x^2 - e^{a\,2i}\right)\,e^{a\,4i}\,1i - \frac{x^4\,1i}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(a + log(x)*1i),x)
```

```
[Out] - x^2*exp(a*2i)*1i - log(x^2 - exp(a*2i))*exp(a*4i)*1i - (x^4*1i)/4
```

sympy [A] time = 0.22, size = 39, normalized size = 0.80

$$-\frac{ix^4}{4} - ix^2e^{2ia} - ie^{4ia}\log\left(x^2 - e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*cot(a+I*ln(x)),x)
```

```
[Out] -I*x**4/4 - I*x**2*exp(2*I*a) - I*exp(4*I*a)*log(x**2 - exp(2*I*a))
```

3.187 $\int x^2 \cot(a + i\log(x))\,dx$

Optimal. Leaf size=43

$$-2ie^{2ia}x + 2ie^{3ia}\tanh^{-1}\left(e^{-ia}x\right) - \frac{ix^3}{3}$$

```
[Out] -2*I*exp(2*I*a)*x-1/3*I*x^3+2*I*exp(3*I*a)*arctanh(x/exp(I*a))
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^2 \cot(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^2*Cot[a + I*Log[x]],x]
```

```
[Out] Defer[Int][x^2*Cot[a + I*Log[x]], x]
```

Rubi steps

$$\int x^2 \cot(a + i\log(x))\,dx = \int x^2 \cot(a + i\log(x))\,dx$$

Mathematica [A] time = 0.02, size = 66, normalized size = 1.53

$$2x\sin(2a) - 2ix\cos(2a) + 2i\cos(3a)\tanh^{-1}(x\cos(a) - ix\sin(a)) - 2\sin(3a)\tanh^{-1}(x\cos(a) - ix\sin(a)) - \frac{ix^3}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Cot[a + I*Log[x]],x]
```

```
[Out] (-1/3*I)*x^3 - (2*I)*x*Cos[2*a] + (2*I)*ArcTanh[x*Cos[a] - I*x*Sin[a]]*Cos[
3*a] + 2*x*Sin[2*a] - 2*ArcTanh[x*Cos[a] - I*x*Sin[a]]*Sin[3*a]
```

fricas [B] time = 1.48, size = 82, normalized size = 1.91

$$-\frac{1}{3}ix^3 - 2ixe^{(2ia)} - \sqrt{-e^{(6ia)}}\log\left(\frac{1}{2}\left(2xe^{(2ia)} + 2i\sqrt{-e^{(6ia)}}\right)e^{(-2ia)}\right) + \sqrt{-e^{(6ia)}}\log\left(\frac{1}{2}\left(2xe^{(2ia)} - 2i\sqrt{-e^{(6ia)}}\right)e^{(-2ia)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cot(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] -1/3*I*x^3 - 2*I*x*e^(2*I*a) - sqrt(-e^(6*I*a))*log(1/2*(2*x*e^(2*I*a) + 2*
I*sqrt(-e^(6*I*a)))*e^(-2*I*a)) + sqrt(-e^(6*I*a))*log(1/2*(2*x*e^(2*I*a) -
 2*I*sqrt(-e^(6*I*a)))*e^(-2*I*a))
```

giac [A] time = 1.07, size = 47, normalized size = 1.09

$$-\frac{1}{3}i\,x^3-2i\,xe^{(2i\,a)}+i\,e^{(3i\,a)}\log\left(i\,x+i\,e^{(i\,a)}\right)-i\,e^{(3i\,a)}\log\left(-i\,x+i\,e^{(i\,a)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cot(a+I*log(x)),x, algorithm="giac")
```

```
[Out] -1/3*I*x^3 - 2*I*x*e^(2*I*a) + I*e^(3*I*a)*log(I*x + I*e^(I*a)) - I*e^(3*I*
a)*log(-I*x + I*e^(I*a))
```

maple [A] time = 0.06, size = 33, normalized size = 0.77

$$-\frac{ix^3}{3}-2i\mathrm{e}^{2ia}x+2i\,\mathrm{arctanh}\left(x\,\mathrm{e}^{-ia}\right)\mathrm{e}^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cot(a+I*ln(x)),x)
```

```
[Out] -1/3*I*x^3-2*I*exp(2*I*a)*x+2*I*arctanh(x*exp(-I*a))*exp(3*I*a)
```

maxima [B] time = 0.38, size = 130, normalized size = 3.02

$$-\frac{1}{3}i\,x^3+2\,x(-i\,\cos\left(2\,a\right)+\sin\left(2\,a\right))-\frac{1}{6}\left(6\,\cos\left(3\,a\right)+6i\,\sin\left(3\,a\right)\right)\arctan\left(\sin(a),x+\cos(a)\right)-\frac{1}{6}\left(6\,\cos\left(3\,a\right)+6i\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cot(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] -1/3*I*x^3 + 2*x*(-I*cos(2*a) + sin(2*a)) - 1/6*(6*cos(3*a) + 6*I*sin(3*a))
*arctan2(sin(a), x + cos(a)) - 1/6*(6*cos(3*a) + 6*I*sin(3*a))*arctan2(sin(
a), x - cos(a)) + 1/2*(I*cos(3*a) - sin(3*a))*log(x^2 + 2*x*cos(a) + cos(a)
^2 + sin(a)^2) + 1/2*(-I*cos(3*a) + sin(3*a))*log(x^2 - 2*x*cos(a) + cos(a)
^2 + sin(a)^2)
```

mupad [B] time = 2.20, size = 40, normalized size = 0.93

$$-\mathrm{atan}\left(\frac{x}{\sqrt{-\mathrm{e}^{a\,2\mathrm{i}}}}\right)\left(-\mathrm{e}^{a\,2\mathrm{i}}\right)^{3/2}\,2\mathrm{i}-\frac{x^3\,1\mathrm{i}}{3}-x\,\mathrm{e}^{a\,2\mathrm{i}}\,2\mathrm{i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cot(a + log(x)*1i),x)
```

```
[Out] - atan(x/(-exp(a*2i))^(1/2))*(-exp(a*2i))^(3/2)*2i - (x^3*1i)/3 - x*exp(a*2
i)*2i
```

sympy [A] time = 0.20, size = 63, normalized size = 1.47

$$-\frac{ix^3}{3} - 2ixe^{2ia} - \left(i\log\left(xe^{2ia} - e^{3ia}\right) - i\log\left(xe^{2ia} + e^{3ia}\right)\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*cot(a+I*ln(x)),x)
```

```
[Out] -I*x**3/3 - 2*I*x*exp(2*I*a) - (I*log(x*exp(2*I*a) - exp(3*I*a)) - I*log(x*
exp(2*I*a) + exp(3*I*a)))*exp(3*I*a)
```

3.188 $\int x \cot(a + i \log(x))\,dx$

Optimal. Leaf size=35

$$-ie^{2ia}\log\left(-x^2+e^{2ia}\right)-\frac{ix^2}{2}$$

```
[Out] -1/2*I*x^2-I*exp(2*I*a)*ln(exp(2*I*a)-x^2)
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x \cot(a + i \log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x*Cot[a + I*Log[x]],x]
```

```
[Out] Defer[Int][x*Cot[a + I*Log[x]], x]
```

Rubi steps

$$\int x \cot(a + i \log(x))\,dx = \int x \cot(a + i \log(x))\,dx$$

Mathematica [B] time = 0.02, size = 118, normalized size = 3.37

$$-\cos(2a)\tan^{-1}\left(\frac{\left(x^2-1\right)\cos(a)}{x^2(-\sin(a))-\sin(a)}\right)-i\sin(2a)\tan^{-1}\left(\frac{\left(x^2-1\right)\cos(a)}{x^2(-\sin(a))-\sin(a)}\right)-\frac{1}{2}i\cos(2a)\log\left(-2x^2\cos(2a)+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Cot[a + I*Log[x]],x]
```

```
[Out] (-1/2*I)*x^2 - ArcTan[((-1 + x^2)*Cos[a])/(-Sin[a] - x^2*Sin[a])]*Cos[2*a]
- (I/2)*Cos[2*a]*Log[1 + x^4 - 2*x^2*Cos[2*a]] - I*ArcTan[((-1 + x^2)*Cos[a
])/(-Sin[a] - x^2*Sin[a])]*Sin[2*a] + (Log[1 + x^4 - 2*x^2*Cos[2*a]]*Sin[2*
a])/2
```

fricas [A] time = 0.59, size = 23, normalized size = 0.66

$$-\frac{1}{2}i\,x^2-i\,e^{(2i\,a)}\log\left(x^2-e^{(2i\,a)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] -1/2*I*x^2 - I*e^(2*I*a)*log(x^2 - e^(2*I*a))
```

giac [A] time = 2.50, size = 41, normalized size = 1.17

$$-\frac{1}{2}i\,x^2+\frac{1}{2}\,\pi e^{(2i\,a)}-i\,e^{(2i\,a)}\log\left(x+e^{(i\,a)}\right)-i\,e^{(2i\,a)}\log\left(-x+e^{(i\,a)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*log(x)),x, algorithm="giac")
```

```
[Out] -1/2*I*x^2 + 1/2*pi*e^(2*I*a) - I*e^(2*I*a)*log(x + e^(I*a)) - I*e^(2*I*a)*
log(-x + e^(I*a))
```

maple [A] time = 0.06, size = 28, normalized size = 0.80

$$-\frac{ix^2}{2}-i\mathrm{e}^{2ia}\ln\left(\mathrm{e}^{2ia}-x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cot(a+I*ln(x)),x)
```

```
[Out] -1/2*I*x^2-I*exp(2*I*a)*ln(exp(2*I*a)-x^2)
```

maxima [B] time = 0.34, size = 114, normalized size = 3.26

$$-\frac{1}{2}i\,x^2+\frac{1}{2}\,(2\,\cos\left(2\,a\right)+2i\,\sin\left(2\,a\right))\arctan\left(\sin(a),x+\cos(a)\right)-\frac{1}{2}\,(2\,\cos\left(2\,a\right)+2i\,\sin\left(2\,a\right))\arctan\left(\sin(a),x-\cos\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] -1/2*I*x^2 + 1/2*(2*cos(2*a) + 2*I*sin(2*a))*arctan2(sin(a), x + cos(a)) -
1/2*(2*cos(2*a) + 2*I*sin(2*a))*arctan2(sin(a), x - cos(a)) + 1/2*(-I*cos(2
*a) + sin(2*a))*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(a)^2) + 1/2*(-I*cos(2
*a) + sin(2*a))*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2)
```

mupad [B] time = 2.20, size = 27, normalized size = 0.77

$$-\ln\left(x^2-\mathrm{e}^{a\,2\mathrm{i}}\right)\,\mathrm{e}^{a\,2\mathrm{i}}\,1\mathrm{i}-\frac{x^2\,1\mathrm{i}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cot(a + log(x)*1i),x)
```

```
[Out] - log(x^2 - exp(a*2i))*exp(a*2i)*1i - (x^2*1i)/2
```

sympy [A] time = 0.20, size = 27, normalized size = 0.77

$$-\frac{ix^2}{2} - ie^{2ia}\log\left(x^2 - e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*ln(x)),x)
```

```
[Out] -I*x**2/2 - I*exp(2*I*a)*log(x**2 - exp(2*I*a))
```

3.189 $\int \cot(a + i\log(x))\, dx$

Optimal. Leaf size=27

$$2ie^{ia}\tanh^{-1}\left(e^{-ia}x\right) - ix$$

```
[Out] -I*x+2*I*exp(I*a)*arctanh(x/exp(I*a))
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot(a + i\log(x))\, dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + I*Log[x]],x]
```

```
[Out] Defer[Int][Cot[a + I*Log[x]], x]
```

Rubi steps

$$\int \cot(a + i\log(x))\, dx = \int \cot(a + i\log(x))\, dx$$

Mathematica [A] time = 0.01, size = 42, normalized size = 1.56

$$2i\cos(a)\tanh^{-1}(x\cos(a) - ix\sin(a)) - 2\sin(a)\tanh^{-1}(x\cos(a) - ix\sin(a)) - ix$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]],x]
```

```
[Out] (-I)*x + (2*I)*ArcTanh[x*Cos[a] - I*x*Sin[a]]*Cos[a] - 2*ArcTanh[x*Cos[a] -
 I*x*Sin[a]]*Sin[a]
```

fricas [B] time = 0.68, size = 49, normalized size = 1.81

$$-\sqrt{-e^{(2ia)}}\log\left(x + i\sqrt{-e^{(2ia)}}\right) + \sqrt{-e^{(2ia)}}\log\left(x - i\sqrt{-e^{(2ia)}}\right) - ix$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] -sqrt(-e^(2*I*a))*log(x + I*sqrt(-e^(2*I*a))) + sqrt(-e^(2*I*a))*log(x - I*
sqrt(-e^(2*I*a))) - I*x
```

giac [B] time = 0.44, size = 38, normalized size = 1.41

$$i\,e^{(i\,a)}\log\left(i\,x+i\,e^{(i\,a)}\right)-i\,e^{(i\,a)}\log\left(-i\,x+i\,e^{(i\,a)}\right)-i\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x)),x, algorithm="giac")
[Out] I*e^(I*a)*log(I*x + I*e^(I*a)) - I*e^(I*a)*log(-I*x + I*e^(I*a)) - I*x
```

maple [A] time = 0.05, size = 22, normalized size = 0.81

$$-ix+2i\,\mathrm{arctanh}\left(x\,\mathrm{e}^{-ia}\right)\mathrm{e}^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x)),x)
[Out] -I*x+2*I*arctanh(x*exp(-I*a))*exp(I*a)
```

maxima [B] time = 0.36, size = 98, normalized size = 3.63

$$-\frac{1}{2}\left(2\,\cos(a)+2i\,\sin(a)\right)\arctan\left(\sin(a),x+\cos(a)\right)-\frac{1}{2}\left(2\,\cos(a)+2i\,\sin(a)\right)\arctan\left(\sin(a),x-\cos(a)\right)-\frac{1}{2}\,(-i$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x)),x, algorithm="maxima")
[Out] -1/2*(2*cos(a) + 2*I*sin(a))*arctan2(sin(a), x + cos(a)) - 1/2*(2*cos(a) +
2*I*sin(a))*arctan2(sin(a), x - cos(a)) - 1/2*(-I*cos(a) + sin(a))*log(x^2
+ 2*x*cos(a) + cos(a)^2 + sin(a)^2) - 1/2*(I*cos(a) - sin(a))*log(x^2 - 2*x
*cos(a) + cos(a)^2 + sin(a)^2) - I*x
```

mupad [B] time = 2.18, size = 29, normalized size = 1.07

$$-x\,1\mathrm{i}+\mathrm{atan}\left(\frac{x}{\sqrt{-\mathrm{e}^{a\,2\mathrm{i}}}}\right)\sqrt{-\mathrm{e}^{a\,2\mathrm{i}}}\;2\mathrm{i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i),x)
[Out] atan(x/(-exp(a*2i))^(1/2))*(-exp(a*2i))^(1/2)*2i - x*1i
```

sympy [A] time = 0.18, size = 29, normalized size = 1.07

$$-ix-\left(i\log\left(x-e^{ia}\right)-i\log\left(x+e^{ia}\right)\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x)),x)
```

```
[Out] -I*x - (I*log(x - exp(I*a)) - I*log(x + exp(I*a)))*exp(I*a)
```

3.190 $\int \frac{\cot(a+i\log(x))}{x}\,dx$

Optimal. Leaf size=14

$$-i\log(\sin(a+i\log(x)))$$

```
[Out] -I*ln(sin(a+I*ln(x)))
```

Rubi [A] time = 0.01, antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {3475}

$$-i\log(\sin(a+i\log(x)))$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + I*Log[x]]/x,x]
```

```
[Out] (-I)*Log[Sin[a + I*Log[x]]]
```

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\cot(a+i\log(x))}{x}\,dx &= \text{Subst}\left(\int \cot(a+ix)\,dx, x, \log(x)\right)\\ &= -i\log(\sin(a+i\log(x)))\end{aligned}$$

Mathematica [A] time = 0.03, size = 25, normalized size = 1.79

$$-i(\log(\tan(a+i\log(x)))+\log(\cos(a+i\log(x))))$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]/x,x]
```

```
[Out] (-I)*(Log[Cos[a + I*Log[x]]] + Log[Tan[a + I*Log[x]]])
```

fricas [A] time = 0.79, size = 18, normalized size = 1.29

$$-i\,\log\left(x^2-e^{(2ia)}\right)+i\,\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x,x, algorithm="fricas")
```

```
[Out] -I*log(x^2 - e^(2*I*a)) + I*log(x)
```

giac [B] time = 1.21, size = 66, normalized size = 4.71

$$-i \log\left(\frac{i\left(x^2-1\right)\tan\left(\frac{1}{2}a\right)^2}{x^2+1} - \frac{i\left(x^2-1\right)}{x^2+1} - 2\tan\left(\frac{1}{2}a\right)\right) + \frac{1}{2}i\log\left(-\frac{\left(x^2-1\right)^2}{\left(x^2+1\right)^2}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x,x, algorithm="giac")
```

```
[Out] -I*log(I*(x^2 - 1)*tan(1/2*a)^2/(x^2 + 1) - I*(x^2 - 1)/(x^2 + 1) - 2*tan(1
/2*a)) + 1/2*I*log(-(x^2 - 1)^2/(x^2 + 1)^2 + 1)
```

maple [A] time = 0.00, size = 17, normalized size = 1.21

$$\frac{i\ln\left(\cot^2\left(a+i\ln(x)\right)+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))/x,x)
```

```
[Out] 1/2*I*ln(cot(a+I*ln(x))^2+1)
```

maxima [A] time = 0.35, size = 10, normalized size = 0.71

$$-i\log\left(\sin\left(a+i\log(x)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x,x, algorithm="maxima")
```

```
[Out] -I*log(sin(a + I*log(x)))
```

mupad [B] time = 2.25, size = 21, normalized size = 1.50

$$-\ln\left(x^2-\mathrm{e}^{a\,2\mathrm{i}}\right)\,1\mathrm{i}+\ln(x)\,1\mathrm{i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)/x,x)
```

```
[Out] log(x)*1i - log(x^2 - exp(a*2i))*1i
```

sympy [A] time = 0.27, size = 17, normalized size = 1.21

$$i\log(x) - i\log\left(x^2 - e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))/x,x)
```

```
[Out] I*log(x) - I*log(x**2 - exp(2*I*a))
```

3.191 $\int \frac{\cot(a+i\log(x))}{x^2}\,dx$

Optimal. Leaf size=29

$$2ie^{-ia}\tanh^{-1}\left(e^{-ia}x\right)-\frac{i}{x}$$

```
[Out] -I/x+2*I*arctanh(x/exp(I*a))/exp(I*a)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot(a+i\log(x))}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + I*Log[x]]/x^2,x]
```

```
[Out] Defer[Int][Cot[a + I*Log[x]]/x^2, x]
```

Rubi steps

$$\int \frac{\cot(a+i\log(x))}{x^2}\,dx=\int \frac{\cot(a+i\log(x))}{x^2}\,dx$$

Mathematica [A] time = 0.02, size = 44, normalized size = 1.52

$$2i\cos(a)\tanh^{-1}(x\cos(a)-ix\sin(a))+2\sin(a)\tanh^{-1}(x\cos(a)-ix\sin(a))-\frac{i}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]/x^2,x]
```

```
[Out] (-I)/x + (2*I)*ArcTanh[x*Cos[a] - I*x*Sin[a]]*Cos[a] + 2*ArcTanh[x*Cos[a] -
 I*x*Sin[a]]*Sin[a]
```

fricas [A] time = 0.91, size = 36, normalized size = 1.24

$$\frac{i\,xe^{(-i\,a)}\log\left(x+e^{(i\,a)}\right)-i\,xe^{(-i\,a)}\log\left(x-e^{(i\,a)}\right)-i}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^2,x, algorithm="fricas")
```

```
[Out] (I*x*e^(-I*a)*log(x + e^(I*a)) - I*x*e^(-I*a)*log(x - e^(I*a)) - I)/x
```

giac [B] time = 0.60, size = 40, normalized size = 1.38

$$ie^{(-ia)}\log\left(ix+ie^{(ia)}\right)-ie^{(-ia)}\log\left(-ix+ie^{(ia)}\right)-\frac{i}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^2,x, algorithm="giac")
```

```
[Out] I*e^(-I*a)*log(I*x + I*e^(I*a)) - I*e^(-I*a)*log(-I*x + I*e^(I*a)) - I/x
```

maple [A] time = 0.06, size = 24, normalized size = 0.83

$$-\frac{i}{x}+2i\operatorname{arctanh}\left(x\,\mathrm{e}^{-ia}\right)\mathrm{e}^{-ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))/x^2,x)
```

```
[Out] -I/x+2*I*arctanh(x*exp(-I*a))*exp(-I*a)
```

maxima [B] time = 0.38, size = 103, normalized size = 3.55

$$x(i\cos(a)+\sin(a))\log\left(x^2+2\,x\cos(a)+\cos(a)^2+\sin(a)^2\right)+x(-i\cos(a)-\sin(a))\log\left(x^2-2\,x\cos(a)+\cos\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^2,x, algorithm="maxima")
```

```
[Out] 1/2*(x*(I*cos(a) + sin(a))*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(a)^2) + x*
(-I*cos(a) - sin(a))*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2) - ((2*cos(
a) - 2*I*sin(a))*arctan2(sin(a), x + cos(a)) + (2*cos(a) - 2*I*sin(a))*arct
an2(sin(a), x - cos(a)))*x - 2*I)/x
```

mupad [B] time = 2.21, size = 31, normalized size = 1.07

$$-\frac{\operatorname{atan}\left(\frac{x}{\sqrt{-\mathrm{e}^{a\,2\mathrm{i}}}}\right)2\mathrm{i}}{\sqrt{-\mathrm{e}^{a\,2\mathrm{i}}}}-\frac{1\mathrm{i}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)/x^2,x)
```

```
[Out] - (atan(x/(-exp(a*2i))^(1/2))*2i)/(-exp(a*2i))^(1/2) - 1i/x
```

sympy [A] time = 0.22, size = 29, normalized size = 1.00

$$-\left(i\log\left(x-e^{ia}\right)-i\log\left(x+e^{ia}\right)\right)e^{-ia}-\frac{i}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))/x**2,x)
[Out] -(I*log(x - exp(I*a)) - I*log(x + exp(I*a)))*exp(-I*a) - I/x
```

3.192 $\int \frac{\cot(a+i\log(x))}{x^3}\,dx$

Optimal. Leaf size=36

$$-ie^{-2ia}\log\left(1-\frac{e^{2ia}}{x^2}\right)-\frac{i}{2x^2}$$

[Out] -1/2*I/x^2-I*ln(1-exp(2*I*a)/x^2)/exp(2*I*a)

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot(a+i\log(x))}{x^3}\,dx$$

Verification is Not applicable to the result.

[In] Int[Cot[a + I*Log[x]]/x^3,x]

[Out] Defer[Int][Cot[a + I*Log[x]]/x^3, x]

Rubi steps

$$\int \frac{\cot(a+i\log(x))}{x^3}\,dx=\int \frac{\cot(a+i\log(x))}{x^3}\,dx$$

Mathematica [B] time = 0.03, size = 136, normalized size = 3.78

$$\cos(2a)\left(-\tan^{-1}\left(\frac{\left(x^2-1\right)\cos(a)}{x^2(-\sin(a))-\sin(a)}\right)\right)+i\sin(2a)\tan^{-1}\left(\frac{\left(x^2-1\right)\cos(a)}{x^2(-\sin(a))-\sin(a)}\right)-\frac{1}{2}i\cos(2a)\log\left(-2x^2\cos(2a)\right.$$

Antiderivative was successfully verified.

[In] Integrate[Cot[a + I*Log[x]]/x^3,x]

[Out] (-1/2*I)/x^2 - ArcTan[((-1 + x^2)*Cos[a])/(-Sin[a] - x^2*Sin[a])]*Cos[2*a] + (2*I)*Cos[2*a]*Log[x] - (I/2)*Cos[2*a]*Log[1 + x^4 - 2*x^2*Cos[2*a]] + I*ArcTan[((-1 + x^2)*Cos[a])/(-Sin[a] - x^2*Sin[a])]*Sin[2*a] + 2*Log[x]*Sin[2*a] - (Log[1 + x^4 - 2*x^2*Cos[2*a]]*Sin[2*a])/2

fricas [A] time = 0.74, size = 39, normalized size = 1.08

$$\frac{\left(-2i\,x^2\log\left(x^2-e^{(2i\,a)}\right)+4i\,x^2\log(x)-i\,e^{(2i\,a)}\right)e^{(-2i\,a)}}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^3,x, algorithm="fricas")
```

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

giac [B] time = 0.25, size = 49, normalized size = 1.36

$$\frac{1}{2}\,\pi e^{(-2i\,a)} - i\,e^{(-2i\,a)}\log\left(x + e^{(i\,a)}\right) + 2i\,e^{(-2i\,a)}\log(x) - i\,e^{(-2i\,a)}\log\left(-x + e^{(i\,a)}\right) - \frac{i}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^3,x, algorithm="giac")
```

```
[Out] 1/2*pi*e^(-2*I*a) - I*e^(-2*I*a)*log(x + e^(I*a)) + 2*I*e^(-2*I*a)*log(x) -
 I*e^(-2*I*a)*log(-x + e^(I*a)) - 1/2*I/x^2
```

maple [A] time = 0.06, size = 38, normalized size = 1.06

$$-\frac{i}{2x^2} + 2i\mathrm{e}^{-2ia}\ln(x) - i\mathrm{e}^{-2ia}\ln\left(\mathrm{e}^{2ia} - x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))/x^3,x)
```

```
[Out] -1/2*I/x^2+2*I*exp(-2*I*a)*ln(x)-I*exp(-2*I*a)*ln(exp(2*I*a)-x^2)
```

maxima [B] time = 0.34, size = 139, normalized size = 3.86

$$-\frac{x^2(i\,\cos(2\,a) + \sin(2\,a))\log\left(x^2 + 2\,x\cos(a) + \cos(a)^2 + \sin(a)^2\right) + x^2(i\,\cos(2\,a) + \sin(2\,a))\log\left(x^2 - 2\,x\cos(\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^3,x, algorithm="maxima")
```

```
[Out] -1/2*(x^2*(I*cos(2*a) + sin(2*a))*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(a)^
2) + x^2*(I*cos(2*a) + sin(2*a))*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2
) - ((2*cos(2*a) - 2*I*sin(2*a))*arctan2(sin(a), x + cos(a)) - (2*cos(2*a)
- 2*I*sin(2*a))*arctan2(sin(a), x - cos(a)) + 4*(I*cos(2*a) + sin(2*a))*log
(x))*x^2 + I)/x^2
```

mupad [B] time = 2.23, size = 37, normalized size = 1.03

$$\mathrm{e}^{-a\,2\mathrm{i}}\,\ln(x)\,2\mathrm{i} - \ln\left(x^2 - \mathrm{e}^{a\,2\mathrm{i}}\right)\,\mathrm{e}^{-a\,2\mathrm{i}}\,1\mathrm{i} - \frac{1\mathrm{i}}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)/x^3,x)
```

```
[Out] exp(-a*2i)*log(x)*2i - log(x^2 - exp(a*2i))*exp(-a*2i)*1i - 1i/(2*x^2)
```

sympy **[A]** time = 0.36, size = 39, normalized size = 1.08

$$2ie^{-2ia}\log(x) - ie^{-2ia}\log\left(x^2 - e^{2ia}\right) - \frac{i}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))/x**3,x)
```

```
[Out] 2*I*exp(-2*I*a)*log(x) - I*exp(-2*I*a)*log(x**2 - exp(2*I*a)) - I/(2*x**2)
```

3.193 $\int \frac{\cot(a+i\log(x))}{x^4}\,dx$

Optimal. Leaf size=45

$$-\frac{2ie^{-2ia}}{x}+2ie^{-3ia}\tanh^{-1}\left(e^{-ia}x\right)-\frac{i}{3x^3}$$

```
[Out] -1/3*I/x^3-2*I/exp(2*I*a)/x+2*I*arctanh(x/exp(I*a))/exp(3*I*a)
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot(a+i\log(x))}{x^4}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + I*Log[x]]/x^4,x]
```

```
[Out] Defer[Int][Cot[a + I*Log[x]]/x^4, x]
```

Rubi steps

$$\int \frac{\cot(a+i\log(x))}{x^4}\,dx=\int \frac{\cot(a+i\log(x))}{x^4}\,dx$$

Mathematica [A] time = 0.02, size = 70, normalized size = 1.56

$$-\frac{2\sin(2a)}{x}-\frac{2i\cos(2a)}{x}+2i\cos(3a)\tanh^{-1}(x\cos(a)-ix\sin(a))+2\sin(3a)\tanh^{-1}(x\cos(a)-ix\sin(a))-\frac{i}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]/x^4,x]
```

```
[Out] (-1/3*I)/x^3 - ((2*I)*Cos[2*a])/x + (2*I)*ArcTanh[x*Cos[a] - I*x*Sin[a]]*Co
s[3*a] - (2*Sin[2*a])/x + 2*ArcTanh[x*Cos[a] - I*x*Sin[a]]*Sin[3*a]
```

fricas [A] time = 0.59, size = 55, normalized size = 1.22

$$\frac{\left(3i\,x^3e^{(-i\,a)}\log\left(x+e^{(i\,a)}\right)-3i\,x^3e^{(-i\,a)}\log\left(x-e^{(i\,a)}\right)-6i\,x^2-i\,e^{(2i\,a)}\right)e^{(-2i\,a)}}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^4,x, algorithm="fricas")
```

```
[Out] 1/3*(3*I*x^3*e^(-I*a)*log(x + e^(I*a)) - 3*I*x^3*e^(-I*a)*log(x - e^(I*a))
- 6*I*x^2 - I*e^(2*I*a))*e^(-2*I*a)/x^3
```

giac [A] time = 0.26, size = 49, normalized size = 1.09

$$i e^{(-3 i a)} \log\left(i x + i e^{(i a)}\right) - i e^{(-3 i a)} \log\left(-i x + i e^{(i a)}\right) - \frac{2 i e^{(-2 i a)}}{x} - \frac{i}{3 x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^4,x, algorithm="giac")
```

```
[Out] I*e^(-3*I*a)*log(I*x + I*e^(I*a)) - I*e^(-3*I*a)*log(-I*x + I*e^(I*a)) - 2*
I*e^(-2*I*a)/x - 1/3*I/x^3
```

maple [A] time = 0.06, size = 35, normalized size = 0.78

$$-\frac{i}{3x^3} - \frac{2i e^{-2ia}}{x} + 2i \operatorname{arctanh}\left(x e^{-ia}\right) e^{-3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))/x^4,x)
```

```
[Out] -1/3*I/x^3-2*I*exp(-2*I*a)/x+2*I*arctanh(x*exp(-I*a))*exp(-3*I*a)
```

maxima [B] time = 0.34, size = 142, normalized size = 3.16

$$-\frac{3 x^3(-i \cos(3 a) - \sin(3 a)) \log\left(x^2 + 2 x \cos(a) + \cos(a)^2 + \sin(a)^2\right) + 3 x^3(i \cos(3 a) + \sin(3 a)) \log\left(x^2 - 2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))/x^4,x, algorithm="maxima")
```

```
[Out] -1/6*(3*x^3*(-I*cos(3*a) - sin(3*a))*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(
a)^2) + 3*x^3*(I*cos(3*a) + sin(3*a))*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin
(a)^2) + ((6*cos(3*a) - 6*I*sin(3*a))*arctan2(sin(a), x + cos(a)) + (6*cos(
3*a) - 6*I*sin(3*a))*arctan2(sin(a), x - cos(a)))*x^3 + 12*x^2*(I*cos(2*a)
+ sin(2*a)) + 2*I)/x^3
```

mupad [B] time = 2.21, size = 44, normalized size = 0.98

$$\frac{\operatorname{atan}\left(\frac{x}{\sqrt{-e^{a\,2i}}}\right) 2i}{\left(-e^{a\,2i}\right)^{3/2}} - \frac{2i\, e^{-a\,2i}\, x^2 + \frac{1}{3} i}{x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)/x^4,x)
```

```
[Out] (atan(x/(-exp(a*2i))^(1/2))*2i)/(-exp(a*2i))^(3/2) - (x^2*exp(-a*2i)*2i + 1
i/3)/x^3
```

sympy [A] time = 0.30, size = 54, normalized size = 1.20

$$-\left(i\log\left(x-e^{ia}\right)-i\log\left(x+e^{ia}\right)\right)e^{-3ia}-\frac{\left(6ix^2+ie^{2ia}\right)e^{-2ia}}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))/x**4,x)
```

```
[Out] -(I*log(x - exp(I*a)) - I*log(x + exp(I*a)))*exp(-3*I*a) - (6*I*x**2 + I*ex
p(2*I*a))*exp(-2*I*a)/(3*x**3)
```

3.194 $\int x^3 \cot^2(a + i\log(x))\,dx$

Optimal. Leaf size=67

$$-2e^{2ia}x^2 - \frac{2e^{6ia}}{-x^2 + e^{2ia}} - 4e^{4ia}\log\left(-x^2 + e^{2ia}\right) - \frac{x^4}{4}$$

```
[Out] -2*exp(2*I*a)*x^2-1/4*x^4-2*exp(6*I*a)/(exp(2*I*a)-x^2)-4*exp(4*I*a)*ln(exp
(2*I*a)-x^2)
```

Rubi [F] time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3 \cot^2(a + i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^3*Cot[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][x^3*Cot[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int x^3 \cot^2(a + i\log(x))\,dx = \int x^3 \cot^2(a + i\log(x))\,dx$$

Mathematica [B] time = 0.18, size = 162, normalized size = 2.42

$$-2ix^2\sin(2a) - 2x^2\cos(2a) + \frac{2\cos(5a) + 2i\sin(5a)}{\left(x^2-1\right)\cos(a) - i\left(x^2+1\right)\sin(a)} + 4i\cos(4a)\tan^{-1}\left(\frac{\cot(a) - x^2\cot(a)}{x^2+1}\right) - 4\sin(4a)\,t$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Cot[a + I*Log[x]]^2,x]
```

```
[Out] -1/4*x^4 - 2*x^2*Cos[2*a] + (4*I)*ArcTan[(Cot[a] - x^2*Cot[a])/(1 + x^2)]*C
os[4*a] - 2*Cos[4*a]*Log[1 + x^4 - 2*x^2*Cos[2*a]] - (2*I)*x^2*Sin[2*a] - 4
*ArcTan[(Cot[a] - x^2*Cot[a])/(1 + x^2)]*Sin[4*a] - (2*I)*Log[1 + x^4 - 2*x
^2*Cos[2*a]]*Sin[4*a] + (2*Cos[5*a] + (2*I)*Sin[5*a])/((-1 + x^2)*Cos[a] -
I*(1 + x^2)*Sin[a])
```

fricas [A] time = 0.59, size = 70, normalized size = 1.04

$$-\frac{x^6 + 7\,x^4e^{(2i\,a)} - 8\,x^2e^{(4i\,a)} + 16\left(x^2e^{(4i\,a)} - e^{(6i\,a)}\right)\log\left(x^2 - e^{(2i\,a)}\right) - 8\,e^{(6i\,a)}}{4\left(x^2 - e^{(2i\,a)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] -1/4*(x^6 + 7*x^4*e^(2*I*a) - 8*x^2*e^(4*I*a) + 16*(x^2*e^(4*I*a) - e^(6*I*
a))*log(x^2 - e^(2*I*a)) - 8*e^(6*I*a))/(x^2 - e^(2*I*a))
```

giac [B] time = 0.28, size = 139, normalized size = 2.07

$$-\frac{x^{6}}{4\left(x^{2}-e^{(2ia)}\right)}-\frac{7x^{4}e^{(2ia)}}{4\left(x^{2}-e^{(2ia)}\right)}-\frac{4x^{2}e^{(4ia)}\log\left(-x^{2}+e^{(2ia)}\right)}{x^{2}-e^{(2ia)}}+\frac{2x^{2}e^{(4ia)}}{x^{2}-e^{(2ia)}}+\frac{4e^{(6ia)}\log\left(-x^{2}+e^{(2ia)}\right)}{x^{2}-e^{(2ia)}}+\frac{2e^{(6ia)}}{x^{2}-e^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -1/4*x^6/(x^2 - e^(2*I*a)) - 7/4*x^4*e^(2*I*a)/(x^2 - e^(2*I*a)) - 4*x^2*e^
(4*I*a)*log(-x^2 + e^(2*I*a))/(x^2 - e^(2*I*a)) + 2*x^2*e^(4*I*a)/(x^2 - e^
(2*I*a)) + 4*e^(6*I*a)*log(-x^2 + e^(2*I*a))/(x^2 - e^(2*I*a)) + 2*e^(6*I*a
)/(x^2 - e^(2*I*a))
```

maple [A] time = 0.06, size = 54, normalized size = 0.81

$$-\frac{9x^{4}}{4}-\frac{2x^{4}}{\frac{e^{2ia}}{x^{2}}-1}-4\,e^{2ia}x^{2}-4\,e^{4ia}\ln\left(e^{2ia}-x^{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(a+I*ln(x))^2,x)
```

```
[Out] -9/4*x^4-2*x^4/(exp(2*I*a)/x^2-1)-4*exp(2*I*a)*x^2-4*exp(4*I*a)*ln(exp(2*I*
a)-x^2)
```

maxima [B] time = 0.35, size = 362, normalized size = 5.40

$$-\frac{x^{6}+x^{4}(7\cos(2a)+7i\sin(2a))-(16(-i\cos(4a)+\sin(4a))\arctan(\sin(a),x+\cos(a))+16(i\cos(4a)-\mathrm{si}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(x^6 + x^4*(7*cos(2*a) + 7*I*sin(2*a)) - (16*(-I*cos(4*a) + sin(4*a))*arct
an2(sin(a), x + cos(a)) + 16*(I*cos(4*a) - sin(4*a))*arctan2(sin(a), x - co
s(a)) + 8*cos(4*a) + 8*I*sin(4*a))*x^2 - (16*(I*cos(2*a) - sin(2*a))*cos(4*
a) - (16*cos(2*a) + 16*I*sin(2*a))*sin(4*a))*arctan2(sin(a), x + cos(a)) -
```

```
(16*(-I*cos(2*a) + sin(2*a))*cos(4*a) + (16*cos(2*a) + 16*I*sin(2*a))*sin(4
*a))*arctan2(sin(a), x - cos(a)) + (x^2*(8*cos(4*a) + 8*I*sin(4*a)) - (8*co
s(2*a) + 8*I*sin(2*a))*cos(4*a) - 8*(I*cos(2*a) - sin(2*a))*sin(4*a))*log(x
^2 + 2*x*cos(a) + cos(a)^2 + sin(a)^2) + (x^2*(8*cos(4*a) + 8*I*sin(4*a)) -
 (8*cos(2*a) + 8*I*sin(2*a))*cos(4*a) - 8*(I*cos(2*a) - sin(2*a))*sin(4*a))
*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2) - 8*cos(6*a) - 8*I*sin(6*a))/(
4*x^2 - 4*cos(2*a) - 4*I*sin(2*a))
```

mupad [B] time = 2.23, size = 55, normalized size = 0.82

$$-2\,x^2\,e^{a\,2i}-\frac{2\,e^{a\,6i}}{e^{a\,2i}-x^2}-4\,\ln\left(x^2-e^{a\,2i}\right)\,e^{a\,4i}-\frac{x^4}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(a + log(x)*1i)^2,x)
```

```
[Out] - 2*x^2*exp(a*2i) - (2*exp(a*6i))/(exp(a*2i) - x^2) - 4*log(x^2 - exp(a*2i)
)*exp(a*4i) - x^4/4
```

sympy [A] time = 0.32, size = 54, normalized size = 0.81

$$-\frac{x^4}{4}-2x^2e^{2ia}-4e^{4ia}\log\left(x^2-e^{2ia}\right)+\frac{2e^{6ia}}{x^2-e^{2ia}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*cot(a+I*ln(x))**2,x)
```

```
[Out] -x**4/4 - 2*x**2*exp(2*I*a) - 4*exp(4*I*a)*log(x**2 - exp(2*I*a)) + 2*exp(6
*I*a)/(x**2 - exp(2*I*a))
```

3.195 $\int x^2 \cot^2(a + i \log(x)) \, dx$

Optimal. Leaf size=64

$$-\frac{2e^{2ia}x^3}{-x^2+e^{2ia}} - 6e^{2ia}x + 6e^{3ia}\tanh^{-1}\left(e^{-ia}x\right) - \frac{x^3}{3}$$

```
[Out] -6*exp(2*I*a)*x-1/3*x^3-2*exp(2*I*a)*x^3/(exp(2*I*a)-x^2)+6*exp(3*I*a)*arct
anh(x/exp(I*a))
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^2 \cot^2(a + i \log(x)) \, dx$$

Verification is Not applicable to the result.

```
[In] Int[x^2*Cot[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][x^2*Cot[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int x^2 \cot^2(a + i \log(x)) \, dx = \int x^2 \cot^2(a + i \log(x)) \, dx$$

Mathematica [A] time = 0.13, size = 100, normalized size = 1.56

$$\frac{2x(\cos(3a)+i\sin(3a))}{\left(x^2-1\right)\cos(a)-i\left(x^2+1\right)\sin(a)} - 4ix\sin(2a) - 4x\cos(2a) + 6\cos(3a)\tanh^{-1}(x(\cos(a)-i\sin(a))) + 6i\sin(3a)\tanh$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Cot[a + I*Log[x]]^2,x]
```

```
[Out] -1/3*x^3 - 4*x*Cos[2*a] + 6*ArcTanh[x*(Cos[a] - I*Sin[a])]*Cos[3*a] - (4*I)
*x*Sin[2*a] + (2*x*(Cos[3*a] + I*Sin[3*a]))/((-1 + x^2)*Cos[a] - I*(1 + x^2
)*Sin[a]) + (6*I)*ArcTanh[x*(Cos[a] - I*Sin[a])]*Sin[3*a]
```

fricas [B] time = 0.65, size = 102, normalized size = 1.59

$$-\frac{x^5 + 11\,x^3 e^{(2ia)} - 9\left(x^2 - e^{(2ia)}\right)e^{(3ia)}\log\left(\left(xe^{(2ia)} + e^{(3ia)}\right)e^{(-2ia)}\right) + 9\left(x^2 - e^{(2ia)}\right)e^{(3ia)}\log\left(\left(xe^{(2ia)} - e^{(3ia)}\right)e^{(-2ia}\right.}{3\left(x^2 - e^{(2ia)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cot(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] -1/3*(x^5 + 11*x^3*e^(2*I*a) - 9*(x^2 - e^(2*I*a))*e^(3*I*a)*log((x*e^(2*I*
a) + e^(3*I*a))*e^(-2*I*a)) + 9*(x^2 - e^(2*I*a))*e^(3*I*a)*log((x*e^(2*I*a
) - e^(3*I*a))*e^(-2*I*a)) - 18*x*e^(4*I*a))/(x^2 - e^(2*I*a))
```

giac [A] time = 0.67, size = 83, normalized size = 1.30

$$-\frac{x^5}{3\left(x^2-e^{(2ia)}\right)}-\frac{11\,x^3e^{(2ia)}}{3\left(x^2-e^{(2ia)}\right)}-\frac{6\,\arctan\left(\frac{x}{\sqrt{-e^{(2ia)}}}\right)e^{(4ia)}}{\sqrt{-e^{(2ia)}}}+\frac{10\,xe^{(4ia)}}{x^2-e^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cot(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -1/3*x^5/(x^2 - e^(2*I*a)) - 11/3*x^3*e^(2*I*a)/(x^2 - e^(2*I*a)) - 6*arcta
n(x/sqrt(-e^(2*I*a)))*e^(4*I*a)/sqrt(-e^(2*I*a)) + 10*x*e^(4*I*a)/(x^2 - e^
(2*I*a))
```

maple [A] time = 0.06, size = 48, normalized size = 0.75

$$-\frac{7x^3}{3}-\frac{2x^3}{\frac{e^{2ia}}{x^2}-1}-6\,e^{2ia}x+6\,\mathrm{arctanh}\left(x\,e^{-ia}\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cot(a+I*ln(x))^2,x)
```

```
[Out] -7/3*x^3-2*x^3/(exp(2*I*a)/x^2-1)-6*exp(2*I*a)*x+6*arctanh(x*exp(-I*a))*exp
(3*I*a)
```

maxima [B] time = 0.36, size = 352, normalized size = 5.50

$$-\frac{2\,x^5+x^3(22\,\cos(2\,a)+22i\,\sin(2\,a))+18\,((-i\,\cos(3\,a)+\sin(3\,a))\arctan(\sin(a),x+\cos(a))+(-i\,\cos(3\,a)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*cot(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(2*x^5 + x^3*(22*cos(2*a) + 22*I*sin(2*a)) + 18*((-I*cos(3*a) + sin(3*a))*
arctan2(sin(a), x + cos(a)) + (-I*cos(3*a) + sin(3*a))*arctan2(sin(a), x -
cos(a)))*x^2 - x*(36*cos(4*a) + 36*I*sin(4*a)) + (18*(I*cos(2*a) - sin(2*a)
```

```
)*cos(3*a) - (18*cos(2*a) + 18*I*sin(2*a))*sin(3*a))*arctan2(sin(a), x + co
s(a)) + (18*(I*cos(2*a) - sin(2*a))*cos(3*a) - (18*cos(2*a) + 18*I*sin(2*a)
)*sin(3*a))*arctan2(sin(a), x - cos(a)) - (x^2*(9*cos(3*a) + 9*I*sin(3*a))
- (9*cos(2*a) + 9*I*sin(2*a))*cos(3*a) - 9*(I*cos(2*a) - sin(2*a))*sin(3*a)
)*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(a)^2) + (x^2*(9*cos(3*a) + 9*I*sin(
3*a)) - (9*cos(2*a) + 9*I*sin(2*a))*cos(3*a) + 9*(-I*cos(2*a) + sin(2*a))*s
in(3*a))*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2))/(6*x^2 - 6*cos(2*a) -
 6*I*sin(2*a))
```

mupad [B] time = 2.22, size = 57, normalized size = 0.89

$$-\left(\mathrm{e}^{a\,2\mathrm{i}}\right)^{3/2}\,\mathrm{atan}\left(\frac{x\,1\mathrm{i}}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}\right)\,6\mathrm{i}-\frac{x^3}{3}-4\,x\,\mathrm{e}^{a\,2\mathrm{i}}-\frac{2\,x\,\mathrm{e}^{a\,4\mathrm{i}}}{\mathrm{e}^{a\,2\mathrm{i}}-x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cot(a + log(x)*1i)^2,x)
```

```
[Out] - exp(a*2i)^(3/2)*atan((x*1i)/exp(a*2i)^(1/2))*6i - x^3/3 - 4*x*exp(a*2i) -
 (2*x*exp(a*4i))/(exp(a*2i) - x^2)
```

sympy [A] time = 0.33, size = 60, normalized size = 0.94

$$-\frac{x^3}{3}-4xe^{2ia}+\frac{2xe^{4ia}}{x^2-e^{2ia}}-3\left(\log\left(x-e^{ia}\right)-\log\left(x+e^{ia}\right)\right)e^{3ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*cot(a+I*ln(x))**2,x)
```

```
[Out] -x**3/3 - 4*x*exp(2*I*a) + 2*x*exp(4*I*a)/(x**2 - exp(2*I*a)) - 3*(log(x -
exp(I*a)) - log(x + exp(I*a)))*exp(3*I*a)
```

3.196 $\int x\cot^2(a+i\log(x))\,dx$

Optimal. Leaf size=55

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

```
[Out] -1/2*x^2-2*exp(4*I*a)/(exp(2*I*a)-x^2)-2*exp(2*I*a)*ln(exp(2*I*a)-x^2)
```

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x\cot^2(a+i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x*Cot[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][x*Cot[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int x\cot^2(a+i\log(x))\,dx=\int x\cot^2(a+i\log(x))\,dx$$

Mathematica [B] time = 0.13, size = 142, normalized size = 2.58

$$\frac{2\cos(3a)+2i\sin(3a)}{\left(x^2-1\right)\cos(a)-i\left(x^2+1\right)\sin(a)}+2i\cos(2a)\tan^{-1}\left(\frac{\cot(a)-x^2\cot(a)}{x^2+1}\right)-4\sin(a)\cos(a)\tan^{-1}\left(\frac{\cot(a)-x^2\cot(}{x^2+1}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Cot[a + I*Log[x]]^2,x]
```

```
[Out] -1/2*x^2 + (2*I)*ArcTan[(Cot[a] - x^2*Cot[a])/(1 + x^2)]*Cos[2*a] - Cos[2*a
]*Log[1 + x^4 - 2*x^2*Cos[2*a]] - 4*ArcTan[(Cot[a] - x^2*Cot[a])/(1 + x^2)]
*Cos[a]*Sin[a] - I*Log[1 + x^4 - 2*x^2*Cos[2*a]]*Sin[2*a] + (2*Cos[3*a] + (
2*I)*Sin[3*a])/((-1 + x^2)*Cos[a] - I*(1 + x^2)*Sin[a])
```

fricas [A] time = 0.98, size = 61, normalized size = 1.11

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*log(x))^2,x, algorithm="fricas")
```

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

giac [B] time = 0.27, size = 118, normalized size = 2.15

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*log(x))^2,x, algorithm="giac")
```

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

maple [A] time = 0.06, size = 44, normalized size = 0.80

$$-\frac{5x^2}{2}-\frac{2x^2}{\frac{e^{2ia}}{x^2}-1}-2\,e^{2ia}\ln\left(e^{2ia}-x^2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cot(a+I*ln(x))^2,x)
```

```
[Out] -5/2*x^2-2*x^2/(exp(2*I*a)/x^2-1)-2*exp(2*I*a)*ln(exp(2*I*a)-x^2)
```

maxima [B] time = 0.35, size = 296, normalized size = 5.38

$$-\frac{x^4-(4(-i\cos(2a)+\sin(2a))\arctan(\sin(a),x+\cos(a))+4(i\cos(2a)-\sin(2a))\arctan(\sin(a),x-\cos(a)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(x^4 - (4*(-I*cos(2*a) + sin(2*a))*arctan2(sin(a), x + cos(a)) + 4*(I*cos(
2*a) - sin(2*a))*arctan2(sin(a), x - cos(a)) + cos(2*a) + I*sin(2*a))*x^2 +
 (-4*I*cos(2*a)^2 + 8*cos(2*a)*sin(2*a) + 4*I*sin(2*a)^2)*arctan2(sin(a), x
 + cos(a)) + (4*I*cos(2*a)^2 - 8*cos(2*a)*sin(2*a) - 4*I*sin(2*a)^2)*arctan
2(sin(a), x - cos(a)) + (x^2*(2*cos(2*a) + 2*I*sin(2*a)) - 2*cos(2*a)^2 - 4
*I*cos(2*a)*sin(2*a) + 2*sin(2*a)^2)*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(
```

```
a)^2) + (x^2*(2*cos(2*a) + 2*I*sin(2*a)) - 2*cos(2*a)^2 - 4*I*cos(2*a)*sin(
2*a) + 2*sin(2*a)^2)*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2) - 4*cos(4*
a) - 4*I*sin(4*a))/(2*x^2 - 2*cos(2*a) - 2*I*sin(2*a))
```

mupad [B] time = 2.19, size = 45, normalized size = 0.82

$$-\frac{2\,\mathrm{e}^{a\,4\mathrm{i}}}{\mathrm{e}^{a\,2\mathrm{i}}-x^2}-2\,\ln\left(x^2-\mathrm{e}^{a\,2\mathrm{i}}\right)\,\mathrm{e}^{a\,2\mathrm{i}}-\frac{x^2}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cot(a + log(x)*1i)^2,x)
```

```
[Out] - (2*exp(a*4i))/(exp(a*2i) - x^2) - 2*log(x^2 - exp(a*2i))*exp(a*2i) - x^2/
2
```

sympy [A] time = 0.29, size = 42, normalized size = 0.76

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*cot(a+I*ln(x))**2,x)
```

```
[Out] -x**2/2 - 2*exp(2*I*a)*log(x**2 - exp(2*I*a)) + 2*exp(4*I*a)/(x**2 - exp(2*
I*a))
```

3.197 $\int \cot^2(a+i\log(x))\,dx$

Optimal. Leaf size=48

$$-\frac{2e^{2ia}x}{-x^2+e^{2ia}}+2e^{ia}\tanh^{-1}\left(e^{-ia}x\right)-x$$

```
[Out] -x-2*exp(2*I*a)*x/(exp(2*I*a)-x^2)+2*exp(I*a)*arctanh(x/exp(I*a))
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot^2(a+i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][Cot[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int \cot^2(a+i\log(x))\,dx=\int \cot^2(a+i\log(x))\,dx$$

Mathematica [A] time = 0.08, size = 70, normalized size = 1.46

$$\frac{-x\left(x^2-3\right)\cos(a)+ix\left(x^2+3\right)\sin(a)}{\left(x^2-1\right)\cos(a)-i\left(x^2+1\right)\sin(a)}+2(\cos(a)+i\sin(a))\tanh^{-1}(x(\cos(a)-i\sin(a)))$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]^2,x]
```

```
[Out] 2*ArcTanh[x*(Cos[a] - I*Sin[a])]*(Cos[a] + I*Sin[a]) + (-(x*(-3 + x^2)*Cos[
a]) + I*x*(3 + x^2)*Sin[a])/((-1 + x^2)*Cos[a] - I*(1 + x^2)*Sin[a])
```

fricas [A] time = 0.73, size = 72, normalized size = 1.50

$$-\frac{x^3-\left(x^2-e^{(2ia)}\right)e^{(ia)}\log\left(x+e^{(ia)}\right)+\left(x^2-e^{(2ia)}\right)e^{(ia)}\log\left(x-e^{(ia)}\right)-3\,xe^{(2ia)}}{x^2-e^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] -(x^3 - (x^2 - e^(2*I*a))*e^(I*a)*log(x + e^(I*a)) + (x^2 - e^(2*I*a))*e^(I
*a)*log(x - e^(I*a)) - 3*x*e^(2*I*a))/(x^2 - e^(2*I*a))
```

giac [B] time = 0.46, size = 79, normalized size = 1.65

$$-\frac{x^3}{x^2 - e^{(2ia)}} - 2\left(\frac{\arctan\left(\frac{x}{\sqrt{-e^{(2ia)}}}\right)}{\sqrt{-e^{(2ia)}}} - \frac{x}{x^2 - e^{(2ia)}}\right)e^{(2ia)} + \frac{5\,xe^{(2ia)}}{x^2 - e^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] -x^3/(x^2 - e^(2*I*a)) - 2*(arctan(x/sqrt(-e^(2*I*a)))/sqrt(-e^(2*I*a)) - x
/(x^2 - e^(2*I*a)))*e^(2*I*a) + 5*x*e^(2*I*a)/(x^2 - e^(2*I*a))
```

maple [A] time = 0.06, size = 36, normalized size = 0.75

$$-3x - \frac{2x}{\frac{e^{2ia}}{x^2} - 1} + 2\,\mathrm{arctanh}\left(x\,e^{-ia}\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))^2,x)
```

```
[Out] -3*x-2*x/(exp(2*I*a)/x^2-1)+2*arctanh(x*exp(-I*a))*exp(I*a)
```

maxima [B] time = 0.38, size = 278, normalized size = 5.79

$$-\frac{2\left((-i\,\cos(a) + \sin(a))\arctan\left(\sin(a), x + \cos(a)\right) + (-i\,\cos(a) + \sin(a))\arctan\left(\sin(a), x - \cos(a)\right)\right)x^2 + 2\,x^3}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] -(2*((-I*cos(a) + sin(a))*arctan2(sin(a), x + cos(a)) + (-I*cos(a) + sin(a)
)*arctan2(sin(a), x - cos(a)))*x^2 + 2*x^3 - x*(6*cos(2*a) + 6*I*sin(2*a))
+ (2*(I*cos(a) - sin(a))*cos(2*a) - (2*cos(a) + 2*I*sin(a))*sin(2*a))*arcta
n2(sin(a), x + cos(a)) + (2*(I*cos(a) - sin(a))*cos(2*a) - (2*cos(a) + 2*I*
sin(a))*sin(2*a))*arctan2(sin(a), x - cos(a)) - (x^2*(cos(a) + I*sin(a)) -
(cos(a) + I*sin(a))*cos(2*a) + (-I*cos(a) + sin(a))*sin(2*a))*log(x^2 + 2*x
*cos(a) + cos(a)^2 + sin(a)^2) + (x^2*(cos(a) + I*sin(a)) - (cos(a) + I*sin
(a))*cos(2*a) - (I*cos(a) - sin(a))*sin(2*a))*log(x^2 - 2*x*cos(a) + cos(a)
^2 + sin(a)^2))/(2*x^2 - 2*cos(2*a) - 2*I*sin(2*a))
```

mupad [B] time = 2.19, size = 44, normalized size = 0.92

$$-x+2\,\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}\,\operatorname{atanh}\left(\frac{x}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}\right)-\frac{2\,x\,\mathrm{e}^{a\,2\mathrm{i}}}{\mathrm{e}^{a\,2\mathrm{i}}-x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)^2,x)
```

```
[Out] 2*exp(a*2i)^(1/2)*atanh(x/exp(a*2i)^(1/2)) - x - (2*x*exp(a*2i))/(exp(a*2i)
 - x^2)
```

sympy [A] time = 0.27, size = 42, normalized size = 0.88

$$-x+\frac{2xe^{2ia}}{x^2-e^{2ia}}-\left(\log\left(x-e^{ia}\right)-\log\left(x+e^{ia}\right)\right)e^{ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))**2,x)
```

```
[Out] -x + 2*x*exp(2*I*a)/(x**2 - exp(2*I*a)) - (log(x - exp(I*a)) - log(x + exp(
I*a)))*exp(I*a)
```

3.198 $\int \frac{\cot^2(a+i\log(x))}{x}\,dx$

Optimal. Leaf size=18

$$-\log(x) + i\cot(a + i\log(x))$$

```
[Out] I*cot(a+I*ln(x))-ln(x)
```

Rubi [A] time = 0.02, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133, Rules used = {3473, 8}

$$-\log(x) + i\cot(a + i\log(x))$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + I*Log[x]]^2/x,x]
```

```
[Out] I*Cot[a + I*Log[x]] - Log[x]
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{\cot^2(a + i\log(x))}{x}\,dx &= \text{Subst}\left(\int \cot^2(a + ix)\,dx, x, \log(x)\right)\\
&= i\cot(a + i\log(x)) - \text{Subst}(\int 1\,dx, x, \log(x))\\
&= i\cot(a + i\log(x)) - \log(x)
\end{aligned}$$

Mathematica [C] time = 0.05, size = 34, normalized size = 1.89

$$i\cot(a + i\log(x))\,{}_2F_1\left(-\frac{1}{2}, 1; \frac{1}{2}; -\tan^2(a + i\log(x))\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]^2/x,x]
[Out] I*Cot[a + I*Log[x]]*Hypergeometric2F1[-1/2, 1, 1/2, -Tan[a + I*Log[x]]^2]
```

fricas [B] time = 0.60, size = 34, normalized size = 1.89

$$-\frac{\left(x^2 - e^{(2i\,a)}\right)\log(x) - 2\,e^{(2i\,a)}}{x^2 - e^{(2i\,a)}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [B] time = 0.31, size = 76, normalized size = 4.22

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x,x, algorithm="giac")
[Out] I*(tan(1/2*a)^4 + 2*tan(1/2*a)^2 + 1)/((I*(x^2 - 1)*tan(1/2*a)^2/(x^2 + 1)
- I*(x^2 - 1)/(x^2 + 1) - 2*tan(1/2*a))*(tan(1/2*a)^2 - 1)) - log(x)
```

maple [A] time = 0.01, size = 27, normalized size = 1.50

$$i\cot\left(a + i\ln(x)\right) - \frac{i\pi}{2} + i\left(a + i\ln(x)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))^2/x,x)
[Out] I*cot(a+I*ln(x))-1/2*I*Pi+I*(a+I*ln(x))
```

maxima [A] time = 0.42, size = 19, normalized size = 1.06

$$i\,a + \frac{i}{\tan\left(a + i\,\log(x)\right)} - \log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x,x, algorithm="maxima")
```

```
[Out] I*a + I/tan(a + I*log(x)) - log(x)
```

mupad [B] time = 2.49, size = 16, normalized size = 0.89

$$-\ln(x)+\cot\left(a+\ln(x)\,1\mathrm{i}\right)\,1\mathrm{i}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)^2/x,x)
```

```
[Out] cot(a + log(x)*1i)*1i - log(x)
```

sympy [A] time = 0.31, size = 20, normalized size = 1.11

$$-\log\left(x\right)+\frac{2e^{2ia}}{x^2-e^{2ia}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))**2/x,x)
```

```
[Out] -log(x) + 2*exp(2*I*a)/(x**2 - exp(2*I*a))
```

3.199 $\int \frac{\cot^2(a+i\log(x))}{x^2}\,dx$

Optimal. Leaf size=64

$$-\frac{3x}{-x^2+e^{2ia}}+\frac{e^{2ia}}{x\left(-x^2+e^{2ia}\right)}-2e^{-ia}\tanh^{-1}\left(e^{-ia}x\right)$$

```
[Out] exp(2*I*a)/x/(exp(2*I*a)-x^2)-3*x/(exp(2*I*a)-x^2)-2*arctanh(x/exp(I*a))/ex
p(I*a)
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot^2(a+i\log(x))}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + I*Log[x]]^2/x^2,x]
```

```
[Out] Defer[Int][Cot[a + I*Log[x]]^2/x^2, x]
```

Rubi steps

$$\int \frac{\cot^2(a+i\log(x))}{x^2}\,dx=\int \frac{\cot^2(a+i\log(x))}{x^2}\,dx$$

Mathematica [A] time = 0.12, size = 72, normalized size = 1.12

$$\frac{2x(\cos(a)-i\sin(a))}{\left(x^2-1\right)\cos(a)-i\left(x^2+1\right)\sin(a)}-2\cos(a)\tanh^{-1}(x(\cos(a)-i\sin(a)))+2i\sin(a)\tanh^{-1}(x(\cos(a)-i\sin(a)))+\frac{1}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]^2/x^2,x]
```

```
[Out] x^(-1) - 2*ArcTanh[x*(Cos[a] - I*Sin[a])]*Cos[a] + (2*I)*ArcTanh[x*(Cos[a]
- I*Sin[a])]*Sin[a] + (2*x*(Cos[a] - I*Sin[a]))/((-1 + x^2)*Cos[a] - I*(1 +
 x^2)*Sin[a])
```

fricas [A] time = 0.71, size = 74, normalized size = 1.16

$$-\frac{\left(x^3-xe^{(2ia)}\right)e^{(-ia)}\log\left(x+e^{(ia)}\right)-\left(x^3-xe^{(2ia)}\right)e^{(-ia)}\log\left(x-e^{(ia)}\right)-3x^2+e^{(2ia)}}{x^3-xe^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x^2,x, algorithm="fricas")
```

```
[Out] -((x^3 - x*e^(2*I*a))*e^(-I*a)*log(x + e^(I*a)) - (x^3 - x*e^(2*I*a))*e^(-I
*a)*log(x - e^(I*a)) - 3*x^2 + e^(2*I*a))/(x^3 - x*e^(2*I*a))
```

giac [A] time = 0.30, size = 87, normalized size = 1.36

$$2\left(\frac{\arctan\left(\frac{x}{\sqrt{-e^{(2ia)}}}\right)e^{(-2ia)}}{\sqrt{-e^{(2ia)}}}+\frac{xe^{(-2ia)}}{x^2-e^{(2ia)}}\right)e^{(2ia)}+\frac{5x^2}{x^3-xe^{(2ia)}}-\frac{e^{(2ia)}}{x^3-xe^{(2ia)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x^2,x, algorithm="giac")
```

```
[Out] 2*(arctan(x/sqrt(-e^(2*I*a)))*e^(-2*I*a)/sqrt(-e^(2*I*a)) + x*e^(-2*I*a)/(x
^2 - e^(2*I*a)))*e^(2*I*a) + 5*x^2/(x^3 - x*e^(2*I*a)) - e^(2*I*a)/(x^3 - x
*e^(2*I*a))
```

maple [A] time = 0.06, size = 38, normalized size = 0.59

$$\frac{1}{x}-\frac{2}{x\left(\frac{e^{2ia}}{x^2}-1\right)}-2\,\mathrm{arctanh}\left(x\,e^{-ia}\right)e^{-ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))^2/x^2,x)
```

```
[Out] 1/x-2/x/(exp(2*I*a)/x^2-1)-2*arctanh(x*exp(-I*a))*exp(-I*a)
```

maxima [B] time = 0.39, size = 285, normalized size = 4.45

$$-\frac{2\left(\left(i\cos(a)+\sin(a)\right)\arctan\left(\sin(a),x+\cos(a)\right)+\left(i\cos(a)+\sin(a)\right)\arctan\left(\sin(a),x-\cos(a)\right)\right)x^3+\left(\left(2\left(-i\,c\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x^2,x, algorithm="maxima")
```

```
[Out] -(2*((I*cos(a) + sin(a))*arctan2(sin(a), x + cos(a)) + (I*cos(a) + sin(a))*
arctan2(sin(a), x - cos(a)))*x^3 + ((2*(-I*cos(a) - sin(a))*cos(2*a) + (2*c
os(a) - 2*I*sin(a))*sin(2*a))*arctan2(sin(a), x + cos(a)) + (2*(-I*cos(a) -
 sin(a))*cos(2*a) + (2*cos(a) - 2*I*sin(a))*sin(2*a))*arctan2(sin(a), x - c
os(a)))*x - 6*x^2 + (x^3*(cos(a) - I*sin(a)) - ((cos(a) - I*sin(a))*cos(2*a
```

```
) + (I*cos(a) + sin(a))*sin(2*a))*x)*log(x^2 + 2*x*cos(a) + cos(a)^2 + sin(
a)^2) - (x^3*(cos(a) - I*sin(a)) - ((cos(a) - I*sin(a))*cos(2*a) - (-I*cos(
a) - sin(a))*sin(2*a))*x)*log(x^2 - 2*x*cos(a) + cos(a)^2 + sin(a)^2) + 2*c
os(2*a) + 2*I*sin(2*a))/(2*x^3 - x*(2*cos(2*a) + 2*I*sin(2*a)))
```

mupad [B] time = 2.21, size = 47, normalized size = 0.73

$$-\frac{2\,\mathrm{atanh}\left(\frac{x}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}\right)}{\sqrt{\mathrm{e}^{a\,2\mathrm{i}}}}-\frac{\mathrm{e}^{a\,2\mathrm{i}}-3\,x^2}{x^3-x\,\mathrm{e}^{a\,2\mathrm{i}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)^2/x^2,x)
```

```
[Out] - (2*atanh(x/exp(a*2i)^(1/2)))/exp(a*2i)^(1/2) - (exp(a*2i) - 3*x^2)/(x^3 -
 x*exp(a*2i))
```

sympy [A] time = 0.38, size = 46, normalized size = 0.72

$$-\frac{-3x^2+e^{2ia}}{x^3-xe^{2ia}}-\left(-\log\left(x-e^{ia}\right)+\log\left(x+e^{ia}\right)\right)e^{-ia}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))**2/x**2,x)
```

```
[Out] -(-3*x**2 + exp(2*I*a))/(x**3 - x*exp(2*I*a)) - (-log(x - exp(I*a)) + log(x
 + exp(I*a)))*exp(-I*a)
```

3.200 $\int \frac{\cot^2(a+i\log(x))}{x^3}\,dx$

Optimal. Leaf size=57

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

```
[Out] 2/exp(2*I*a)/(1-exp(2*I*a)/x^2)+1/2/x^2+2*ln(1-exp(2*I*a)/x^2)/exp(2*I*a)
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot^2(a+i\log(x))}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + I*Log[x]]^2/x^3,x]
```

```
[Out] Defer[Int][Cot[a + I*Log[x]]^2/x^3, x]
```

Rubi steps

$$\int \frac{\cot^2(a+i\log(x))}{x^3}\,dx=\int \frac{\cot^2(a+i\log(x))}{x^3}\,dx$$

Mathematica [B] time = 0.23, size = 153, normalized size = 2.68

$$\frac{2\cos(a)}{\left(x^2-1\right)\cos(a)-i\left(x^2+1\right)\sin(a)}+\frac{2\sin(a)}{\left(x^2+1\right)\sin(a)+i\left(x^2-1\right)\cos(a)}+(-4\sin(a)\cos(a)-2i\cos(2a))\tan^{-1}\left(\cot\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + I*Log[x]]^2/x^3,x]
```

```
[Out] 1/(2*x^2) + Cos[2*a]*(-4*Log[x] + Log[1 + x^4 - 2*x^2*Cos[2*a]]) + (2*Cos[a
])/((-1 + x^2)*Cos[a] - I*(1 + x^2)*Sin[a]) + (2*Sin[a])/(I*(-1 + x^2)*Cos[
a] + (1 + x^2)*Sin[a]) + ArcTan[(Cot[a] - x^2*Cot[a])/(1 + x^2)]*((-2*I)*Co
s[2*a] - 4*Cos[a]*Sin[a]) + (4*I)*Log[x]*Sin[2*a] - I*Log[1 + x^4 - 2*x^2*C
os[2*a]]*Sin[2*a]
```

fricas [A]   time = 0.70, size = 81, normalized size = 1.42

$$\frac{5\,x^{2}e^{(2i\,a)} + 4\left(x^{4} - x^{2}e^{(2i\,a)}\right)\log\left(x^{2} - e^{(2i\,a)}\right) - 8\left(x^{4} - x^{2}e^{(2i\,a)}\right)\log(x) - e^{(4i\,a)}}{2\left(x^{4}e^{(2i\,a)} - x^{2}e^{(4i\,a)}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x^3,x, algorithm="fricas")
```

```
[Out] 1/2*(5*x^2*e^(2*I*a) + 4*(x^4 - x^2*e^(2*I*a))*log(x^2 - e^(2*I*a)) - 8*(x^
4 - x^2*e^(2*I*a))*log(x) - e^(4*I*a))/(x^4*e^(2*I*a) - x^2*e^(4*I*a))
```

giac [B]   time = 0.41, size = 190, normalized size = 3.33

$$\frac{2\,x^{4}\log\left(x^{2} - e^{(2i\,a)}\right)}{x^{4}e^{(2i\,a)} - x^{2}e^{(4i\,a)}} - \frac{4\,x^{4}\log(x)}{x^{4}e^{(2i\,a)} - x^{2}e^{(4i\,a)}} - \frac{2\,x^{2}e^{(2i\,a)}\log\left(x^{2} - e^{(2i\,a)}\right)}{x^{4}e^{(2i\,a)} - x^{2}e^{(4i\,a)}} + \frac{4\,x^{2}e^{(2i\,a)}\log(x)}{x^{4}e^{(2i\,a)} - x^{2}e^{(4i\,a)}} + \frac{5\,x^{2}e^{(2i\,a)}}{2\left(x^{4}e^{(2i\,a)} - x^{2}e^{(4i\,a)}\right)} - \frac{}{2\,(}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*log(x))^2/x^3,x, algorithm="giac")
```

```
[Out] 2*x^4*log(x^2 - e^(2*I*a))/(x^4*e^(2*I*a) - x^2*e^(4*I*a)) - 4*x^4*log(x)/(
x^4*e^(2*I*a) - x^2*e^(4*I*a)) - 2*x^2*e^(2*I*a)*log(x^2 - e^(2*I*a))/(x^4*
e^(2*I*a) - x^2*e^(4*I*a)) + 4*x^2*e^(2*I*a)*log(x)/(x^4*e^(2*I*a) - x^2*e^
(4*I*a)) + 5/2*x^2*e^(2*I*a)/(x^4*e^(2*I*a) - x^2*e^(4*I*a)) - 1/2*e^(4*I*a
)/(x^4*e^(2*I*a) - x^2*e^(4*I*a))
```

maple [A]   time = 0.07, size = 53, normalized size = 0.93

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+I*ln(x))^2/x^3,x)
```

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

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(cot(a+I*log(x))^2/x^3,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError >> ECL says: THROW: The catch RAT-ERR is und
efined.
```

mupad [B] time = 2.23, size = 60, normalized size = 1.05

$$-4\,e^{-a\,2i}\,\ln(x)+2\,\ln\left(x^2-e^{a\,2i}\right)\,e^{-a\,2i}+\frac{\frac{e^{a\,2i}}{2}-\frac{5\,x^2}{2}}{x^2\,e^{a\,2i}-x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)^2/x^3,x)
```

```
[Out] 2*log(x^2 - exp(a*2i))*exp(-a*2i) - 4*exp(-a*2i)*log(x) + (exp(a*2i)/2 - (5
*x^2)/2)/(x^2*exp(a*2i) - x^4)
```

sympy [A] time = 0.49, size = 60, normalized size = 1.05

$$-\frac{-5x^2+e^{2ia}}{2x^4-2x^2e^{2ia}}-4e^{-2ia}\log(x)+2e^{-2ia}\log\left(x^2-e^{2ia}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+I*ln(x))**2/x**3,x)
```

```
[Out] -(-5*x**2 + exp(2*I*a))/(2*x**4 - 2*x**2*exp(2*I*a)) - 4*exp(-2*I*a)*log(x)
 + 2*exp(-2*I*a)*log(x**2 - exp(2*I*a))
```

3.201 $\int (ex)^m \cot(a + i \log(x))\,dx$

Optimal. Leaf size=70

$$\frac{i(ex)^{m+1}}{e(m+1)} - \frac{2i(ex)^{m+1}\,{}_2F_1\left(1, \frac{1}{2}(-m-1); \frac{1-m}{2}; \frac{e^{2ia}}{x^2}\right)}{e(m+1)}$$

```
[Out] I*(e*x)^(1+m)/e/(1+m)-2*I*(e*x)^(1+m)*hypergeom([1, -1/2-1/2*m],[1/2-1/2*m]
,exp(2*I*a)/x^2)/e/(1+m)
```

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \cot(a + i \log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Cot[a + I*Log[x]],x]
```

```
[Out] Defer[Int][(e*x)^m*Cot[a + I*Log[x]], x]
```

Rubi steps

$$\int (ex)^m \cot(a + i \log(x))\,dx = \int (ex)^m \cot(a + i \log(x))\,dx$$

Mathematica [A] time = 0.26, size = 103, normalized size = 1.47

$$ix(ex)^m \left(\frac{x^2(\cos(a) - i\sin(a))^2\,{}_2F_1\left(1, \frac{m+3}{2}; \frac{m+5}{2}; x^2(\cos(2a) - i\sin(2a))\right)}{m+3} + \frac{{}_2F_1\left(1, \frac{m+1}{2}; \frac{m+3}{2}; x^2(\cos(2a) - i\sin(2a\right.}{m+1}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Cot[a + I*Log[x]],x]
```

```
[Out] I*x*(e*x)^m*(Hypergeometric2F1[1, (1 + m)/2, (3 + m)/2, x^2*(Cos[2*a] - I*S
in[2*a])]/(1 + m) + (x^2*Hypergeometric2F1[1, (3 + m)/2, (5 + m)/2, x^2*(Co
s[2*a] - I*Sin[2*a])]*(Cos[a] - I*Sin[a])^2)/(3 + m))
```

fricas [F] time = 0.56, size = 0, normalized size = 0.00

$$\text{integral}\left(-\frac{\left(i\,x^2 + i\,e^{(2i\,a)}\right)e^{\left(m\log(e) + m\log(x)\right)}}{x^2 - e^{(2i\,a)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x)),x, algorithm="fricas")
```

```
[Out] integral(-(I*x^2 + I*e^(2*I*a))*e^(m*log(e) + m*log(x))/(x^2 - e^(2*I*a)),
x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(a + i\,\log(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x)),x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*cot(a + I*log(x)), x)
```

maple [F] time = 0.12, size = 0, normalized size = 0.00

$$\int (ex)^m \cot(a + i\ln(x))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(a+I*ln(x)),x)
```

```
[Out] int((e*x)^m*cot(a+I*ln(x)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(a + i\,\log(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x)),x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m*cot(a + I*log(x)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot(a + \ln(x)\,1\mathrm{i})\,(e\,x)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)*(e*x)^m,x)
```

```
[Out] int(cot(a + log(x)*1i)*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(a + i\log(x)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*cot(a+I*ln(x)),x)
```

```
[Out] Integral((e*x)**m*cot(a + I*log(x)), x)
```

3.202 $\int (ex)^m \cot^2(a + i\log(x))\, dx$

Optimal. Leaf size=77

$$-2x(ex)^m\,{}_2F_1\left(1,\frac{1}{2}(-m-1);\frac{1-m}{2};\frac{e^{2ia}}{x^2}\right)+\frac{2x(ex)^m}{1-\frac{e^{2ia}}{x^2}}-\frac{x(ex)^m}{m+1}$$

```
[Out] -x*(e*x)^m/(1+m)+2*x*(e*x)^m/(1-exp(2*I*a)/x^2)-2*x*(e*x)^m*hypergeom([1, -
1/2-1/2*m],[1/2-1/2*m],exp(2*I*a)/x^2)
```

Rubi [F] time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \cot^2(a + i\log(x))\, dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Cot[a + I*Log[x]]^2,x]
```

```
[Out] Defer[Int][(e*x)^m*Cot[a + I*Log[x]]^2, x]
```

Rubi steps

$$\int (ex)^m \cot^2(a + i\log(x))\, dx = \int (ex)^m \cot^2(a + i\log(x))\, dx$$

Mathematica [A] time = 0.17, size = 84, normalized size = 1.09

$$\frac{x(ex)^m\left(4\,{}_2F_1\left(1,\frac{m+1}{2};\frac{m+3}{2};x^2(\cos(2a)-i\sin(2a))\right)-4\,{}_2F_1\left(2,\frac{m+1}{2};\frac{m+3}{2};x^2(\cos(2a)-i\sin(2a))\right)-1\right)}{m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Cot[a + I*Log[x]]^2,x]
```

```
[Out] (x*(e*x)^m*(-1 + 4*Hypergeometric2F1[1, (1 + m)/2, (3 + m)/2, x^2*(Cos[2*a]
 - I*Sin[2*a])] - 4*Hypergeometric2F1[2, (1 + m)/2, (3 + m)/2, x^2*(Cos[2*a
] - I*Sin[2*a])]))/(1 + m)
```

fricas [F] time = 0.66, size = 0, normalized size = 0.00

$$\text{integral}\left(-\frac{\left(x^4+2\,x^2e^{(2i\,a)}+e^{(4i\,a)}\right)e^{\left(m\log(e)+m\log(x)\right)}}{x^4-2\,x^2e^{(2i\,a)}+e^{(4i\,a)}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x))^2,x, algorithm="fricas")
```

```
[Out] integral(-(x^4 + 2*x^2*e^(2*I*a) + e^(4*I*a))*e^(m*log(e) + m*log(x))/(x^4
- 2*x^2*e^(2*I*a) + e^(4*I*a)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(a + i\log(x)\right)^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x))^2,x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*cot(a + I*log(x))^2, x)
```

maple [F] time = 0.06, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\cot^2(a + i\ln(x))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(a+I*ln(x))^2,x)
```

```
[Out] int((e*x)^m*cot(a+I*ln(x))^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(a + i\log(x)\right)^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x))^2,x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m*cot(a + I*log(x))^2, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot(a + \ln(x)\,1i)^2\,(e\,x)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)^2*(e*x)^m,x)
```

```
[Out] int(cot(a + log(x)*1i)^2*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot^2\left(a + i\log(x)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*cot(a+I*ln(x))**2,x)
```

```
[Out] Integral((e*x)**m*cot(a + I*log(x))**2, x)
```

3.203 $\int (ex)^m \cot^3(a+i\log(x))\,dx$

Optimal. Leaf size=169

$$\frac{i\left(m^2+2m+3\right)x(ex)^m\,{}_2F_1\left(1,\frac{1}{2}(-m-1);\frac{1-m}{2};\frac{e^{2ia}}{x^2}\right)}{m+1}-\frac{ix\left(1+\frac{e^{2ia}}{x^2}\right)^2(ex)^m}{2\left(1-\frac{e^{2ia}}{x^2}\right)^2}-\frac{ix\left(-\frac{e^{2ia}(1-m)}{x^2}+m+3\right)(ex)^m}{2\left(1-\frac{e^{2ia}}{x^2}\right)}+\frac{i(1-m)r}{2(m}$$

```
[Out] 1/2*I*(1-m)*m*x*(e*x)^m/(1+m)-1/2*I*(1+exp(2*I*a)/x^2)^2*x*(e*x)^m/(1-exp(2
*I*a)/x^2)^2-1/2*I*(3+m-exp(2*I*a)*(1-m)/x^2)*x*(e*x)^m/(1-exp(2*I*a)/x^2)+
I*(m^2+2*m+3)*x*(e*x)^m*hypergeom([1, -1/2-1/2*m],[1/2-1/2*m],exp(2*I*a)/x^
2)/(1+m)
```

Rubi [F] time = 0.08, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \cot^3(a+i\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Cot[a + I*Log[x]]^3,x]
```

```
[Out] Defer[Int][(e*x)^m*Cot[a + I*Log[x]]^3, x]
```

Rubi steps

$$\int (ex)^m \cot^3(a+i\log(x))\,dx=\int (ex)^m \cot^3(a+i\log(x))\,dx$$

Mathematica [A] time = 0.23, size = 122, normalized size = 0.72

$$-\frac{ix(ex)^m\left(6\,{}_2F_1\left(1,\frac{m+1}{2};\frac{m+3}{2};x^2(\cos(2a)-i\sin(2a))\right)-12\,{}_2F_1\left(2,\frac{m+1}{2};\frac{m+3}{2};x^2(\cos(2a)-i\sin(2a))\right)+8\,{}_2F_1\left(3,\frac{m}{}\right.\right.}{m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Cot[a + I*Log[x]]^3,x]
```

```
[Out] ((-I)*x*(e*x)^m*(-1 + 6*Hypergeometric2F1[1, (1 + m)/2, (3 + m)/2, x^2*(Cos
[2*a] - I*Sin[2*a])] - 12*Hypergeometric2F1[2, (1 + m)/2, (3 + m)/2, x^2*(C
os[2*a] - I*Sin[2*a])] + 8*Hypergeometric2F1[3, (1 + m)/2, (3 + m)/2, x^2*(
Cos[2*a] - I*Sin[2*a])]))/(1 + m)
```

fricas [F] time = 1.65, size = 0, normalized size = 0.00

$$\text{integral}\left(-\frac{\left(-i\,x^{6}-3i\,x^{4}e^{(2i\,a)}-3i\,x^{2}e^{(4i\,a)}-i\,e^{(6i\,a)}\right)e^{\left(m\log(e)+m\log(x)\right)}}{x^{6}-3\,x^{4}e^{(2i\,a)}+3\,x^{2}e^{(4i\,a)}-e^{(6i\,a)}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x))^3,x, algorithm="fricas")
```

```
[Out] integral(-(-I*x^6 - 3*I*x^4*e^(2*I*a) - 3*I*x^2*e^(4*I*a) - I*e^(6*I*a))*e^
(m*log(e) + m*log(x))/(x^6 - 3*x^4*e^(2*I*a) + 3*x^2*e^(4*I*a) - e^(6*I*a))
, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^{m}\cot\left(a+i\,\log(x)\right)^{3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x))^3,x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*cot(a + I*log(x))^3, x)
```

maple [F] time = 0.13, size = 0, normalized size = 0.00

$$\int (ex)^{m}\left(\cot^{3}\left(a+i\ln(x)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(a+I*ln(x))^3,x)
```

```
[Out] int((e*x)^m*cot(a+I*ln(x))^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^{m}\cot\left(a+i\,\log(x)\right)^{3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+I*log(x))^3,x, algorithm="maxima")
```

```
[Out] integrate((e*x)^m*cot(a + I*log(x))^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(a+\ln(x)\,1\mathrm{i}\right)^{3}(e\,x)^{m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x)*1i)^3*(e*x)^m,x)
```

```
[Out] int(cot(a + log(x)*1i)^3*(e*x)^m, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot^3\left(a + i\log(x)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*cot(a+I*ln(x))**3,x)
```

```
[Out] Integral((e*x)**m*cot(a + I*log(x))**3, x)
```

3.204 $\int \cot^p(a+b\log(x))\,dx$

Optimal. Leaf size=142

$$x\left(1-e^{2ia}x^{2ib}\right)^p\left(1+e^{2ia}x^{2ib}\right)^{-p}\left(-\frac{i\left(1+e^{2ia}x^{2ib}\right)}{1-e^{2ia}x^{2ib}}\right)^p F_1\left(-\frac{i}{2b};p,-p;1-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)$$

```
[Out] x*(1-exp(2*I*a)*x^(2*I*b))^p*(-I*(1+exp(2*I*a)*x^(2*I*b))/(1-exp(2*I*a)*x^(
2*I*b)))^p*AppellF1(-1/2*I/b,p,-p,1-1/2*I/b,exp(2*I*a)*x^(2*I*b),-exp(2*I*a
)*x^(2*I*b))/((1+exp(2*I*a)*x^(2*I*b))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot^p(a+b\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + b*Log[x]]^p,x]
```

```
[Out] Defer[Int][Cot[a + b*Log[x]]^p, x]
```

Rubi steps

$$\int \cot^p(a+b\log(x))\,dx=\int \cot^p(a+b\log(x))\,dx$$

Mathematica [B] time = 0.61, size = 330, normalized size = 2.32

$$\frac{(2b-i)x\left(\frac{i\left(1+e^{2ia}x^{2ib}\right)}{-1+e^{2ia}x^{2ib}}\right)^p F_1\left(-\frac{i}{2b};p,-p;1-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)}{2e^{2ia}bpx^{2ib}F_1\left(1-\frac{i}{2b};p,1-p;2-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)+2e^{2ia}bpx^{2ib}F_1\left(1-\frac{i}{2b};p+1,-p;2-\frac{i}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cot[a + b*Log[x]]^p,x]
```

```
[Out] ((-I + 2*b)*x*((I*(1 + E^((2*I)*a)*x^((2*I)*b)))/(-1 + E^((2*I)*a)*x^((2*I)
*b)))^p*AppellF1[(-1/2*I)/b, p, -p, 1 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -
(E^((2*I)*a)*x^((2*I)*b))])/(2*b*E^((2*I)*a)*p*x^((2*I)*b)*AppellF1[1 - (I/
2)/b, p, 1 - p, 2 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*I)*a)*x^((2*I
```

```
)*b))] + 2*b*E^((2*I)*a)*p*x^((2*I)*b)*AppellF1[1 - (I/2)/b, 1 + p, -p, 2 -
 (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*I)*a)*x^((2*I)*b))] + (-I + 2*b)
*AppellF1[(-1/2*I)/b, p, -p, 1 - (I/2)/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*
I)*a)*x^((2*I)*b))])
```

fricas [F] time = 0.80, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot\left(b\log(x)+a\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(x))^p,x, algorithm="fricas")
[Out] integral(cot(b*log(x) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(b\log(x)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(x))^p,x, algorithm="giac")
[Out] integrate(cot(b*log(x) + a)^p, x)
```

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a+b\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(x))^p,x)
[Out] int(cot(a+b*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(b\log(x)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(x))^p,x, algorithm="maxima")
[Out] integrate(cot(b*log(x) + a)^p, x)
```

mupad **[F]** time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(a + b\ \ln(x)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(x))^p,x)
```

```
[Out] int(cot(a + b*log(x))^p, x)
```

sympy **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int \cot^{p}{\left(a + b \log{\left(x \right)} \right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*ln(x))**p,x)
```

```
[Out] Integral(cot(a + b*log(x))**p, x)
```

3.205 $\int (ex)^m \cot^p(a+b\log(x))\,dx$

Optimal. Leaf size=162

$$\frac{(ex)^{m+1}\left(1-e^{2ia}x^{2ib}\right)^p\left(1+e^{2ia}x^{2ib}\right)^{-p}\left(-\frac{i\left(1+e^{2ia}x^{2ib}\right)}{1-e^{2ia}x^{2ib}}\right)^p F_1\left(-\frac{i(m+1)}{2b};p,-p;1-\frac{i(m+1)}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)}{e(m+1)}$$

```
[Out] (e*x)^(1+m)*(1-exp(2*I*a)*x^(2*I*b))^p*(-I*(1+exp(2*I*a)*x^(2*I*b))/(1-exp(
2*I*a)*x^(2*I*b)))^p*AppellF1(-1/2*I*(1+m)/b,p,-p,1-1/2*I*(1+m)/b,exp(2*I*a
)*x^(2*I*b),-exp(2*I*a)*x^(2*I*b))/e/(1+m)/((1+exp(2*I*a)*x^(2*I*b))^p)
```

Rubi [F] time = 0.12, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \cot^p(a+b\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(e*x)^m*Cot[a + b*Log[x]]^p,x]
```

```
[Out] Defer[Int][(e*x)^m*Cot[a + b*Log[x]]^p, x]
```

Rubi steps

$$\int (ex)^m \cot^p(a+b\log(x))\,dx=\int (ex)^m \cot^p(a+b\log(x))\,dx$$

Mathematica [A] time = 0.65, size = 157, normalized size = 0.97

$$\frac{x(ex)^m\left(1-e^{2ia}x^{2ib}\right)^p\left(1+e^{2ia}x^{2ib}\right)^{-p}\left(\frac{i\left(1+e^{2ia}x^{2ib}\right)}{-1+e^{2ia}x^{2ib}}\right)^p F_1\left(-\frac{i(m+1)}{2b};p,-p;1-\frac{i(m+1)}{2b};e^{2ia}x^{2ib},-e^{2ia}x^{2ib}\right)}{m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Cot[a + b*Log[x]]^p,x]
```

```
[Out] (x*(e*x)^m*(1 - E^((2*I)*a)*x^((2*I)*b))^p*((I*(1 + E^((2*I)*a)*x^((2*I)*b)
))/(-1 + E^((2*I)*a)*x^((2*I)*b)))^p*AppellF1[((-1/2*I)*(1 + m))/b, p, -p,
1 - ((I/2)*(1 + m))/b, E^((2*I)*a)*x^((2*I)*b), -(E^((2*I)*a)*x^((2*I)*b))]
)/((1 + m)*(1 + E^((2*I)*a)*x^((2*I)*b))^p)
```

fricas [F] time = 1.15, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m \cot\left(b\log(x) + a\right)^p, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+b*log(x))^p,x, algorithm="fricas")
[Out] integral((e*x)^m*cot(b*log(x) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(b\log(x) + a\right)^p\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+b*log(x))^p,x, algorithm="giac")
[Out] integrate((e*x)^m*cot(b*log(x) + a)^p, x)
```

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\cot^p\left(a + b\ln(x)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(a+b*ln(x))^p,x)
[Out] int((e*x)^m*cot(a+b*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot\left(b\log(x) + a\right)^p\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(a+b*log(x))^p,x, algorithm="maxima")
[Out] integrate((e*x)^m*cot(b*log(x) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(a + b\,\ln(x)\right)^p (e\,x)^m\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(x))^p*(e*x)^m,x)
[Out] int(cot(a + b*log(x))^p*(e*x)^m, x)
```

sympy [F]   time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot^p \left(a + b\log(x)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*cot(a+b*ln(x))**p,x)
[Out] Integral((e*x)**m*cot(a + b*log(x))**p, x)
```

3.206 $\int \cot^p(a+\log(x))\,dx$

Optimal. Leaf size=120

$$x\left(1-e^{2ia}x^{2i}\right)^p\left(1+e^{2ia}x^{2i}\right)^{-p}\left(-\frac{i\left(1+e^{2ia}x^{2i}\right)}{1-e^{2ia}x^{2i}}\right)^p F_1\left(-\frac{i}{2};p,-p;1-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)$$

```
[Out] (1-exp(2*I*a)*x^(2*I))^p*(-I*(1+exp(2*I*a)*x^(2*I))/(1-exp(2*I*a)*x^(2*I)))
^p*x*AppellF1(-1/2*I,p,-p,1-1/2*I,exp(2*I*a)*x^(2*I),-exp(2*I*a)*x^(2*I))/(
(1+exp(2*I*a)*x^(2*I))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot^p(a+\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + Log[x]]^p,x]
```

```
[Out] Defer[Int][Cot[a + Log[x]]^p, x]
```

Rubi steps

$$\int \cot^p(a+\log(x))\,dx=\int \cot^p(a+\log(x))\,dx$$

Mathematica [A] time = 0.48, size = 238, normalized size = 1.98

$$\frac{(2-i)x\left(\frac{i\left(1+e^{2ia}x^{2i}\right)}{-1+e^{2ia}x^{2i}}\right)^p F_1\left(-\frac{i}{2};p,-p;1-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)}{(2-i)F_1\left(-\frac{i}{2};p,-p;1-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)+2e^{2ia}px^{2i}\left(F_1\left(1-\frac{i}{2};p,1-p;2-\frac{i}{2};e^{2ia}x^{2i},-e^{2ia}x^{2i}\right)+F_1\left(1-\frac{i}{2};p+\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cot[a + Log[x]]^p,x]
```

```
[Out] ((2 - I)*((I*(1 + E^((2*I)*a)*x^(2*I)))/(-1 + E^((2*I)*a)*x^(2*I)))^p*x*App
ellF1[-1/2*I, p, -p, 1 - I/2, E^((2*I)*a)*x^(2*I), -(E^((2*I)*a)*x^(2*I))])
/((2 - I)*AppellF1[-1/2*I, p, -p, 1 - I/2, E^((2*I)*a)*x^(2*I), -(E^((2*I)*
a)*x^(2*I))] + 2*E^((2*I)*a)*p*x^(2*I)*(AppellF1[1 - I/2, p, 1 - p, 2 - I/2
```

```
, E^((2*I)*a)*x^(2*I), -(E^((2*I)*a)*x^(2*I))] + AppellF1[1 - I/2, 1 + p, -
p, 2 - I/2, E^((2*I)*a)*x^(2*I), -(E^((2*I)*a)*x^(2*I))]))
```

fricas [F] time = 1.23, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot\left(a + \log(x)\right)^{p}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+log(x))^p,x, algorithm="fricas")
[Out] integral(cot(a + log(x))^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(a + \log(x)\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+log(x))^p,x, algorithm="giac")
[Out] integrate(cot(a + log(x))^p, x)
```

maple [F] time = 0.30, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a + \ln(x)\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+ln(x))^p,x)
[Out] int(cot(a+ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(a + \log(x)\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+log(x))^p,x, algorithm="maxima")
[Out] integrate(cot(a + log(x))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\mathrm{cot}\left(a+\ln\left(x\right)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + log(x))^p,x)
[Out] int(cot(a + log(x))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a+\log\left(x\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+ln(x))**p,x)
[Out] Integral(cot(a + log(x))**p, x)
```

3.207 $\int \cot^p(a+2\log(x))\,dx$

Optimal. Leaf size=120

$$x\left(1-e^{2ia}x^{4i}\right)^p\left(1+e^{2ia}x^{4i}\right)^{-p}\left(-\frac{i\left(1+e^{2ia}x^{4i}\right)}{1-e^{2ia}x^{4i}}\right)^p F_1\left(-\frac{i}{4};p,-p;1-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)$$

```
[Out] (1-exp(2*I*a)*x^(4*I))^p*(-I*(1+exp(2*I*a)*x^(4*I))/(1-exp(2*I*a)*x^(4*I)))
^p*x*AppellF1(-1/4*I,p,-p,1-1/4*I,exp(2*I*a)*x^(4*I),-exp(2*I*a)*x^(4*I))/(
(1+exp(2*I*a)*x^(4*I))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot^p(a+2\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + 2*Log[x]]^p,x]
```

```
[Out] Defer[Int][Cot[a + 2*Log[x]]^p, x]
```

Rubi steps

$$\int \cot^p(a+2\log(x))\,dx=\int \cot^p(a+2\log(x))\,dx$$

Mathematica [A] time = 0.47, size = 238, normalized size = 1.98

$$\frac{(4-i)x\left(\frac{i\left(1+e^{2ia}x^{4i}\right)}{-1+e^{2ia}x^{4i}}\right)^p F_1\left(-\frac{i}{4};p,-p;1-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)}{(4-i)F_1\left(-\frac{i}{4};p,-p;1-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)+4e^{2ia}px^{4i}\left(F_1\left(1-\frac{i}{4};p,1-p;2-\frac{i}{4};e^{2ia}x^{4i},-e^{2ia}x^{4i}\right)+F_1\left(1-\frac{i}{4};p+\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cot[a + 2*Log[x]]^p,x]
```

```
[Out] ((4 - I)*((I*(1 + E^((2*I)*a)*x^(4*I)))/(-1 + E^((2*I)*a)*x^(4*I)))^p*x*App
ellF1[-1/4*I, p, -p, 1 - I/4, E^((2*I)*a)*x^(4*I), -(E^((2*I)*a)*x^(4*I))])
/((4 - I)*AppellF1[-1/4*I, p, -p, 1 - I/4, E^((2*I)*a)*x^(4*I), -(E^((2*I)*
a)*x^(4*I))] + 4*E^((2*I)*a)*p*x^(4*I)*(AppellF1[1 - I/4, p, 1 - p, 2 - I/4
```

```
, E^((2*I)*a)*x^(4*I), -(E^((2*I)*a)*x^(4*I))] + AppellF1[1 - I/4, 1 + p, -
p, 2 - I/4, E^((2*I)*a)*x^(4*I), -(E^((2*I)*a)*x^(4*I))]))
```

fricas [F] time = 0.80, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot\left(a + 2\,\log(x)\right)^{p}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+2*log(x))^p,x, algorithm="fricas")
[Out] integral(cot(a + 2*log(x))^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(a + 2\,\log(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+2*log(x))^p,x, algorithm="giac")
[Out] integrate(cot(a + 2*log(x))^p, x)
```

maple [F] time = 0.30, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a + 2\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+2*ln(x))^p,x)
[Out] int(cot(a+2*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(a + 2\,\log(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+2*log(x))^p,x, algorithm="maxima")
[Out] integrate(cot(a + 2*log(x))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(a + 2\,\ln(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + 2*log(x))^p,x)
```

```
[Out] int(cot(a + 2*log(x))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a + 2\log\left(x\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+2*ln(x))**p,x)
```

```
[Out] Integral(cot(a + 2*log(x))**p, x)
```

3.208 $\int \cot^p(a + 3\log(x))\,dx$

Optimal. Leaf size=120

$$x\left(1-e^{2ia}x^{6i}\right)^p\left(1+e^{2ia}x^{6i}\right)^{-p}\left(-\frac{i\left(1+e^{2ia}x^{6i}\right)}{1-e^{2ia}x^{6i}}\right)^p F_1\left(-\frac{i}{6};p,-p;1-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)$$

```
[Out] (1-exp(2*I*a)*x^(6*I))^p*(-I*(1+exp(2*I*a)*x^(6*I))/(1-exp(2*I*a)*x^(6*I)))
^p*x*AppellF1(-1/6*I,p,-p,1-1/6*I,exp(2*I*a)*x^(6*I),-exp(2*I*a)*x^(6*I))/(
(1+exp(2*I*a)*x^(6*I))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot^p(a + 3\log(x))\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[a + 3*Log[x]]^p,x]
```

```
[Out] Defer[Int][Cot[a + 3*Log[x]]^p, x]
```

Rubi steps

$$\int \cot^p(a + 3\log(x))\,dx = \int \cot^p(a + 3\log(x))\,dx$$

Mathematica [A] time = 0.47, size = 238, normalized size = 1.98

$$\frac{(6-i)x\left(\frac{i\left(1+e^{2ia}x^{6i}\right)}{-1+e^{2ia}x^{6i}}\right)^p F_1\left(-\frac{i}{6};p,-p;1-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)}{(6-i)F_1\left(-\frac{i}{6};p,-p;1-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)+6e^{2ia}px^{6i}\left(F_1\left(1-\frac{i}{6};p,1-p;2-\frac{i}{6};e^{2ia}x^{6i},-e^{2ia}x^{6i}\right)+F_1\left(1-\frac{i}{6};p+\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Cot[a + 3*Log[x]]^p,x]
```

```
[Out] ((6 - I)*((I*(1 + E^((2*I)*a)*x^(6*I)))/(-1 + E^((2*I)*a)*x^(6*I)))^p*x*App
ellF1[-1/6*I, p, -p, 1 - I/6, E^((2*I)*a)*x^(6*I), -(E^((2*I)*a)*x^(6*I))])
/((6 - I)*AppellF1[-1/6*I, p, -p, 1 - I/6, E^((2*I)*a)*x^(6*I), -(E^((2*I)*
a)*x^(6*I))] + 6*E^((2*I)*a)*p*x^(6*I)*(AppellF1[1 - I/6, p, 1 - p, 2 - I/6
```

```
, E^((2*I)*a)*x^(6*I), -(E^((2*I)*a)*x^(6*I))] + AppellF1[1 - I/6, 1 + p, -
p, 2 - I/6, E^((2*I)*a)*x^(6*I), -(E^((2*I)*a)*x^(6*I))]))
```

fricas [F] time = 1.68, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot\left(a+3\log(x)\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+3*log(x))^p,x, algorithm="fricas")
[Out] integral(cot(a + 3*log(x))^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(a+3\log(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+3*log(x))^p,x, algorithm="giac")
[Out] integrate(cot(a + 3*log(x))^p, x)
```

maple [F] time = 0.31, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a+3\ln(x)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+3*ln(x))^p,x)
[Out] int(cot(a+3*ln(x))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(a+3\log(x)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+3*log(x))^p,x, algorithm="maxima")
[Out] integrate(cot(a + 3*log(x))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\cot\left(a+3\,\ln(x)\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + 3*log(x))^p,x)
[Out] int(cot(a + 3*log(x))^p, x)
```

sympy [F]   time = 0.00, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(a+3\log\left(x\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+3*ln(x))**p,x)
[Out] Integral(cot(a + 3*log(x))**p, x)
```

3.209 $\int x^3 \cot\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=70

$$\frac{ix^4}{4}-\frac{1}{2}ix^4\,{}_2F_1\left(1,-\frac{2i}{bdn};1-\frac{2i}{bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)$$

```
[Out] 1/4*I*x^4-1/2*I*x^4*hypergeom([1, -2*I/b/d/n],[1-2*I/b/d/n],exp(2*I*a*d)*(c
*x^n)^(2*I*b*d))
```

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x^3*Cot[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

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

Mathematica [B] time = 5.30, size = 220, normalized size = 3.14

$$-\frac{x^4\left(2e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{2i}{bdn};2-\frac{2i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(bdn-2i)\left(i\,{}_2F_1\left(1,-\frac{2i}{bdn};1-\frac{2i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\right.\right.}{}$$

Antiderivative was successfully verified.

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

```
[Out] -((x^4*(2*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (2*I)/(b*
d*n), 2 - (2*I)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-2*I + b*d*n)*(
Cot[d*(a + b*Log[c*x^n])] - Cot[d*(a - b*n*Log[x] + b*Log[c*x^n])] + I*Hype
rgeometric2F1[1, (-2*I)/(b*d*n), 1 - (2*I)/(b*d*n), E^((2*I)*d*(a + b*Log[c
*x^n]))] + Csc[d*(a + b*Log[c*x^n])]*Csc[d*(a - b*n*Log[x] + b*Log[c*x^n])]
*Sin[b*d*n*Log[x]])))/(-8*I + 4*b*d*n))
```

fricas [F] time = 0.72, size = 0, normalized size = 0.00

$$\text{integral}\left(x^3\cot\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.66, size = 0, normalized size = 0.00

$$\int x^3\cot\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(d*(a+b*ln(c*x^n))),x)
[Out] int(x^3*cot(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \cot\left(ad + bd\log\left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**3*cot(a*d + b*d*log(c*x**n)), x)
```

3.210 $\int x^2 \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$

Optimal. Leaf size=74

$$\frac{ix^3}{3}-\frac{2}{3}ix^3\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)$$

```
[Out] 1/3*I*x^3-2/3*I*x^3*hypergeom([1, -3/2*I/b/d/n],[1-3/2*I/b/d/n],exp(2*I*a*d
)*(c*x^n)^(2*I*b*d))
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^2 \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x^2*Cot[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

$$\int x^2 \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx=\int x^2 \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Mathematica [B] time = 5.58, size = 229, normalized size = 3.09

$$-\frac{x^3\left(3e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{3i}{2bdn};2-\frac{3i}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(2bdn-3i)\left(i\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};e^{2id\left(a+b\log\right.}\right.\right.\right.}{}$$

Antiderivative was successfully verified.

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

```
[Out] -((x^3*(3*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - ((3*I)/2)
/(b*d*n), 2 - ((3*I)/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-3*I +
2*b*d*n)*(Cot[d*(a + b*Log[c*x^n])] - Cot[d*(a - b*n*Log[x] + b*Log[c*x^n])
] + I*Hypergeometric2F1[1, ((-3*I)/2)/(b*d*n), 1 - ((3*I)/2)/(b*d*n), E^((2
*I)*d*(a + b*Log[c*x^n]))] + Csc[d*(a + b*Log[c*x^n])]*Csc[d*(a - b*n*Log[x
] + b*Log[c*x^n])]*Sin[b*d*n*Log[x]])))/(-9*I + 6*b*d*n))
```

fricas [F] time = 2.05, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\cot\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.42, size = 0, normalized size = 0.00

$$\int x^2\cot\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cot(d*(a+b*ln(c*x^n))),x)
[Out] int(x^2*cot(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \cot \left(ad + bd \log \left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2*cot(a*d + b*d*log(c*x**n)), x)
```

3.211 $\int x \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$

Optimal. Leaf size=68

$$\frac{i x^2}{2}-i x^2 \, _2F_1\left(1,-\frac{i}{b d n};1-\frac{i}{b d n};e^{2 i a d} \left(c x^n\right)^{2 i b d}\right)$$

[Out] 1/2*I*x^2-I*x^2*hypergeom([1, -I/b/d/n],[1-I/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Verification is Not applicable to the result.

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

[Out] Defer[Int][x*Cot[d*(a + b*Log[c*x^n])], x]

Rubi steps

$$\int x \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx=\int x \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Mathematica [B] time = 5.52, size = 219, normalized size = 3.22

$$-\frac{x^2 \left(e^{2 i d \left(a+b \log \left(c x^n\right)\right)} \, _2F_1\left(1,1-\frac{i}{b d n};2-\frac{i}{b d n};e^{2 i d \left(a+b \log \left(c x^n\right)\right)}\right)+(b d n-i) \left(i \, _2F_1\left(1,-\frac{i}{b d n};1-\frac{i}{b d n};e^{2 i d \left(a+b \log \left(c x^n\right)\right)}\right)+ \cdots\right.\right.}{\cdots}$$

Antiderivative was successfully verified.

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

[Out] -((x^2*(E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - I/(b*d*n), 2 - I/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-I + b*d*n)*(Cot[d*(a + b*Log[c*x^n])] - Cot[d*(a - b*n*Log[x] + b*Log[c*x^n])] + I*Hypergeometric2F1[1, (-I)/(b*d*n), 1 - I/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + Csc[d*(a + b*Log[c*x^n])]*Csc[d*(a - b*n*Log[x] + b*Log[c*x^n])]*Sin[b*d*n*Log[x]])))/(-2*I + 2*b*d*n))

fricas [F] time = 0.72, size = 0, normalized size = 0.00

$$\text{integral}\left(x\cot\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.24, size = 0, normalized size = 0.00

$$\int x\cot\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*cot(d*(a+b*ln(c*x^n))),x)
[Out] int(x*cot(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\cot\left(ad + bd\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x*cot(a*d + b*d*log(c*x**n)), x)
```

3.212 $\int \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$

Optimal. Leaf size=66

$$ix-2 i x \, _2F_1\left(1,-\frac{i}{2 b d n};1-\frac{i}{2 b d n};e^{2 i a d} \left(c x^n\right)^{2 i b d}\right)$$

```
[Out] I*x-2*I*x*hypergeom([1, -1/2*I/b/d/n],[1-1/2*I/b/d/n],exp(2*I*a*d)*(c*x^n)^
(2*I*b*d))
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

$$\int \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx=\int \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) \, dx$$

Mathematica [B] time = 10.32, size = 141, normalized size = 2.14

$$x \left(-\frac{e^{2 i d \left(a+b \log \left(c x^n\right)\right)} \, _2F_1\left(1,1-\frac{i}{2 b d n};2-\frac{i}{2 b d n};e^{2 i d \left(a+b \log \left(c x^n\right)\right)}\right)}{2 b d n-i}-i \, _2F_1\left(1,-\frac{i}{2 b d n};1-\frac{i}{2 b d n};e^{2 i d \left(a+b \log \left(c x^n\right)\right)}\right)\right)$$

Antiderivative was successfully verified.

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

```
[Out] x*(-((E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (I/2)/(b*d*n)
, 2 - (I/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))])/(-I + 2*b*d*n)) - I*H
ypergeometric2F1[1, (-1/2*I)/(b*d*n), 1 - (I/2)/(b*d*n), E^((2*I)*d*(a + b*
Log[c*x^n]))])
```

fricas [F] time = 1.18, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot \left(b d \log \left(c x^n\right)+a d\right), x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.05, size = 0, normalized size = 0.00

$$\int \cot \left(d \left(a+b \ln \left(c \,x^{n}\right)\right)\right)d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n))),x)
[Out] int(cot(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left({\left(b \log\left(c x^{n}\right) + a\right)} d\right)\,{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \mathrm{cot}\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot \left(d\left(a+b\log \left(cx^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(cot(d*(a + b*log(c*x**n))), x)
```

3.213 $\int \frac{\cot(d(a+b\log(cx^n)))}{x}\,dx$

Optimal. Leaf size=25

$$\frac{\log\left(\sin\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}$$

```
[Out] ln(sin(a*d+b*d*ln(c*x^n)))/b/d/n
```

Rubi [A] time = 0.02, antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {3475}

$$\frac{\log\left(\sin\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}$$

Antiderivative was successfully verified.

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

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

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{\cot\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x}\,dx &= \frac{\operatorname{Subst}\left(\int \cot(d(a+bx))\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= \frac{\log\left(\sin\left(ad+bd\log\left(cx^n\right)\right)\right)}{bdn}\end{aligned}$$

Mathematica [A] time = 0.06, size = 40, normalized size = 1.60

$$\frac{\log\left(\tan\left(ad+bd\log\left(cx^n\right)\right)\right)+\log\left(\cos\left(d\left(a+b\log\left(cx^n\right)\right)\right)\right)}{bdn}$$

Antiderivative was successfully verified.

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

```
[Out] (Log[Cos[d*(a + b*Log[c*x^n])]] + Log[Tan[a*d + b*d*Log[c*x^n]]])/(b*d*n)
```

fricas [A] time = 1.46, size = 35, normalized size = 1.40

$$\frac{\log\left(-\frac{1}{2}\cos\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)+\frac{1}{2}\right)}{2\,bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [A] time = 0.00, size = 30, normalized size = 1.20

$$-\frac{\ln\left(\cot^{2}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)+1\right)}{2nbd}$$

Verification of antiderivative is not currently implemented for this CAS.

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

maxima [A] time = 0.32, size = 24, normalized size = 0.96

$$\frac{\log\left(\sin\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)\right)}{bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [B] time = 3.80, size = 37, normalized size = 1.48

$$-\ln(x)\,1\mathrm{i}+\frac{\ln\left(\mathrm{e}^{a\,d\,2\mathrm{i}}\,{\left(c\,x^{n}\right)}^{b\,d\,2\mathrm{i}}-1\right)}{b\,d\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [A] time = 4.14, size = 46, normalized size = 1.84

$$\begin{cases} \log(x)\cot(ad) & \text{for } b = 0 \\ \tilde{\infty}\log(x) & \text{for } d = 0 \\ \log(x)\cot\left(ad + bd\log(c)\right) & \text{for } n = 0 \\ \frac{\log\left(\sin\left(ad+bd\log(cx^n)\right)\right)}{bdn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Piecewise((log(x)*cot(a*d), Eq(b, 0)), (zoo*log(x), Eq(d, 0)), (log(x)*cot(
a*d + b*d*log(c)), Eq(n, 0)), (log(sin(a*d + b*d*log(c*x**n)))/(b*d*n), Tru
e))
```

3.214 $\int \frac{\cot\left(d\left(a+b\log(cx^n)\right)\right)}{x^2}\,dx$

Optimal. Leaf size=70

$$\frac{2i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{x}-\frac{i}{x}$$

```
[Out] -I/x+2*I*hypergeom([1, 1/2*I/b/d/n],[1+1/2*I/b/d/n],exp(2*I*a*d)*(c*x^n)^(2
*I*b*d))/x
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])]/x^2, x]
```

Rubi steps

$$\int \frac{\cot\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx=\int \frac{\cot\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx$$

Mathematica [B] time = 4.59, size = 217, normalized size = 3.10

$$\frac{-\frac{e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1+\frac{i}{2bdn};2+\frac{i}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)}{2bdn+i}+i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+\cot\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{}$$

Antiderivative was successfully verified.

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

```
[Out] (Cot[d*(a + b*Log[c*x^n])] - Cot[d*(a - b*n*Log[x] + b*Log[c*x^n])] - (E^((
2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + (I/2)/(b*d*n), 2 + (I/2
)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))])/(I + 2*b*d*n) + I*Hypergeometri
c2F1[1, (I/2)/(b*d*n), 1 + (I/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] +
```

```
 Csc[d*(a + b*Log[c*x^n])]*Csc[d*(a - b*n*Log[x] + b*Log[c*x^n])]*Sin[b*d*n
*Log[x]])/x
```

fricas [F] time = 0.61, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\cot\left(bd\log\left(cx^n\right)+ad\right)}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.45, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n)))/x^2,x)
[Out] int(cot(d*(a+b*ln(c*x^n)))/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot\left(ad + bd\log\left(cx^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(cot(a*d + b*d*log(c*x**n))/x**2, x)
```

3.215 $\int \frac{\cot \left(d \left(a+b \log \left(c x^n\right)\right)\right)}{x^3} \, dx$

Optimal. Leaf size=68

$$\frac{i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{x^2}-\frac{i}{2x^2}$$

```
[Out] -1/2*I/x^2+I*hypergeom([1, I/b/d/n],[1+I/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b
*d))/x^2
```

Rubi [F] time = 0.03, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot \left(d \left(a+b \log \left(c x^n\right)\right)\right)}{x^3} \, dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])]/x^3, x]
```

Rubi steps

$$\int \frac{\cot \left(d \left(a+b \log \left(c x^n\right)\right)\right)}{x^3} \, dx=\int \frac{\cot \left(d \left(a+b \log \left(c x^n\right)\right)\right)}{x^3} \, dx$$

Mathematica [B] time = 4.16, size = 211, normalized size = 3.10

$$\frac{-\frac{e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1+\frac{i}{bdn};2+\frac{i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)}{bdn+i}+i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+\cot\left(d\left(a+b\log\left(cx^n\right)\right)\right)-\text{co}}{2x}$$

Antiderivative was successfully verified.

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

```
[Out] (Cot[d*(a + b*Log[c*x^n])] - Cot[d*(a - b*n*Log[x] + b*Log[c*x^n])] - (E^((
2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + I/(b*d*n), 2 + I/(b*d*n
), E^((2*I)*d*(a + b*Log[c*x^n]))])/(I + b*d*n) + I*Hypergeometric2F1[1, I/
(b*d*n), 1 + I/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + Csc[d*(a + b*Log[
c*x^n])]*Csc[d*(a - b*n*Log[x] + b*Log[c*x^n])]*Sin[b*d*n*Log[x]])/(2*x^2)
```

fricas [F] time = 1.51, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\cot\left(bd\log\left(cx^{n}\right)+ad\right)}{x^{3}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*log(c*x^n)))/x^3,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 1.71, size = 0, normalized size = 0.00

$$\int \frac{\cot\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n)))/x^3,x)
[Out] int(cot(d*(a+b*ln(c*x^n)))/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\cot\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(cot(d*(a + b*log(c*x^n)))/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot\left(ad + bd\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(cot(a*d + b*d*log(c*x**n))/x**3, x)
```

3.216 $\int x^3 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=158

$$-\frac{2ix^4\,{}_2F_1\left(1,-\frac{2i}{bdn};1-\frac{2i}{bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix^4\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x^4(-bdn+4i)}{4bdn}$$

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

Rubi [F] time = 0.09, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^3 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Verification is Not applicable to the result.

```
[In] Int[x^3*Cot[d*(a + b*Log[c*x^n])]^2,x]
```

```
[Out] Defer[Int][x^3*Cot[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int x^3 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int x^3 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 4.64, size = 175, normalized size = 1.11

$$-\frac{x^4\left(8e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{2i}{bdn};2-\frac{2i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(bdn-2i)\left(4i\,{}_2F_1\left(1,-\frac{2i}{bdn};1-\frac{2i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right.\right.\right.}{4bdn(bdn-2i)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*Cot[d*(a + b*Log[c*x^n])]^2,x]
```

```
[Out] -1/4*(x^4*(8*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (2*I)/
(b*d*n), 2 - (2*I)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-2*I + b*d*n
)*(b*d*n + 4*Cot[d*(a + b*Log[c*x^n])] + (4*I)*Hypergeometric2F1[1, (-2*I)/
(b*d*n), 1 - (2*I)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))])))/(b*d*n*(-2*I
 + b*d*n))
```

fricas [F] time = 0.54, size = 0, normalized size = 0.00

$$\text{integral}\left(x^3\cot\left(bd\log\left(cx^n\right)+ad\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(d*(a+b*log(c*x^n)))^2,x, algorithm="fricas")
```

```
[Out] integral(x^3*cot(b*d*log(c*x^n) + a*d)^2, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(d*(a+b*log(c*x^n)))^2,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.42, size = 0, normalized size = 0.00

$$\int x^3\left(\cot^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(d*(a+b*ln(c*x^n)))^2,x)
```

```
[Out] int(x^3*cot(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*cot(d*(a+b*log(c*x^n)))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^3\,\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*cot(d*(a + b*log(c*x^n)))^2,x)
```

```
[Out] int(x^3*cot(d*(a + b*log(c*x^n)))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^3 \cot^2\left(ad + bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*cot(d*(a+b*ln(c*x**n)))**2,x)
```

```
[Out] Integral(x**3*cot(a*d + b*d*log(c*x**n))**2, x)
```

3.217 $\int x^2 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$

Optimal. Leaf size=162

$$-\frac{2ix^3\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix^3\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x^3(-bdn+3i)}{3bdn}$$

```
[Out] 1/3*(3*I-b*d*n)*x^3/b/d/n+I*x^3*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/(1
-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*x^3*hypergeom([1, -3/2*I/b/d/n],[1-3/2
*I/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n
```

Rubi [F] time = 0.06, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x^2*Cot[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int x^2 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx=\int x^2 \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$$

Mathematica [A] time = 5.32, size = 185, normalized size = 1.14

$$-\frac{x^3\left(9e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{3i}{2bdn};2-\frac{3i}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(2bdn-3i)\left(3i\,{}_2F_1\left(1,-\frac{3i}{2bdn};1-\frac{3i}{2bdn};e^{2id\left(a+b\log\left(\right.\right.}\right.\right.\right.}{3bdn(2bdn-3i)}$$

Antiderivative was successfully verified.

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

```
[Out] -1/3*(x^3*(9*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - ((3*I)
/2)/(b*d*n), 2 - ((3*I)/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-3*I
 + 2*b*d*n)*(b*d*n + 3*Cot[d*(a + b*Log[c*x^n])] + (3*I)*Hypergeometric2F1[
1, ((-3*I)/2)/(b*d*n), 1 - ((3*I)/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n])
)]))))/(b*d*n*(-3*I + 2*b*d*n))
```

fricas [F] time = 0.56, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\cot\left(bd\log\left(cx^n\right)+ad\right)^2, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.81, size = 0, normalized size = 0.00

$$\int x^2\left(\cot^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*cot(d*(a+b*ln(c*x^n)))^2,x)
[Out] int(x^2*cot(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^2\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \cot^2 \left(ad + bd \log \left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2*cot(a*d + b*d*log(c*x**n))**2, x)
```

3.218 $\int x \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=158

$$-\frac{2ix^2\,{}_2F_1\left(1,-\frac{i}{bdn};1-\frac{i}{bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix^2\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x^2(-bdn+2i)}{2bdn}$$

```
[Out] 1/2*(2*I-b*d*n)*x^2/b/d/n+I*x^2*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/(1
-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*x^2*hypergeom([1, -I/b/d/n],[1-I/b/d/n
],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n
```

Rubi [F] time = 0.04, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][x*Cot[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

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

Mathematica [A] time = 5.20, size = 175, normalized size = 1.11

$$-\frac{x^2\left(2e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{i}{bdn};2-\frac{i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(bdn-i)\left(2i\,{}_2F_1\left(1,-\frac{i}{bdn};1-\frac{i}{bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right.\right.}{2bdn(bdn-i)}$$

Antiderivative was successfully verified.

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

```
[Out] -1/2*(x^2*(2*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - I/(b*d
*n), 2 - I/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-I + b*d*n)*(b*d*n +
 2*Cot[d*(a + b*Log[c*x^n])] + (2*I)*Hypergeometric2F1[1, (-I)/(b*d*n), 1 -
 I/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))])))/(b*d*n*(-I + b*d*n))
```

fricas [F] time = 1.65, size = 0, normalized size = 0.00

$$\text{integral}\left(x\cot\left(bd\log\left(cx^n\right)+ad\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x*cot(b*d*log(c*x^n) + a*d)^2, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.27, size = 0, normalized size = 0.00

$$\int x\left(\cot^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(x*cot(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy **[F]**   time = 0.00, size = 0, normalized size = 0.00

$$\int x\cot^2\left(ad + bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x*cot(a*d + b*d*log(c*x**n))**2, x)
```

3.219 $\int \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=153

$$-\frac{2ix\,{}_2F_1\left(1,-\frac{i}{2bdn};1-\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn}+\frac{ix\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdn\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{x(-bdn+i)}{bdn}$$

```
[Out] (I-b*d*n)*x/b/d/n+I*x*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/(1-exp(2*I*a
*d)*(c*x^n)^(2*I*b*d))-2*I*x*hypergeom([1, -1/2*I/b/d/n],[1-1/2*I/b/d/n],ex
p(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n
```

Rubi [F] time = 0.01, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 11.53, size = 178, normalized size = 1.16

$$-\frac{x\left(e^{2id\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,1-\frac{i}{2bdn};2-\frac{i}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)+(2bdn-i)\left(i\,{}_2F_1\left(1,-\frac{i}{2bdn};1-\frac{i}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\right.\right.}{bdn(2bdn-i)}$$

Antiderivative was successfully verified.

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

```
[Out] -((x*(E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 - (I/2)/(b*d*n)
, 2 - (I/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (-I + 2*b*d*n)*(b*d*
n + Cot[d*(a + b*Log[c*x^n])] + I*Hypergeometric2F1[1, (-1/2*I)/(b*d*n), 1
- (I/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))])))/(b*d*n*(-I + 2*b*d*n)))
```

fricas [F] time = 0.63, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot\left(bd\log\left(cx^{n}\right)+ad\right)^{2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.20, size = 0, normalized size = 0.00

$$\int \cot^{2}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n)))^2,x)
[Out] int(cot(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)^{2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(cot(d*(a + b*log(c*x**n)))**2, x)
```

3.220 $\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x}\,dx$

Optimal. Leaf size=30

$$-\frac{\cot\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\log(x)$$

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

Rubi [A] time = 0.03, antiderivative size = 30, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {3473, 8}

$$-\frac{\cot\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\log(x)$$

Antiderivative was successfully verified.

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

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

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rubi steps

$$\begin{aligned}\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x}\,dx&=\frac{\text{Subst}\left(\int \cot^2(d(a+bx))\,dx,x,\log\left(cx^n\right)\right)}{n}\\&=-\frac{\cot\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\frac{\text{Subst}\left(\int 1\,dx,x,\log\left(cx^n\right)\right)}{n}\\&=-\frac{\cot\left(ad+bd\log\left(cx^n\right)\right)}{bdn}-\log(x)\end{aligned}$$

Mathematica [C] time = 0.12, size = 51, normalized size = 1.70

$$-\frac{\cot \left(ad+bd\log \left(cx^n\right)\right) {}_2F_1\left(-\frac{1}{2},1;\frac{1}{2};-\tan^2\left(ad+b\log \left(cx^n\right)d\right)\right)}{bdn}$$

Antiderivative was successfully verified.

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

```
[Out] -((Cot[a*d + b*d*Log[c*x^n]]*Hypergeometric2F1[-1/2, 1, 1/2, -Tan[a*d + b*d
*Log[c*x^n]]^2])/(b*d*n))
```

fricas [B] time = 0.77, size = 78, normalized size = 2.60

$$-\frac{bdn\log(x)\sin\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)+\cos\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)+1}{bdn\sin\left(2\,bdn\log(x)+2\,bd\log(c)+2\,ad\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [B] time = 0.01, size = 63, normalized size = 2.10

$$-\frac{\cot \left(d \left(a+b\ln \left(c\,x^{n}\right)\right)\right)}{bdn}+\frac{\pi}{2bdn}-\frac{\mathrm{arccot}\left(\cot \left(d \left(a+b\ln \left(c\,x^{n}\right)\right)\right)\right)}{bdn}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

maxima [B] time = 0.95, size = 322, normalized size = 10.73

$$\frac{\left(bd\cos\left(2\,bd\log(c)\right)^{2}+bd\sin\left(2\,bd\log(c)\right)^{2}\right)n\cos\left(2\,bd\log\left(x^{n}\right)+2\,ad\right)^{2}\log(x)+\left(bd\cos\left(2\,bd\log(c)\right)^{2}+bd\,\mathrm{s}\right.}{2\,bdn\cos\left(2\,bd\log(c)\right)\cos\left(2\,bd\log\left(x^{n}\right)+2\,ad\right)-2\,bdn\sin\left(2\,bd\log(c)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

mupad [B] time = 3.86, size = 39, normalized size = 1.30

$$-\ln(x)-\frac{2\mathrm{i}}{b\,d\,n\,\left(\mathrm{e}^{a\,d\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,d\,2\mathrm{i}}-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\cot^{2}\left(ad+bd\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(cot(a*d + b*d*log(c*x**n))**2/x, x)
```

3.221 $\int \frac{\cot^2\left(d\left(a+b\log(cx^n)\right)\right)}{x^2}\,dx$

Optimal. Leaf size=156

$$-\frac{2i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx}+\frac{i\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{1+\frac{i}{bdn}}{x}$$

```
[Out] (1+I/b/d/n)/x+I*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x/(1-exp(2*I*a*d)*
(c*x^n)^(2*I*b*d))-2*I*hypergeom([1, 1/2*I/b/d/n],[1+1/2*I/b/d/n],exp(2*I*a
*d)*(c*x^n)^(2*I*b*d))/b/d/n/x
```

Rubi [F] time = 0.06, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])]^2/x^2, x]
```

Rubi steps

$$\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx=\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^2}\,dx$$

Mathematica [A] time = 4.38, size = 181, normalized size = 1.16

$$\frac{e^{2id\left(a+b\log(cx^n)\right)}\,{}_2F_1\left(1,1+\frac{i}{2bdn};2+\frac{i}{2bdn};e^{2id\left(a+b\log(cx^n)\right)}\right)+(2bdn+i)\left(-i\,{}_2F_1\left(1,\frac{i}{2bdn};1+\frac{i}{2bdn};e^{2id\left(a+b\log(cx^n)\right)}\right)-c\right.}{bdnx(2bdn+i)}$$

Antiderivative was successfully verified.

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

```
[Out] (E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + (I/2)/(b*d*n), 2 +
 (I/2)/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (I + 2*b*d*n)*(b*d*n - Co
t[d*(a + b*Log[c*x^n])] - I*Hypergeometric2F1[1, (I/2)/(b*d*n), 1 + (I/2)/(
b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))]))/(b*d*n*(I + 2*b*d*n)*x)
```

fricas [F] time = 0.47, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\cot\left(bd\log\left(cx^{n}\right)+ad\right)^{2}}{x^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.32, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n)))^2/x^2,x)
[Out] int(cot(d*(a+b*ln(c*x^n)))^2/x^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot^2\left(ad + bd\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(cot(a*d + b*d*log(c*x**n))**2/x**2, x)
```

3.222 $\int \frac{\cot^2\left(d\left(a+b\log(cx^n)\right)\right)}{x^3}\,dx$

Optimal. Leaf size=155

$$-\frac{2i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx^2}+\frac{i\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bdnx^2\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{1+\frac{2i}{bdn}}{2x^2}$$

```
[Out] 1/2*(1+2*I/b/d/n)/x^2+I*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x^2/(1-exp
(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*hypergeom([1, I/b/d/n],[1+I/b/d/n],exp(2*I
*a*d)*(c*x^n)^(2*I*b*d))/b/d/n/x^2
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Cot[d*(a + b*Log[c*x^n])]^2/x^3,x]
```

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])]^2/x^3, x]
```

Rubi steps

$$\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx=\int \frac{\cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{x^3}\,dx$$

Mathematica [A] time = 3.91, size = 175, normalized size = 1.13

$$\frac{2e^{2id\left(a+b\log(cx^n)\right)}\,{}_2F_1\left(1,1+\frac{i}{bdn};2+\frac{i}{bdn};e^{2id\left(a+b\log(cx^n)\right)}\right)+(bdn+i)\left(-2i\,{}_2F_1\left(1,\frac{i}{bdn};1+\frac{i}{bdn};e^{2id\left(a+b\log(cx^n)\right)}\right)-2\right.}{2bdnx^2(bdn+i)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[d*(a + b*Log[c*x^n])]^2/x^3,x]
```

```
[Out] (2*E^((2*I)*d*(a + b*Log[c*x^n]))*Hypergeometric2F1[1, 1 + I/(b*d*n), 2 + I
/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (I + b*d*n)*(b*d*n - 2*Cot[d*(a
 + b*Log[c*x^n])] - (2*I)*Hypergeometric2F1[1, I/(b*d*n), 1 + I/(b*d*n), E^
((2*I)*d*(a + b*Log[c*x^n]))]))/(2*b*d*n*(I + b*d*n)*x^2)
```

fricas [F] time = 1.44, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\cot\left(bd\log\left(cx^n\right)+ad\right)^2}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*log(c*x^n)))^2/x^3,x, algorithm="fricas")
[Out] integral(cot(b*d*log(c*x^n) + a*d)^2/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot\left(\left(b\log\left(cx^n\right)+a\right)d\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*log(c*x^n)))^2/x^3,x, algorithm="giac")
[Out] integrate(cot((b*log(c*x^n) + a)*d)^2/x^3, x)
```

maple [F] time = 0.40, size = 0, normalized size = 0.00

$$\int \frac{\cot^2\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n)))^2/x^3,x)
[Out] int(cot(d*(a+b*ln(c*x^n)))^2/x^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*log(c*x^n)))^2/x^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a + b*log(c*x^n)))^2/x^3,x)
```

```
[Out] int(cot(d*(a + b*log(c*x^n)))^2/x^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot^2\left(ad + bd\log\left(cx^n\right)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*ln(c*x**n)))**2/x**3,x)
```

```
[Out] Integral(cot(a*d + b*d*log(c*x**n))**2/x**3, x)
```

3.223 $\int \frac{\cot^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=44

$$-\frac{\log\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}-\frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

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

Rubi [A] time = 0.04, antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3473, 3475}

$$-\frac{\log\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}-\frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + b*Log[c*x^n]]^3/x,x]
```

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

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \cot^3(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\
&= -\frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}-\frac{\text{Subst}\left(\int \cot(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\
&= -\frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}-\frac{\log\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}
\end{aligned}$$

Mathematica [A] time = 0.22, size = 52, normalized size = 1.18

$$-\frac{2\log\left(\tan\left(a+b\log\left(cx^n\right)\right)\right)+2\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)+\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] -1/2*(Cot[a + b*Log[c*x^n]]^2 + 2*Log[Cos[a + b*Log[c*x^n]]] + 2*Log[Tan[a
+ b*Log[c*x^n]]])/(b*n)
```

fricas [A] time = 0.74, size = 70, normalized size = 1.59

$$-\frac{\left(\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)-1\right)\log\left(-\frac{1}{2}\,\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)+\frac{1}{2}\right)-2}{2\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)-bn\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [A] time = 0.01, size = 47, normalized size = 1.07

$$-\frac{\cot^2\left(a+b\ln\left(c\,x^n\right)\right)}{2bn}+\frac{\ln\left(\cot^2\left(a+b\ln\left(c\,x^n\right)\right)+1\right)}{2nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(c*x^n))^3/x,x)
```

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

maxima [B] time = 1.89, size = 1713, normalized size = 38.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(8*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 +
 8*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 - 4*((
cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*
log(x^n) + 2*a) + (cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*
b*log(c)))*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 4*cos(2*b*log
(c))*cos(2*b*log(x^n) + 2*a) + ((cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos
(4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*
log(x^n) + 2*a)^2 + (cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n
) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2
*a)^2 - 2*(2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log
(c)))*cos(2*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*
b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos(4*b*log(c)))*cos(4
*b*log(x^n) + 4*a) - 4*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + 2*(2*(cos(
2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(
x^n) + 2*a) - 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*
log(c)))*sin(2*b*log(x^n) + 2*a) - sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a)
 + 4*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)*log((cos(a)^2 + sin(a)^2)
*cos(b*log(c))^2 + (cos(a)^2 + sin(a)^2)*sin(b*log(c))^2 + 2*(cos(b*log(c))
*cos(a) - sin(b*log(c))*sin(a))*cos(b*log(x^n)) + cos(b*log(x^n))^2 - 2*(co
s(a)*sin(b*log(c)) + cos(b*log(c))*sin(a))*sin(b*log(x^n)) + sin(b*log(x^n)
)^2) + ((cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(4*b*log(x^n) + 4*a)^2 +
 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 + (cos
(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*
log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 - 2*(2*(cos(4*b*lo
g(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) +
 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)
))*sin(2*b*log(x^n) + 2*a) - cos(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 4*c
os(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + 2*(2*(cos(2*b*log(c))*sin(4*b*log(
c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 2*(cos(4*b
*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n
) + 2*a) - sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4*sin(2*b*log(c))*sin
(2*b*log(x^n) + 2*a) + 1)*log((cos(a)^2 + sin(a)^2)*cos(b*log(c))^2 + (cos(
a)^2 + sin(a)^2)*sin(b*log(c))^2 - 2*(cos(b*log(c))*cos(a) - sin(b*log(c))*
sin(a))*cos(b*log(x^n)) + cos(b*log(x^n))^2 + 2*(cos(a)*sin(b*log(c)) + cos
(b*log(c))*sin(a))*sin(b*log(x^n)) + sin(b*log(x^n))^2) + 4*((cos(2*b*log(c
))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*
a) - (cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*si
```

```
n(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a) + 4*sin(2*b*log(c))*sin(2*b*
log(x^n) + 2*a))/((b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log
(x^n) + 4*a)^2 - 4*b*n*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + 4*(b*cos(2
*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2*a)^2 + (b*cos(4*
b*log(c))^2 + b*sin(4*b*log(c))^2)*n*sin(4*b*log(x^n) + 4*a)^2 + 4*b*n*sin(
2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 4*(b*cos(2*b*log(c))^2 + b*sin(2*b*lo
g(c))^2)*n*sin(2*b*log(x^n) + 2*a)^2 + b*n + 2*(b*n*cos(4*b*log(c)) - 2*(b*
cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(
2*b*log(x^n) + 2*a) - 2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(
c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) + 2
*(2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))
*n*cos(2*b*log(x^n) + 2*a) - b*n*sin(4*b*log(c)) - 2*(b*cos(4*b*log(c))*cos
(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a)
)*sin(4*b*log(x^n) + 4*a))
```

mupad [B] time = 4.69, size = 106, normalized size = 2.41

$$\ln(x)\,1\mathrm{i}+\frac{2}{b\,n\,\left(1+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}-2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}\right)}+\frac{2}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}-\frac{\ln\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.224 $\int \frac{\cot^4(a+b\log(cx^n))}{x} dx$

Optimal. Leaf size=44

$$-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}+\log(x)$$

```
[Out] cot(a+b*ln(c*x^n))/b/n-1/3*cot(a+b*ln(c*x^n))^3/b/n+ln(x)
```

Rubi [A] time = 0.04, antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3473, 8}

$$-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}+\log(x)$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] Cot[a + b*Log[c*x^n]]/(b*n) - Cot[a + b*Log[c*x^n]]^3/(3*b*n) + Log[x]
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{\cot^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \cot^4(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= -\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\text{Subst}\left(\int \cot^2(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= \frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\text{Subst}\left(\int 1\,dx,x,\log\left(cx^n\right)\right)}{n}\\
&= \frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\log(x)
\end{aligned}$$

Mathematica [C] time = 0.11, size = 46, normalized size = 1.05

$$-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(-\frac{3}{2},1;-\frac{1}{2};-\tan^2\left(a+b\log\left(cx^n\right)\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] -1/3*(Cot[a + b*Log[c*x^n]]^3*Hypergeometric2F1[-3/2, 1, -1/2, -Tan[a + b*L
og[c*x^n]]^2])/(b*n)
```

fricas [B] time = 0.81, size = 132, normalized size = 3.00

$$\frac{4\,\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2+3\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)\log(x)-bn\log(x)\right)\sin\left(2\,bn\,\mathrm{l}\right.}{3\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)-bn\right)\sin\left(2\,bn\log(x)\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^4/x,x, algorithm="fricas")
```

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^4/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.01, size = 69, normalized size = 1.57

$$-\frac{\cot^3\left(a+b\ln\left(c\,x^n\right)\right)}{3bn}+\frac{\cot\left(a+b\ln\left(c\,x^n\right)\right)}{bn}-\frac{\pi}{2nb}+\frac{\mathrm{arccot}\left(\cot\left(a+b\ln\left(c\,x^n\right)\right)\right)}{nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(c*x^n))^4/x,x)
```

```
[Out] -1/3*cot(a+b*ln(c*x^n))^3/b/n+cot(a+b*ln(c*x^n))/b/n-1/2/n/b*Pi+1/n/b*arcco
t(cot(a+b*ln(c*x^n)))
```

maxima [B] time = 0.75, size = 2172, normalized size = 49.36

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^4/x,x, algorithm="maxima")
```

```
[Out] 1/3*(3*(b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a
)^2*log(x) + 27*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x
^n) + 4*a)^2*log(x) + 27*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*cos(
2*b*log(x^n) + 2*a)^2*log(x) + 3*(b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2
)*n*log(x)*sin(6*b*log(x^n) + 6*a)^2 + 27*(b*cos(4*b*log(c))^2 + b*sin(4*b*
log(c))^2)*n*log(x)*sin(4*b*log(x^n) + 4*a)^2 + 27*(b*cos(2*b*log(c))^2 + b
*sin(2*b*log(c))^2)*n*log(x)*sin(2*b*log(x^n) + 2*a)^2 + 3*b*n*log(x) - 2*(
3*b*n*cos(6*b*log(c))*log(x) + 3*(3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*
sin(6*b*log(c))*sin(4*b*log(c)))*n*log(x) - 2*cos(4*b*log(c))*sin(6*b*log(c
)) + 2*cos(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 3*(3*(b*c
os(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*log(x
) - 2*cos(2*b*log(c))*sin(6*b*log(c)) + 2*cos(6*b*log(c))*sin(2*b*log(c)))*
cos(2*b*log(x^n) + 2*a) + 3*(3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6
*b*log(c))*sin(4*b*log(c)))*n*log(x) + 2*cos(6*b*log(c))*cos(4*b*log(c)) +
2*sin(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 3*(3*(b*cos(2*
b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*log(x) + 2
*cos(6*b*log(c))*cos(2*b*log(c)) + 2*sin(6*b*log(c))*sin(2*b*log(c)))*sin(2
*b*log(x^n) + 2*a) - 4*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) + 6*(3*b*n*
cos(4*b*log(c))*log(x) - 9*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*l
og(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a)*log(x) - 9*(b*cos(2*b*log
(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*log(x)*sin(2*b*
log(x^n) + 2*a) - 2*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 6*(3*b*n*cos
(2*b*log(c))*log(x) - 2*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*(3*b*n
*log(x)*sin(6*b*log(c)) + 3*(3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6
*b*log(c))*sin(4*b*log(c)))*n*log(x) + 2*cos(6*b*log(c))*cos(4*b*log(c)) +
2*sin(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 3*(3*(b*cos(2*
b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*log(x) + 2
*cos(6*b*log(c))*cos(2*b*log(c)) + 2*sin(6*b*log(c))*sin(2*b*log(c)))*cos(2
*b*log(x^n) + 2*a) - 3*(3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*lo
g(c))*sin(4*b*log(c)))*n*log(x) - 2*cos(4*b*log(c))*sin(6*b*log(c)) + 2*cos
(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 3*(3*(b*cos(6*b*log
(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*log(x) - 2*cos(
2*b*log(c))*sin(6*b*log(c)) + 2*cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*lo
g(x^n) + 2*a) + 4*cos(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + 6*(9*(b*cos(2*
b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*lo
g(x^n) + 2*a)*log(x) - 3*b*n*log(x)*sin(4*b*log(c)) - 9*(b*cos(4*b*log(c))*
cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*log(x)*sin(2*b*log(x
```

```
^n) + 2*a) - 2*cos(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 6*(3*b*n*log(x)*s
in(2*b*log(c)) + 2*cos(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))/((b*cos(6*b*lo
g(c))^2 + b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*l
og(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 - 6*b*n*cos(2*b
*log(c))*cos(2*b*log(x^n) + 2*a) + 9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c
))^2)*n*cos(2*b*log(x^n) + 2*a)^2 + (b*cos(6*b*log(c))^2 + b*sin(6*b*log(c)
)^2)*n*sin(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c
))^2)*n*sin(4*b*log(x^n) + 4*a)^2 + 6*b*n*sin(2*b*log(c))*sin(2*b*log(x^n)
+ 2*a) + 9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) +
 2*a)^2 + b*n - 2*(b*n*cos(6*b*log(c)) + 3*(b*cos(6*b*log(c))*cos(4*b*log(c
)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) - 3*(b*co
s(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*
b*log(x^n) + 2*a) + 3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c)
)*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) - 3*(b*cos(2*b*log(c))*sin(6*b
*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*co
s(6*b*log(x^n) + 6*a) + 6*(b*n*cos(4*b*log(c)) - 3*(b*cos(4*b*log(c))*cos(2
*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) -
 3*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*
n*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) + 2*(3*(b*cos(4*b*log(c)
)*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) +
 4*a) - 3*(b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*lo
g(c)))*n*cos(2*b*log(x^n) + 2*a) + b*n*sin(6*b*log(c)) - 3*(b*cos(6*b*log(c
))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n)
+ 4*a) + 3*(b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*l
og(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) + 6*(3*(b*cos(2*
b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*lo
g(x^n) + 2*a) - b*n*sin(4*b*log(c)) - 3*(b*cos(4*b*log(c))*cos(2*b*log(c))
+ b*sin(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log
(x^n) + 4*a))
```

mupad [B] time = 8.10, size = 182, normalized size = 4.14

$$\ln(x)+\frac{\frac{4\mathrm{i}}{3\,b\,n}+\frac{\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}\,4\mathrm{i}}{3\,b\,n}}{3\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-3\,\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}+\mathrm{e}^{a\,6\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,6\mathrm{i}}-1}+\frac{4\mathrm{i}}{3\,b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}+\frac{\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}\,4}{3\,b\,n\,\left(1+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}-2\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(c*x^n))^4/x,x)
```

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

sympy [A] time = 8.05, size = 66, normalized size = 1.50

$$\begin{cases} \log(x)\cot^4(a) & \text{for } b = 0 \wedge (b = 0 \vee n = 0) \\ \log(x)\cot^4\left(a + b\log(c)\right) & \text{for } n = 0 \\ \log(x) - \frac{\cot^3\left(a+bn\log(x)+b\log(c)\right)}{3bn} + \frac{\cot\left(a+bn\log(x)+b\log(c)\right)}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*ln(c*x**n))**4/x,x)
```

```
[Out] Piecewise((log(x)*cot(a)**4, Eq(b, 0) & (Eq(b, 0) | Eq(n, 0))), (log(x)*cot
(a + b*log(c))**4, Eq(n, 0)), (log(x) - cot(a + b*n*log(x) + b*log(c))**3/(
3*b*n) + cot(a + b*n*log(x) + b*log(c))/(b*n), True))
```

3.225 $\int \frac{\cot^5(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=66

$$\frac{\log\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}-\frac{\cot^4\left(a+b\log\left(cx^n\right)\right)}{4bn}+\frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

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

Rubi [A] time = 0.05, antiderivative size = 66, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3473, 3475}

$$\frac{\log\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}-\frac{\cot^4\left(a+b\log\left(cx^n\right)\right)}{4bn}+\frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + b*Log[c*x^n]]^5/x,x]
```

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

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3475

```
Int[tan[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[Log[RemoveContent[Cos[c + d
*x], x]]/d, x] /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\cot^5\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\operatorname{Subst}\left(\int \cot^5(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{\cot^4\left(a+b\log\left(cx^n\right)\right)}{4bn} - \frac{\operatorname{Subst}\left(\int \cot^3(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn} - \frac{\cot^4\left(a+b\log\left(cx^n\right)\right)}{4bn} + \frac{\operatorname{Subst}\left(\int \cot(a+bx)\,dx, x, \log\left(c\right.\right.}{n}$$
$$= \frac{\cot^2\left(a+b\log\left(cx^n\right)\right)}{2bn} - \frac{\cot^4\left(a+b\log\left(cx^n\right)\right)}{4bn} + \frac{\log\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Mathematica [A] time = 0.22, size = 69, normalized size = 1.05

$$\frac{4\log\left(\tan\left(a+b\log\left(cx^n\right)\right)\right)+4\log\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)-\cot^4\left(a+b\log\left(cx^n\right)\right)+2\cot^2\left(a+b\log\left(cx^n\right)\right)}{4bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + b*Log[c*x^n]]^5/x,x]
```

```
[Out] (2*Cot[a + b*Log[c*x^n]]^2 - Cot[a + b*Log[c*x^n]]^4 + 4*Log[Cos[a + b*Log[
c*x^n]]] + 4*Log[Tan[a + b*Log[c*x^n]]])/(4*b*n)
```

fricas [B] time = 1.31, size = 129, normalized size = 1.95

$$\frac{\left(\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2-2\,\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)+1\right)\log\left(-\frac{1}{2}\,\cos\left(2\,bn\log(x)+2\,b\right.\right.}{2\left(bn\cos\left(2\,bn\log(x)+2\,b\log(c)+2\,a\right)^2-2\,bn\cos\left(2\,bn\log(x)+2\,b\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^5/x,x, algorithm="fricas")
```

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^5/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.01, size = 68, normalized size = 1.03

$$-\frac{\cot^{4}\left(a+b\ln\left(c\,x^{n}\right)\right)}{4bn}+\frac{\cot^{2}\left(a+b\ln\left(c\,x^{n}\right)\right)}{2bn}-\frac{\ln\left(\cot^{2}\left(a+b\ln\left(c\,x^{n}\right)\right)+1\right)}{2nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(c*x^n))^5/x,x)
```

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

maxima [B] time = 0.58, size = 5998, normalized size = 90.88

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^5/x,x, algorithm="maxima")
```

```
[Out] 1/2*(32*(cos(6*b*log(c))^2 + sin(6*b*log(c))^2)*cos(6*b*log(x^n) + 6*a)^2 +
 48*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(4*b*log(x^n) + 4*a)^2 + 32*
(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 + 32*(cos
(6*b*log(c))^2 + sin(6*b*log(c))^2)*sin(6*b*log(x^n) + 6*a)^2 + 48*(cos(4*b
*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n) + 4*a)^2 + 32*(cos(2*b*log
(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 - 8*((cos(8*b*log(c))
*cos(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a)
 - (cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)))*cos(
4*b*log(x^n) + 4*a) + (cos(8*b*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))*si
n(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + (cos(6*b*log(c))*sin(8*b*log(c)) -
 cos(8*b*log(c))*sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - (cos(4*b*log(c)
)*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a
) + (cos(2*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)))*sin
(2*b*log(x^n) + 2*a))*cos(8*b*log(x^n) + 8*a) - 8*(10*(cos(6*b*log(c))*cos(
4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 8*
(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*cos(2*b
*log(x^n) + 2*a) + 10*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*si
n(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 8*(cos(2*b*log(c))*sin(6*b*log(c))
 - cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos(6*b*log(c
)))*cos(6*b*log(x^n) + 6*a) - 8*(10*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(
4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 10*(cos(2*b*log(c))*
sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a)
- cos(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 8*cos(2*b*log(c))*cos(2*b*log(
```

```
x^n) + 2*a) + ((cos(8*b*log(c))^2 + sin(8*b*log(c))^2)*cos(8*b*log(x^n) + 8
*a)^2 + 16*(cos(6*b*log(c))^2 + sin(6*b*log(c))^2)*cos(6*b*log(x^n) + 6*a)^
2 + 36*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(4*b*log(x^n) + 4*a)^2 +
16*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 + (cos
(8*b*log(c))^2 + sin(8*b*log(c))^2)*sin(8*b*log(x^n) + 8*a)^2 + 16*(cos(6*b
*log(c))^2 + sin(6*b*log(c))^2)*sin(6*b*log(x^n) + 6*a)^2 + 36*(cos(4*b*log
(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n) + 4*a)^2 + 16*(cos(2*b*log(c))
^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 - 2*(4*(cos(8*b*log(c))*c
os(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) -
 6*(cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)))*cos(
4*b*log(x^n) + 4*a) + 4*(cos(8*b*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))*
sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 4*(cos(6*b*log(c))*sin(8*b*log(c
)) - cos(8*b*log(c))*sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - 6*(cos(4*b*
log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n)
 + 4*a) + 4*(cos(2*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(
c)))*sin(2*b*log(x^n) + 2*a) - cos(8*b*log(c)))*cos(8*b*log(x^n) + 8*a) - 8
*(6*(cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*cos
(4*b*log(x^n) + 4*a) - 4*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))
*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 6*(cos(4*b*log(c))*sin(6*b*log(
c)) - cos(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 4*(cos(2*b
*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n
) + 2*a) + cos(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) - 12*(4*(cos(4*b*log(c)
)*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a
) + 4*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*s
in(2*b*log(x^n) + 2*a) - cos(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 8*cos(2
*b*log(c))*cos(2*b*log(x^n) + 2*a) + 2*(4*(cos(6*b*log(c))*sin(8*b*log(c))
 - cos(8*b*log(c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) - 6*(cos(4*b*log
(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) +
4*a) + 4*(cos(2*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c))
)*cos(2*b*log(x^n) + 2*a) - 4*(cos(8*b*log(c))*cos(6*b*log(c)) + sin(8*b*lo
g(c))*sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + 6*(cos(8*b*log(c))*cos(4*b
*log(c)) + sin(8*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 4*(co
s(8*b*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))*sin(2*b*log(c)))*sin(2*b*lo
g(x^n) + 2*a) - sin(8*b*log(c)))*sin(8*b*log(x^n) + 8*a) + 8*(6*(cos(4*b*lo
g(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) +
 4*a) - 4*(cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)
))*cos(2*b*log(x^n) + 2*a) - 6*(cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*l
og(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4*(cos(6*b*log(c))*cos(2*
b*log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(
6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + 12*(4*(cos(2*b*log(c))*sin(4*b*log(c
)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 4*(cos(4*b*
log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n)
 + 2*a) - sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 8*sin(2*b*log(c))*sin(
2*b*log(x^n) + 2*a) + 1)*log((cos(a)^2 + sin(a)^2)*cos(b*log(c))^2 + (cos(a
)^2 + sin(a)^2)*sin(b*log(c))^2 + 2*(cos(b*log(c))*cos(a) - sin(b*log(c))*s
```

```
in(a))*cos(b*log(x^n)) + cos(b*log(x^n))^2 - 2*(cos(a)*sin(b*log(c)) + cos(
b*log(c))*sin(a))*sin(b*log(x^n)) + sin(b*log(x^n))^2) + ((cos(8*b*log(c))^
2 + sin(8*b*log(c))^2)*cos(8*b*log(x^n) + 8*a)^2 + 16*(cos(6*b*log(c))^2 +
sin(6*b*log(c))^2)*cos(6*b*log(x^n) + 6*a)^2 + 36*(cos(4*b*log(c))^2 + sin(
4*b*log(c))^2)*cos(4*b*log(x^n) + 4*a)^2 + 16*(cos(2*b*log(c))^2 + sin(2*b*
log(c))^2)*cos(2*b*log(x^n) + 2*a)^2 + (cos(8*b*log(c))^2 + sin(8*b*log(c))
^2)*sin(8*b*log(x^n) + 8*a)^2 + 16*(cos(6*b*log(c))^2 + sin(6*b*log(c))^2)*
sin(6*b*log(x^n) + 6*a)^2 + 36*(cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(
4*b*log(x^n) + 4*a)^2 + 16*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*
log(x^n) + 2*a)^2 - 2*(4*(cos(8*b*log(c))*cos(6*b*log(c)) + sin(8*b*log(c))
*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) - 6*(cos(8*b*log(c))*cos(4*b*log(
c)) + sin(8*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 4*(cos(8*b
*log(c))*cos(2*b*log(c)) + sin(8*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n
) + 2*a) + 4*(cos(6*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(6*b*log
(c)))*sin(6*b*log(x^n) + 6*a) - 6*(cos(4*b*log(c))*sin(8*b*log(c)) - cos(8*
b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4*(cos(2*b*log(c))*sin
(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - c
os(8*b*log(c)))*cos(8*b*log(x^n) + 8*a) - 8*(6*(cos(6*b*log(c))*cos(4*b*log
(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 4*(cos(6*
b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^
n) + 2*a) + 6*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*lo
g(c)))*sin(4*b*log(x^n) + 4*a) - 4*(cos(2*b*log(c))*sin(6*b*log(c)) - cos(6
*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos(6*b*log(c)))*cos(
6*b*log(x^n) + 6*a) - 12*(4*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(
c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 4*(cos(2*b*log(c))*sin(4*b*l
og(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos(4*b
*log(c)))*cos(4*b*log(x^n) + 4*a) - 8*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*
a) + 2*(4*(cos(6*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(6*b*log(c)
))*cos(6*b*log(x^n) + 6*a) - 6*(cos(4*b*log(c))*sin(8*b*log(c)) - cos(8*b*l
og(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 4*(cos(2*b*log(c))*sin(8*
b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 4*(c
os(8*b*log(c))*cos(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)))*sin(6*b*l
og(x^n) + 6*a) + 6*(cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log(c))*sin(4
*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 4*(cos(8*b*log(c))*cos(2*b*log(c)) +
sin(8*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(8*b*log(c)))
*sin(8*b*log(x^n) + 8*a) + 8*(6*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*
log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 4*(cos(2*b*log(c))*sin(6
*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 6*(
cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*
log(x^n) + 4*a) + 4*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(
2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(6*b*log(c)))*sin(6*b*log(x^n) +
6*a) + 12*(4*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log
(c)))*cos(2*b*log(x^n) + 2*a) - 4*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*
b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(4*b*log(c)))*sin(4
*b*log(x^n) + 4*a) + 8*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)*log((co
```

```
s(a)^2 + sin(a)^2)*cos(b*log(c))^2 + (cos(a)^2 + sin(a)^2)*sin(b*log(c))^2
- 2*(cos(b*log(c))*cos(a) - sin(b*log(c))*sin(a))*cos(b*log(x^n)) + cos(b*l
og(x^n))^2 + 2*(cos(a)*sin(b*log(c)) + cos(b*log(c))*sin(a))*sin(b*log(x^n)
) + sin(b*log(x^n))^2) + 8*((cos(6*b*log(c))*sin(8*b*log(c)) - cos(8*b*log(
c))*sin(6*b*log(c)))*cos(6*b*log(x^n) + 6*a) - (cos(4*b*log(c))*sin(8*b*log
(c)) - cos(8*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + (cos(2*b*
log(c))*sin(8*b*log(c)) - cos(8*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n)
 + 2*a) - (cos(8*b*log(c))*cos(6*b*log(c)) + sin(8*b*log(c))*sin(6*b*log(c)
))*sin(6*b*log(x^n) + 6*a) + (cos(8*b*log(c))*cos(4*b*log(c)) + sin(8*b*log
(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) - (cos(8*b*log(c))*cos(2*b*lo
g(c)) + sin(8*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*sin(8*b*l
og(x^n) + 8*a) + 8*(10*(cos(4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*s
in(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) - 8*(cos(2*b*log(c))*sin(6*b*log(c)
) - cos(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 10*(cos(6*b*
log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n)
 + 4*a) + 8*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c))*sin(2*b*log(
c)))*sin(2*b*log(x^n) + 2*a) + sin(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + 8
*(10*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*co
s(2*b*log(x^n) + 2*a) - 10*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c
))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(4*b*log(c)))*sin(4*b*log(
x^n) + 4*a) + 8*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/((b*cos(8*b*log(c)
)^2 + b*sin(8*b*log(c))^2)*n*cos(8*b*log(x^n) + 8*a)^2 + 16*(b*cos(6*b*log(
c))^2 + b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a)^2 + 36*(b*cos(4*b*lo
g(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 - 8*b*n*cos(2*b*
log(c))*cos(2*b*log(x^n) + 2*a) + 16*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c
))^2)*n*cos(2*b*log(x^n) + 2*a)^2 + (b*cos(8*b*log(c))^2 + b*sin(8*b*log(c)
)^2)*n*sin(8*b*log(x^n) + 8*a)^2 + 16*(b*cos(6*b*log(c))^2 + b*sin(6*b*log(
c))^2)*n*sin(6*b*log(x^n) + 6*a)^2 + 36*(b*cos(4*b*log(c))^2 + b*sin(4*b*lo
g(c))^2)*n*sin(4*b*log(x^n) + 4*a)^2 + 8*b*n*sin(2*b*log(c))*sin(2*b*log(x^
n) + 2*a) + 16*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^
n) + 2*a)^2 + b*n + 2*(b*n*cos(8*b*log(c)) - 4*(b*cos(8*b*log(c))*cos(6*b*l
og(c)) + b*sin(8*b*log(c))*sin(6*b*log(c)))*n*cos(6*b*log(x^n) + 6*a) + 6*(
b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*b*log(c))*sin(4*b*log(c)))*n*co
s(4*b*log(x^n) + 4*a) - 4*(b*cos(8*b*log(c))*cos(2*b*log(c)) + b*sin(8*b*lo
g(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - 4*(b*cos(6*b*log(c))*sin
(8*b*log(c)) - b*cos(8*b*log(c))*sin(6*b*log(c)))*n*sin(6*b*log(x^n) + 6*a)
 + 6*(b*cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c))
)*n*sin(4*b*log(x^n) + 4*a) - 4*(b*cos(2*b*log(c))*sin(8*b*log(c)) - b*cos(
8*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(8*b*log(x^n) +
8*a) - 8*(b*n*cos(6*b*log(c)) + 6*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*si
n(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) - 4*(b*cos(6*b*log
(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n
) + 2*a) + 6*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b
*log(c)))*n*sin(4*b*log(x^n) + 4*a) - 4*(b*cos(2*b*log(c))*sin(6*b*log(c))
- b*cos(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(6*b*log
```

```
(x^n) + 6*a) + 12*(b*n*cos(4*b*log(c)) - 4*(b*cos(4*b*log(c))*cos(2*b*log(c
)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - 4*(b*co
s(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*
b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) + 2*(4*(b*cos(6*b*log(c))*sin(8*
b*log(c)) - b*cos(8*b*log(c))*sin(6*b*log(c)))*n*cos(6*b*log(x^n) + 6*a) -
6*(b*cos(4*b*log(c))*sin(8*b*log(c)) - b*cos(8*b*log(c))*sin(4*b*log(c)))*n
*cos(4*b*log(x^n) + 4*a) + 4*(b*cos(2*b*log(c))*sin(8*b*log(c)) - b*cos(8*b
*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - b*n*sin(8*b*log(c)) -
 4*(b*cos(8*b*log(c))*cos(6*b*log(c)) + b*sin(8*b*log(c))*sin(6*b*log(c)))*
n*sin(6*b*log(x^n) + 6*a) + 6*(b*cos(8*b*log(c))*cos(4*b*log(c)) + b*sin(8*
b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) - 4*(b*cos(8*b*log(c))
*cos(2*b*log(c)) + b*sin(8*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) +
2*a))*sin(8*b*log(x^n) + 8*a) + 8*(6*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b
*cos(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) - 4*(b*cos(2*b*
log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(
x^n) + 2*a) + b*n*sin(6*b*log(c)) - 6*(b*cos(6*b*log(c))*cos(4*b*log(c)) +
b*sin(6*b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) + 4*(b*cos(6*b
*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log
(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) + 12*(4*(b*cos(2*b*log(c))*sin(4*b*lo
g(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - b*n*
sin(4*b*log(c)) - 4*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*
sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a))
```

mupad [B] time = 6.60, size = 246, normalized size = 3.73

$$-\ln(x)\,1\mathrm{i}-\frac{8}{b\,n\,\left(1+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}-2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}\right)}-\frac{4}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}-\frac{}{b\,n\,\left(1+6\,\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}-4\,\mathrm{e}^{a\,6\mathrm{i}}\,(c\,x^n\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(c*x^n))^5/x,x)
```

```
[Out] log(exp(a*2i)*(c*x^n)^(b*2i) - 1)/(b*n) - 8/(b*n*(exp(a*4i)*(c*x^n)^(b*4i)
- 2*exp(a*2i)*(c*x^n)^(b*2i) + 1)) - 4/(b*n*(exp(a*2i)*(c*x^n)^(b*2i) - 1))
 - 4/(b*n*(6*exp(a*4i)*(c*x^n)^(b*4i) - 4*exp(a*2i)*(c*x^n)^(b*2i) - 4*exp(
a*6i)*(c*x^n)^(b*6i) + exp(a*8i)*(c*x^n)^(b*8i) + 1)) - log(x)*1i - 8/(b*n*
(3*exp(a*2i)*(c*x^n)^(b*2i) - 3*exp(a*4i)*(c*x^n)^(b*4i) + exp(a*6i)*(c*x^n
)^(b*6i) - 1))
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*ln(c*x**n))**5/x,x)
```

```
[Out] Timed out
```

3.226 $\int (ex)^m \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) dx$

Optimal. Leaf size=100

$$\frac{i(ex)^{m+1}}{e(m+1)}-\frac{2i(ex)^{m+1}\,{}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(m+1)}$$

```
[Out] I*(e*x)^(1+m)/e/(1+m)-2*I*(e*x)^(1+m)*hypergeom([1, -1/2*I*(1+m)/b/d/n],[1-
1/2*I*(1+m)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/e/(1+m)
```

Rubi [F] time = 0.05, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Cot[d*(a + b*Log[c*x^n])], x]
```

Rubi steps

$$\int (ex)^m \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) dx=\int (ex)^m \cot \left(d \left(a+b \log \left(c x^n\right)\right)\right) dx$$

Mathematica [A] time = 13.67, size = 182, normalized size = 1.82

$$-\frac{ix(ex)^m\left(\frac{(m+1)e^{2iad}\left(cx^n\right)^{2ibd}\,{}_2F_1\left(1,-\frac{i(m+2ibdn+1)}{2bdn};-\frac{i(m+4ibdn+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{2ibdn+m+1}+{}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};e^{2id\left(a+b\log\left(cx^n\right)\right)}\right)\right)}{m+1}$$

Antiderivative was successfully verified.

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

```
[Out] ((-I)*x*(e*x)^m*(Hypergeometric2F1[1, ((-1/2*I)*(1 + m))/(b*d*n), 1 - ((I/2
)*(1 + m))/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] + (E^((2*I)*a*d)*(1 + m
)*(c*x^n)^((2*I)*b*d)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m + (2*I)*b*d*n))
/(b*d*n), ((-1/2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n), E^((2*I)*a*d)*(c*x^n)^(
(2*I)*b*d)])/(1 + m + (2*I)*b*d*n)))/(1 + m)
```

fricas [F] time = 0.42, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m\cot\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 1.88, size = 0, normalized size = 0.00

$$\int (ex)^m\cot\left(d\left(a+b\ln\left(c\,x^n\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(d*(a+b*ln(c*x^n))),x)
[Out] int((e*x)^m*cot(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)\,\left(e\,x\right)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot \left(ad + bd \log (cx^n)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((e*x)**m*cot(a*d + b*d*log(c*x**n)), x)
```

3.227 $\int (ex)^m \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=195

$$-\frac{2i(ex)^{m+1}\,{}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bden}+\frac{i(ex)^{m+1}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{bden\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)}+\frac{(ex)^{m+1}(-bdn+i(m+1))}{bde(m+1)n}$$

```
[Out] (I*(1+m)-b*d*n)*(e*x)^(1+m)/b/d/e/(1+m)/n+I*(e*x)^(1+m)*(1+exp(2*I*a*d)*(c*
x^n)^(2*I*b*d))/b/d/e/n/(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))-2*I*(e*x)^(1+m)*
hypergeom([1, -1/2*I*(1+m)/b/d/n],[1-1/2*I*(1+m)/b/d/n],exp(2*I*a*d)*(c*x^n
)^(2*I*b*d))/b/d/e/n
```

Rubi [F] time = 0.08, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Cot[d*(a + b*Log[c*x^n])]^2, x]
```

Rubi steps

$$\int (ex)^m \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \cot^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [B] time = 16.57, size = 547, normalized size = 2.81

$$-\frac{(m+1)x^{-m}(ex)^m\csc\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)\left(\frac{x^{m+1}\sin(bdn\log(x))\csc\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{m+1}-\frac{i\sin\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(\right.\right.\right.}{}\right.}{}$$

Antiderivative was successfully verified.

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

```
[Out] -((x*(e*x)^m)/(1 + m)) + (x*(e*x)^m*Csc[d*(a + b*(-(n*Log[x]) + Log[c*x^n])
)]*Csc[b*d*n*Log[x] + d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Sin[b*d*n*Log[x
```

```
]])/(b*d*n) - ((1 + m)*(e*x)^m*Csc[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*((
x^(1 + m)*Csc[d*(a + b*Log[c*x^n])]*Sin[b*d*n*Log[x]])/(1 + m) - (I*(I*E^((
a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b
*n))*(1 + m + (2*I)*b*d*n)*Cot[d*(a + b*Log[c*x^n])] - E^((a + 2*a*m + b*(1
 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 + m + (2
*I)*b*d*n)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m))/(b*d*n), 1 - ((I/2)*(1 +
 m))/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] - E^((a*(1 + 2*m + (2*I)*b*d*
n))/(b*n) + (1 + m + (2*I)*b*d*n)*Log[x] + ((1 + 2*m + (2*I)*b*d*n)*(-(n*Lo
g[x]) + Log[c*x^n]))/n)*(1 + m)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m + (2*
I)*b*d*n))/(b*d*n), ((-1/2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n), E^((2*I)*d*(a
 + b*Log[c*x^n]))])*Sin[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))])/(E^(((1 + 2*
m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*(1 + m + (2*I)*b*d*n)
)))/(b*d*n*x^m)
```

fricas [F] time = 1.16, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m \cot\left(bd\log\left(cx^n\right) + ad\right)^2, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

maple [F] time = 0.45, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\cot^2\left(d\left(a + b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(d*(a+b*ln(c*x^n)))^2,x)
[Out] int((e*x)^m*cot(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^2\,\left(e\,x\right)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \cot^2\left(ad+bd\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*cot(d*(a+b*ln(c*x**n)))**2,x)
[Out] Integral((e*x)**m*cot(a*d + b*d*log(c*x**n))**2, x)
```

3.228 $\int (ex)^m \cot^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=350

$$-\frac{i(ex)^{m+1}\left(-2b^2d^2n^2+m^2+2m+1\right){}_2F_1\left(1,-\frac{i(m+1)}{2bdn};1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{b^2d^2e(m+1)n^2}+\frac{ie^{-2iad}(ex)^{m+1}\left(\frac{e^{4iad}(2ibdn+m+1)(cx}{n}\right.}{2b^2d^2en\left(1-e^{2iad}\right.}$$

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

Rubi [F] time = 0.07, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

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

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Cot[d*(a + b*Log[c*x^n])]^3, x]
```

Rubi steps

$$\int (ex)^m \cot^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \cot^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 16.98, size = 639, normalized size = 1.83

$$x^{-m}(ex)^m\left(2b^2d^2n^2-m^2-2m-1\right)\csc\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)\left(\frac{x^{m+1}\sin(bdn\log(x))\csc\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{m+1}-\frac{i\sin}{\ }\right.$$

Warning: Unable to verify antiderivative.

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

```
[Out] -((x*(e*x)^m*Cot[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))])/(1 + m)) - (x*(e*x)
^m*Csc[b*d*n*Log[x] + d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]^2)/(2*b*d*n) +
((1 + m)*x*(e*x)^m*Csc[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Csc[b*d*n*Log[
x] + d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Sin[b*d*n*Log[x]])/(2*b^2*d^2*n^
2) + ((-1 - 2*m - m^2 + 2*b^2*d^2*n^2)*(e*x)^m*Csc[d*(a + b*(-(n*Log[x]) +
Log[c*x^n]))]*((x^(1 + m)*Csc[d*(a + b*Log[c*x^n])]*Sin[b*d*n*Log[x]])/(1 +
 m) - (I*(I*E^((a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) +
 Log[c*x^n]))/(b*n))*(1 + m + (2*I)*b*d*n)*Cot[d*(a + b*Log[c*x^n])] - E^((
a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b
*n))*(1 + m + (2*I)*b*d*n)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m))/(b*d*n),
 1 - ((I/2)*(1 + m))/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))] - E^((a*(1 +
2*m + (2*I)*b*d*n))/(b*n) + (1 + m + (2*I)*b*d*n)*Log[x] + ((1 + 2*m + (2*I
)*b*d*n)*(-(n*Log[x]) + Log[c*x^n]))/n)*(1 + m)*Hypergeometric2F1[1, ((-1/2
*I)*(1 + m + (2*I)*b*d*n))/(b*d*n), ((-1/2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n
), E^((2*I)*d*(a + b*Log[c*x^n]))])*Sin[d*(a + b*(-(n*Log[x]) + Log[c*x^n])
)])/(E^(((1 + 2*m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*(1 +
m + (2*I)*b*d*n))))/(2*b^2*d^2*n^2*x^m)
```

fricas [F] time = 1.08, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m \cot\left(bd\log\left(cx^n\right) + ad\right)^3, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((e*x)^m*cot(b*d*log(c*x^n) + a*d)^3, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

maple [F] time = 0.49, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\cot^3\left(d\left(a + b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int((e*x)^m*cot(d*(a+b*ln(c*x^n)))^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (4*(b*d*cos(2*b*d*log(c))^2 + b*d*sin(2*b*d*log(c))^2)*e^m*n*x*x^m*cos(2*b*
d*log(x^n) + 2*a*d)^2 + 4*(b*d*cos(2*b*d*log(c))^2 + b*d*sin(2*b*d*log(c))^
2)*e^m*n*x*x^m*sin(2*b*d*log(x^n) + 2*a*d)^2 - (2*b*d*e^m*n*cos(2*b*d*log(c
)) - e^m*m*sin(2*b*d*log(c)) - e^m*sin(2*b*d*log(c)))*x*x^m*cos(2*b*d*log(x
^n) + 2*a*d) + (2*b*d*e^m*n*sin(2*b*d*log(c)) + e^m*m*cos(2*b*d*log(c)) + e
^m*cos(2*b*d*log(c)))*x*x^m*sin(2*b*d*log(x^n) + 2*a*d) + (((cos(2*b*d*log(
c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m - 2*(b*d
*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b*d*sin(4*b*d*log(c))*sin(2*b*d*log(
c)))*e^m*n + (cos(2*b*d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*sin(2
*b*d*log(c)))*e^m)*x*x^m*cos(2*b*d*log(x^n) + 2*a*d) - ((cos(4*b*d*log(c))*
cos(2*b*d*log(c)) + sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + 2*(b*d*cos
(2*b*d*log(c))*sin(4*b*d*log(c)) - b*d*cos(4*b*d*log(c))*sin(2*b*d*log(c)))
*e^m*n + (cos(4*b*d*log(c))*cos(2*b*d*log(c)) + sin(4*b*d*log(c))*sin(2*b*d
*log(c)))*e^m)*x*x^m*sin(2*b*d*log(x^n) + 2*a*d) - (e^m*m*sin(4*b*d*log(c))
 + e^m*sin(4*b*d*log(c)))*x*x^m)*cos(4*b*d*log(x^n) + 4*a*d) - 2*(2*b^6*d^6
*e^m*n^6 - (b^4*d^4*e^m*m^2 + 2*b^4*d^4*e^m*m + b^4*d^4*e^m)*n^4 + (2*(b^6*
d^6*cos(4*b*d*log(c))^2 + b^6*d^6*sin(4*b*d*log(c))^2)*e^m*n^6 - ((b^4*d^4*
cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos
(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(4*b*d*
log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m)*n^4)*cos(4*b*d*log(x^n) + 4*a
*d)^2 + 4*(2*(b^6*d^6*cos(2*b*d*log(c))^2 + b^6*d^6*sin(2*b*d*log(c))^2)*e^
m*n^6 - ((b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m^
2 + 2*(b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m + (
b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m)*n^4)*cos(2*
b*d*log(x^n) + 2*a*d)^2 + (2*(b^6*d^6*cos(4*b*d*log(c))^2 + b^6*d^6*sin(4*b
*d*log(c))^2)*e^m*n^6 - ((b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*l
og(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(
c))^2)*e^m*m + (b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*
e^m)*n^4)*sin(4*b*d*log(x^n) + 4*a*d)^2 + 4*(2*(b^6*d^6*cos(2*b*d*log(c))^2
 + b^6*d^6*sin(2*b*d*log(c))^2)*e^m*n^6 - ((b^4*d^4*cos(2*b*d*log(c))^2 + b
^4*d^4*sin(2*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))^2 + b^4*
d^4*sin(2*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin
(2*b*d*log(c))^2)*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d)^2 + 2*(2*b^6*d^6*e^
m*n^6*cos(4*b*d*log(c)) - (b^4*d^4*e^m*m^2*cos(4*b*d*log(c)) + 2*b^4*d^4*e^
m*m*cos(4*b*d*log(c)) + b^4*d^4*e^m*cos(4*b*d*log(c)))*n^4 - 2*(2*(b^6*d^6*
cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^6*d^6*sin(4*b*d*log(c))*sin(2*b*d*l
```

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og(c)))*e^m*n^6 - ((b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*s
in(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))*
cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b
^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(
2*b*d*log(c)))*e^m)*n^4)*cos(2*b*d*log(x^n) + 2*a*d) - 2*(2*(b^6*d^6*cos(2*
b*d*log(c))*sin(4*b*d*log(c)) - b^6*d^6*cos(4*b*d*log(c))*sin(2*b*d*log(c))
)*e^m*n^6 - ((b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b
*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))*sin(4*
b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4
*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*
log(c)))*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d))*cos(4*b*d*log(x^n) + 4*a*d)
 - 4*(2*b^6*d^6*e^m*n^6*cos(2*b*d*log(c)) - (b^4*d^4*e^m*m^2*cos(2*b*d*log(
c)) + 2*b^4*d^4*e^m*m*cos(2*b*d*log(c)) + b^4*d^4*e^m*cos(2*b*d*log(c)))*n^
4)*cos(2*b*d*log(x^n) + 2*a*d) - 2*(2*b^6*d^6*e^m*n^6*sin(4*b*d*log(c)) - (
b^4*d^4*e^m*m^2*sin(4*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(4*b*d*log(c)) + b^4
*d^4*e^m*sin(4*b*d*log(c)))*n^4 - 2*(2*(b^6*d^6*cos(2*b*d*log(c))*sin(4*b*d
*log(c)) - b^6*d^6*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 - ((b^4*d^4
*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*
log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4
*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(2*b*d*log(c))*si
n(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*co
s(2*b*d*log(x^n) + 2*a*d) + 2*(2*(b^6*d^6*cos(4*b*d*log(c))*cos(2*b*d*log(c
)) + b^6*d^6*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 - ((b^4*d^4*cos(4
*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)
))*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4
*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(4*b*d*log(c))*cos(2*b*
d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*sin(2*b*
d*log(x^n) + 2*a*d))*sin(4*b*d*log(x^n) + 4*a*d) + 4*(2*b^6*d^6*e^m*n^6*sin
(2*b*d*log(c)) - (b^4*d^4*e^m*m^2*sin(2*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(2
*b*d*log(c)) + b^4*d^4*e^m*sin(2*b*d*log(c)))*n^4)*sin(2*b*d*log(x^n) + 2*a
*d))*integrate(1/4*(x^m*cos(b*d*log(x^n) + a*d)*sin(b*d*log(c)) + x^m*cos(b
*d*log(c))*sin(b*d*log(x^n) + a*d))/(2*b^4*d^4*n^4*cos(b*d*log(c))*cos(b*d*
log(x^n) + a*d) - 2*b^4*d^4*n^4*sin(b*d*log(c))*sin(b*d*log(x^n) + a*d) + b
^4*d^4*n^4 + (b^4*d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*log(c))^2)*n^4*co
s(b*d*log(x^n) + a*d)^2 + (b^4*d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*log(
c))^2)*n^4*sin(b*d*log(x^n) + a*d)^2), x) + 2*(2*b^6*d^6*e^m*n^6 - (b^4*d^4
*e^m*m^2 + 2*b^4*d^4*e^m*m + b^4*d^4*e^m)*n^4 + (2*(b^6*d^6*cos(4*b*d*log(c
))^2 + b^6*d^6*sin(4*b*d*log(c))^2)*e^m*n^6 - ((b^4*d^4*cos(4*b*d*log(c))^2
 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))^2 +
b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4
*sin(4*b*d*log(c))^2)*e^m)*n^4)*cos(4*b*d*log(x^n) + 4*a*d)^2 + 4*(2*(b^6*d
^6*cos(2*b*d*log(c))^2 + b^6*d^6*sin(2*b*d*log(c))^2)*e^m*n^6 - ((b^4*d^4*c
os(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(
2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(2*b*d*l
og(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m)*n^4)*cos(2*b*d*log(x^n) + 2*a*
```

```
d)^2 + (2*(b^6*d^6*cos(4*b*d*log(c))^2 + b^6*d^6*sin(4*b*d*log(c))^2)*e^m*n
^6 - ((b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m^2 +
 2*(b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m + (b^4
*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m)*n^4)*sin(4*b*d
*log(x^n) + 4*a*d)^2 + 4*(2*(b^6*d^6*cos(2*b*d*log(c))^2 + b^6*d^6*sin(2*b*
d*log(c))^2)*e^m*n^6 - ((b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*lo
g(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c
))^2)*e^m*m + (b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e
^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d)^2 + 2*(2*b^6*d^6*e^m*n^6*cos(4*b*d*log
(c)) - (b^4*d^4*e^m*m^2*cos(4*b*d*log(c)) + 2*b^4*d^4*e^m*m*cos(4*b*d*log(c
)) + b^4*d^4*e^m*cos(4*b*d*log(c)))*n^4 - 2*(2*(b^6*d^6*cos(4*b*d*log(c))*c
os(2*b*d*log(c)) + b^6*d^6*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 - (
(b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*si
n(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) +
 b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(4*b*d*lo
g(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)
*n^4)*cos(2*b*d*log(x^n) + 2*a*d) - 2*(2*(b^6*d^6*cos(2*b*d*log(c))*sin(4*b
*d*log(c)) - b^6*d^6*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 - ((b^4*d
^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*
d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d
^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(2*b*d*log(c))*
sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*
sin(2*b*d*log(x^n) + 2*a*d))*cos(4*b*d*log(x^n) + 4*a*d) - 4*(2*b^6*d^6*e^m
*n^6*cos(2*b*d*log(c)) - (b^4*d^4*e^m*m^2*cos(2*b*d*log(c)) + 2*b^4*d^4*e^m
*m*cos(2*b*d*log(c)) + b^4*d^4*e^m*cos(2*b*d*log(c)))*n^4)*cos(2*b*d*log(x^
n) + 2*a*d) - 2*(2*b^6*d^6*e^m*n^6*sin(4*b*d*log(c)) - (b^4*d^4*e^m*m^2*sin
(4*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(4*b*d*log(c)) + b^4*d^4*e^m*sin(4*b*d*
log(c)))*n^4 - 2*(2*(b^6*d^6*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^6*d^6*
cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 - ((b^4*d^4*cos(2*b*d*log(c))*
sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 +
2*(b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*
sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b
^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*cos(2*b*d*log(x^n) +
2*a*d) + 2*(2*(b^6*d^6*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^6*d^6*sin(4*
b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 - ((b^4*d^4*cos(4*b*d*log(c))*cos(2*
b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4
*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*
b*d*log(c)))*e^m*m + (b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4
*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d)
)*sin(4*b*d*log(x^n) + 4*a*d) + 4*(2*b^6*d^6*e^m*n^6*sin(2*b*d*log(c)) - (b
^4*d^4*e^m*m^2*sin(2*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(2*b*d*log(c)) + b^4*
d^4*e^m*sin(2*b*d*log(c)))*n^4)*sin(2*b*d*log(x^n) + 2*a*d))*integrate(-1/4
*(x^m*cos(b*d*log(x^n) + a*d)*sin(b*d*log(c)) + x^m*cos(b*d*log(c))*sin(b*d
*log(x^n) + a*d))/(2*b^4*d^4*n^4*cos(b*d*log(c))*cos(b*d*log(x^n) + a*d) -
2*b^4*d^4*n^4*sin(b*d*log(c))*sin(b*d*log(x^n) + a*d) - b^4*d^4*n^4 - (b^4*
```

```
d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*log(c))^2)*n^4*cos(b*d*log(x^n) + a
*d)^2 - (b^4*d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*log(c))^2)*n^4*sin(b*d
*log(x^n) + a*d)^2), x) + (((cos(4*b*d*log(c))*cos(2*b*d*log(c)) + sin(4*b*
d*log(c))*sin(2*b*d*log(c)))*e^m*m + 2*(b*d*cos(2*b*d*log(c))*sin(4*b*d*log
(c)) - b*d*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n + (cos(4*b*d*log(c))*
cos(2*b*d*log(c)) + sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*x*x^m*cos(2*b
*d*log(x^n) + 2*a*d) + ((cos(2*b*d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*lo
g(c))*sin(2*b*d*log(c)))*e^m*m - 2*(b*d*cos(4*b*d*log(c))*cos(2*b*d*log(c))
 + b*d*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n + (cos(2*b*d*log(c))*sin(
4*b*d*log(c)) - cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*x*x^m*sin(2*b*d*l
og(x^n) + 2*a*d) - (e^m*m*cos(4*b*d*log(c)) + e^m*cos(4*b*d*log(c)))*x*x^m)
*sin(4*b*d*log(x^n) + 4*a*d))/(4*b^2*d^2*n^2*cos(2*b*d*log(c))*cos(2*b*d*lo
g(x^n) + 2*a*d) - 4*b^2*d^2*n^2*sin(2*b*d*log(c))*sin(2*b*d*log(x^n) + 2*a*
d) - b^2*d^2*n^2 - (b^2*d^2*cos(4*b*d*log(c))^2 + b^2*d^2*sin(4*b*d*log(c))
^2)*n^2*cos(4*b*d*log(x^n) + 4*a*d)^2 - 4*(b^2*d^2*cos(2*b*d*log(c))^2 + b^
2*d^2*sin(2*b*d*log(c))^2)*n^2*cos(2*b*d*log(x^n) + 2*a*d)^2 - (b^2*d^2*cos
(4*b*d*log(c))^2 + b^2*d^2*sin(4*b*d*log(c))^2)*n^2*sin(4*b*d*log(x^n) + 4*
a*d)^2 - 4*(b^2*d^2*cos(2*b*d*log(c))^2 + b^2*d^2*sin(2*b*d*log(c))^2)*n^2*
sin(2*b*d*log(x^n) + 2*a*d)^2 - 2*(b^2*d^2*n^2*cos(4*b*d*log(c)) - 2*(b^2*d
^2*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^2*d^2*sin(4*b*d*log(c))*sin(2*b*
d*log(c)))*n^2*cos(2*b*d*log(x^n) + 2*a*d) - 2*(b^2*d^2*cos(2*b*d*log(c))*s
in(4*b*d*log(c)) - b^2*d^2*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*n^2*sin(2*b
*d*log(x^n) + 2*a*d))*cos(4*b*d*log(x^n) + 4*a*d) + 2*(b^2*d^2*n^2*sin(4*b*
d*log(c)) - 2*(b^2*d^2*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^2*d^2*cos(4*
b*d*log(c))*sin(2*b*d*log(c)))*n^2*cos(2*b*d*log(x^n) + 2*a*d) + 2*(b^2*d^2
*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^2*d^2*sin(4*b*d*log(c))*sin(2*b*d*
log(c)))*n^2*sin(2*b*d*log(x^n) + 2*a*d))*sin(4*b*d*log(x^n) + 4*a*d))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \cot\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^3\,{\left(e\,x\right)}^m \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \left(ex\right)^{m} \cot^{3}{\left(ad + bd \log{\left(cx^{n} \right)} \right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((e*x)**m*cot(a*d + b*d*log(c*x**n))**3, x)
```

3.229 $\int \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=190

$$x\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\left(-\frac{i\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{1-e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p F_1\left(-\frac{i}{2bdn};p,-p;1-\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},-$$

```
[Out] x*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p*(-I*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d
))/(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d)))^p*AppellF1(-1/2*I/b/d/n,p,-p,1-1/2*I
/b/d/n,exp(2*I*a*d)*(c*x^n)^(2*I*b*d),-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/((1+
exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p)
```

Rubi [F] time = 0.02, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][Cot[d*(a + b*Log[c*x^n])]^p, x]
```

Rubi steps

$$\int \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [B] time = 1.29, size = 458, normalized size = 2.41

$$\frac{x(2bdn-i)\left(\frac{i\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{-1+e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p F_1\left(-\frac{i}{2bdn}\right.}{2bdnpe^{2iad}\left(cx^n\right)^{2ibd}F_1\left(1-\frac{i}{2bdn};p,1-p;2-\frac{i}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},-e^{2iad}\left(cx^n\right)^{2ibd}\right)+2bdnpe^{2iad}\left(cx^n\right)^{2ibd}F_1\left(1-\frac{i}{2bd}\right.}$$

Warning: Unable to verify antiderivative.

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

```
[Out] ((-I + 2*b*d*n)*x*((I*(1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))/(-1 + E^((2*
I)*a*d)*(c*x^n)^((2*I)*b*d)))^p*AppellF1[(-1/2*I)/(b*d*n), p, -p, 1 - (I/2)
```

```
/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)
*b*d))])/(2*b*d*E^((2*I)*a*d)*n*p*(c*x^n)^((2*I)*b*d)*AppellF1[1 - (I/2)/(b
*d*n), p, 1 - p, 2 - (I/2)/(b*d*n), E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d), -(E^
((2*I)*a*d)*(c*x^n)^((2*I)*b*d))] + 2*b*d*E^((2*I)*a*d)*n*p*(c*x^n)^((2*I)*
b*d)*AppellF1[1 - (I/2)/(b*d*n), 1 + p, -p, 2 - (I/2)/(b*d*n), E^((2*I)*a*d
)*(c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))] + (-I + 2*b*d*
n)*AppellF1[(-1/2*I)/(b*d*n), p, -p, 1 - (I/2)/(b*d*n), E^((2*I)*a*d)*(c*x^
n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))])
```

fricas [F] time = 1.78, size = 0, normalized size = 0.00

$$\text{integral}\left(\cot\left(bd\log\left(cx^{n}\right)+ad\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*log(c*x^n)))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.12, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(d*(a+b*ln(c*x^n)))^p,x)
[Out] int(cot(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cot((b*log(c*x^n) + a)*d)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \cot\left(d\ \left(a+b\ \ln\left(c\,x^n\right)\right)\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \cot^{p}\left(d\left(a+b\log\left(cx^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(d*(a+b*ln(c*x**n)))**p,x)
[Out] Integral(cot(d*(a + b*log(c*x**n)))**p, x)
```

3.230 $\int (ex)^m \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=210

$$\frac{(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\left(-\frac{i\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{1-e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p F_1\left(-\frac{i(m+1)}{2bdn};p,-p;1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right.}{e(m+1)}$$

```
[Out] (e*x)^(1+m)*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p*(-I*(1+exp(2*I*a*d)*(c*x^n
)^(2*I*b*d))/(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d)))^p*AppellF1(-1/2*I*(1+m)/b/
d/n,p,-p,1-1/2*I*(1+m)/b/d/n,exp(2*I*a*d)*(c*x^n)^(2*I*b*d),-exp(2*I*a*d)*(
c*x^n)^(2*I*b*d))/e/(1+m)/((1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p)
```

Rubi [F] time = 0.10, antiderivative size = 0, normalized size of antiderivative = 0.00, number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int (ex)^m \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Verification is Not applicable to the result.

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

```
[Out] Defer[Int][(e*x)^m*Cot[d*(a + b*Log[c*x^n])]^p, x]
```

Rubi steps

$$\int (ex)^m \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx=\int (ex)^m \cot^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$$

Mathematica [A] time = 1.11, size = 205, normalized size = 0.98

$$\frac{x(ex)^m\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^{-p}\left(\frac{i\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)}{-1+e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p F_1\left(-\frac{i(m+1)}{2bdn};p,-p;1-\frac{i(m+1)}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd},-\right.}{m+1}$$

Antiderivative was successfully verified.

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

```
[Out] (x*(e*x)^m*(1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p*((I*(1 + E^((2*I)*a*d)
*(c*x^n)^((2*I)*b*d)))/(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))^p*AppellF1
```

```
[((-1/2*I)*(1 + m))/(b*d*n), p, -p, 1 - ((I/2)*(1 + m))/(b*d*n), E^((2*I)*a
*d)*(c*x^n)^((2*I)*b*d), -(E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))])/((1 + m)*(1
 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p)
```

fricas [F] time = 1.06, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^{m}\cot\left(bd\log\left(cx^{n}\right)+ad\right)^{p},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*cot(d*(a+b*log(c*x^n)))^p,x, algorithm="giac")
[Out] Timed out
```

maple [F] time = 0.10, size = 0, normalized size = 0.00

$$\int(ex)^{m}\left(\cot^{p}\left(d\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*cot(d*(a+b*ln(c*x^n)))^p,x)
[Out] int((e*x)^m*cot(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int(ex)^{m}\cot\left(\left(b\log\left(cx^{n}\right)+a\right)d\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int\cot\left(d\,\left(a+b\,\ln\left(c\,x^{n}\right)\right)\right)^{p}\,(e\,x)^{m}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] int(cot(d*(a + b*log(c*x^n)))^p*(e*x)^m, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

3.231 $\int \frac{\cot^{\frac{5}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=201

$$-\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}\,bn}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)\right.}{}$$

```
[Out] -2/3*cot(a+b*ln(c*x^n))^(3/2)/b/n+1/2*arctan(-1+2^(1/2)*cot(a+b*ln(c*x^n))^
(1/2))/b/n*2^(1/2)+1/2*arctan(1+2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/
2)+1/4*ln(1+cot(a+b*ln(c*x^n))-2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2
)-1/4*ln(1+cot(a+b*ln(c*x^n))+2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)
```

Rubi [A] time = 0.14, antiderivative size = 201, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3473, 3476, 329, 297, 1162, 617, 204, 1165, 628}

$$-\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}\,bn}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] -(ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n)) + ArcTan[1
 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - (2*Cot[a + b*Log[c*
x^n]]^(3/2))/(3*b*n) + Log[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a
+ b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) - Log[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n
]]] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 297

```
Int[(x_)^2/((a_) + (b_.)*(x_)^4), x_Symbol] :> With[{r = Numerator[Rt[a/b,
2]], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*s), Int[(r + s*x^2)/(a + b*x^4
), x], x] - Dist[1/(2*s), Int[(r - s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a,
 b}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &
& AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
```

```
IntegerQ[n]
```

Rubi steps

$$\int \frac{\cot^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \cot^{\frac{5}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} - \frac{\text{Subst}\left(\int \sqrt{\cot(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\text{Subst}\left(\int \frac{\sqrt{x}}{1+x^2}\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$
$$= -\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{2\,\text{Subst}\left(\int \frac{x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$
$$= -\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} - \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} + \frac{\text{Subst}}{}$$
$$= -\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} + \text{Su}$$
$$= -\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\log\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+\cot\left(a+b\log(c\right.\right.}{2\sqrt{2}\,bn}$$
$$= -\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} + \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.25, size = 50, normalized size = 0.25

$$\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\left({}_2F_1\left(\frac{3}{4},1;\frac{7}{4};-\cot^2\left(a+b\log\left(cx^n\right)\right)\right)-1\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (2*Cot[a + b*Log[c*x^n]]^(3/2)*(-1 + Hypergeometric2F1[3/4, 1, 7/4, -Cot[a
+ b*Log[c*x^n]]^2]))/(3*b*n)
```

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(cot(a+b*log(c*x^n))^(5/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^(5/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.06, size = 161, normalized size = 0.80

$$-\frac{2\left(\cot^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{3bn}+\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\cot}\,\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right)\sqrt{2}}{2bn}+\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\cot}\,\left(a+b\ln\left(c\right.\right.\right.\right.}{2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(c*x^n))^(5/2)/x,x)
```

```
[Out] -2/3*cot(a+b*ln(c*x^n))^(3/2)/b/n+1/2*arctan(1+2^(1/2)*cot(a+b*ln(c*x^n))^(
1/2))/b/n*2^(1/2)+1/2*arctan(-1+2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/
2)+1/4/b/n*2^(1/2)*ln((1+cot(a+b*ln(c*x^n))-2^(1/2)*cot(a+b*ln(c*x^n))^(1/2
))/(1+cot(a+b*ln(c*x^n))+2^(1/2)*cot(a+b*ln(c*x^n))^(1/2)))
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\cot\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^(5/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(cot(b*log(c*x^n) + a)^(5/2)/x, x)
```

mupad [B] time = 3.39, size = 79, normalized size = 0.39

$$\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}-\frac{2\cot\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}}{3\,b\,n}-\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(c*x^n))^(5/2)/x,x)
```

```
[Out] ((-1)^(1/4)*atan((-1)^(1/4)*cot(a + b*log(c*x^n))^(1/2)))/(b*n) - (2*cot(a
+ b*log(c*x^n))^(3/2))/(3*b*n) - ((-1)^(1/4)*atanh((-1)^(1/4)*cot(a + b*log
(c*x^n))^(1/2)))/(b*n)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*ln(c*x**n))**(5/2)/x,x)
```

```
[Out] Timed out
```

3.232 $\int \frac{\cot^{\frac{3}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=199

$$-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}+\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(\right.\right.}\right.}{2\sqrt{2}bn}$$

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

Rubi [A] time = 0.13, antiderivative size = 199, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3473, 3476, 329, 211, 1165, 628, 1162, 617, 204}

$$-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}+\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(\right.\right.}\right.}{2\sqrt{2}bn}$$

Antiderivative was successfully verified.

```
[In] Int[Cot[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] -(ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n)) + ArcTan[1
 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - (2*Sqrt[Cot[a + b*L
og[c*x^n]]])/(b*n) - Log[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a +
b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) + Log[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]
] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^4)^(-1), x_Symbol] :> With[{r = Numerator[Rt[a/b, 2]
], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*r), Int[(r - s*x^2)/(a + b*x^4),
 x], x] + Dist[1/(2*r), Int[(r + s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a, b
}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &&
AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3473

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*(b*Tan[c + d
*x])^(n - 1))/(d*(n - 1)), x] - Dist[b^2, Int[(b*Tan[c + d*x])^(n - 2), x],
 x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
```

```
IntegerQ[n]
```

Rubi steps

$$\int \frac{\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \cot^{\frac{3}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\cot(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{bn} + \frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}\left(1+x^2\right)}\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= -\frac{2\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{bn} + \frac{2\,\text{Subst}\left(\int \frac{1}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= -\frac{2\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{bn} + \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} + \frac{\text{Sub}}{}$$

$$= -\frac{2\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{bn} + \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} +$$

$$= -\frac{2\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\log\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+\cot\left(a+b\log\right.\right.}{2\sqrt{2}\,bn}$$

$$= -\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} + \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right.}{\sqrt{2}\,bn}$$

Mathematica [A] time = 0.28, size = 175, normalized size = 0.88

$$-\frac{\sqrt{2}\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)-\sqrt{2}\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a\right.}\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[Cot[a + b*Log[c*x^n]]^(3/2)/x,x]

[Out] -1/4*(2*Sqrt[2]*ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]] - 2*Sqrt[2]
*ArcTan[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]] + 8*Sqrt[Cot[a + b*Log[c*x
^n]]] + Sqrt[2]*Log[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a + b*Log
```

```
[c*x^n]]] - Sqrt[2]*Log[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a + b
*Log[c*x^n]]]])/(b*n)
```

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(cot(a+b*log(c*x^n))^(3/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^(3/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.04, size = 161, normalized size = 0.81

$$-\frac{2\left(\sqrt{\cot}\,\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{bn}+\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\cot}\,\left(a+b\ln\left(c\,x^{n}\right)\right)\right)\right)\sqrt{2}}{2bn}+\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\cot}\,\left(a+b\ln\left(c\,x\right.\right.\right.\right.}{2bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(c*x^n))^(3/2)/x,x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(cot(b*log(c*x^n) + a)^(3/2)/x, x)
```

mupad [B] time = 3.32, size = 80, normalized size = 0.40

$$-\frac{2\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}}{b\,n}-\frac{{\left(-1\right)}^{1/4}\,\mathrm{atan}\left({\left(-1\right)}^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)\,1{}\mathrm{i}}{b\,n}-\frac{{\left(-1\right)}^{1/4}\,\mathrm{atanh}\left({\left(-1\right)}^{1/4}\,\sqrt{\cot\left(a+b\,\ln\right.}\right.}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(c*x^n))^(3/2)/x,x)
```

```
[Out] - (2*cot(a + b*log(c*x^n))^(1/2))/(b*n) - ((-1)^(1/4)*atan((-1)^(1/4)*cot(a
 + b*log(c*x^n))^(1/2))*1i)/(b*n) - ((-1)^(1/4)*atanh((-1)^(1/4)*cot(a + b*
log(c*x^n))^(1/2))*1i)/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\cot^{\frac{3}{2}}{\left(a + b \log{\left(c x^{n} \right)} \right)}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*ln(c*x**n))**(3/2)/x,x)
```

```
[Out] Integral(cot(a + b*log(c*x**n))**(3/2)/x, x)
```

3.233 $\int \frac{\sqrt{\cot(a+b\log(cx^n))}}{x}\,dx$

Optimal. Leaf size=176

$$-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}+\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(c\right.\right.}\right.}{2\sqrt{2}bn}$$

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

Rubi [A] time = 0.12, antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.421$, Rules used = {3476, 329, 297, 1162, 617, 204, 1165, 628}

$$-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}+\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(c\right.\right.}\right.}{2\sqrt{2}bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Cot[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - ArcTan[1 +
Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - Log[1 - Sqrt[2]*Sqrt[C
ot[a + b*Log[c*x^n]]] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) + Log[1 + Sq
rt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 297

```
Int[(x_)^2/((a_) + (b_.)*(x_)^4), x_Symbol] :> With[{r = Numerator[Rt[a/b,
2]], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*s), Int[(r + s*x^2)/(a + b*x^4
), x], x] - Dist[1/(2*s), Int[(r - s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a,
 b}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &
& AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$\int \frac{\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx = \frac{\text{Subst}\left(\int \sqrt{\cot(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{\text{Subst}\left(\int \frac{\sqrt{x}}{1+x^2}\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= -\frac{2\,\text{Subst}\left(\int \frac{x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} - \frac{\text{Subst}\left(\int \frac{1+x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\,l\right.}\right.}{bn}$$

$$= -\frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}\,x+x^2}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} - \frac{\text{Subst}\left(\int \frac{1}{1+\sqrt{2}\,x+x^2}\,dx, x, \sqrt{\right.}{2bn}$$

$$= -\frac{\log\left(1-\sqrt{2}\,\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+\cot\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} + \frac{\log\left(1+\sqrt{2}\,\sqrt{\text{co}\right.}{}$$

$$= \frac{\tan^{-1}\left(1-\sqrt{2}\,\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} - \frac{\tan^{-1}\left(1+\sqrt{2}\,\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.10, size = 48, normalized size = 0.27

$$-\frac{2\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{3}{4},1;\frac{7}{4};-\cot^2\left(a+b\log\left(cx^n\right)\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Cot[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (-2*Cot[a + b*Log[c*x^n]]^(3/2)*Hypergeometric2F1[3/4, 1, 7/4, -Cot[a + b*L
og[c*x^n]]^2])/(3*b*n)
```

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(cot(a+b*log(c*x^n))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >> Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*log(c*x^n))^(1/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.04, size = 140, normalized size = 0.80

$$-\frac{\sqrt{2}\,\ln\left(\frac{1+\cot(a+b\ln(c\,x^{n}))-\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^{n}))\right)}{1+\cot(a+b\ln(c\,x^{n}))+\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^{n}))\right)}\right)}{4bn}-\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^{n}))\right)\right)\sqrt{2}}{2bn}-\frac{\arctan\left(-1+\sqrt{2}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a+b*ln(c*x^n))^(1/2)/x,x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\cot\left(b\log\left(cx^{n}\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(cot(b*log(c*x^n) + a))/x, x)
```

mupad [B] time = 2.62, size = 58, normalized size = 0.33

$$\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)}{b\,n}-\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(cot(a + b*log(c*x^n))^(1/2)/x,x)
```

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\cot\left(a + b\log\left(cx^{n}\right)\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(cot(a+b*ln(c*x**n))**(1/2)/x,x)
```

```
[Out] Integral(sqrt(cot(a + b*log(c*x**n)))/x, x)
```

3.234 $\int \frac{1}{x\sqrt{\cot(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=176

$$\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right.}\right.}{2\sqrt{2}bn}$$

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

Rubi [A] time = 0.13, antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.421, Rules used = {3476, 329, 211, 1165, 628, 1162, 617, 204}

$$\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right.}\right.}{2\sqrt{2}bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Cot[a + b*Log[c*x^n]]]),x]
```

```
[Out] ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) - ArcTan[1 +
Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) + Log[1 - Sqrt[2]*Sqrt[C
ot[a + b*Log[c*x^n]]] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) - Log[1 + Sq
rt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^4)^(-1), x_Symbol] :> With[{r = Numerator[Rt[a/b, 2]
], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*r), Int[(r - s*x^2)/(a + b*x^4),
 x], x] + Dist[1/(2*r), Int[(r + s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a, b
}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &&
AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$\int \frac{1}{x\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\cot(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}\left(1+x^2\right)}\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= -\frac{2\,\text{Subst}\left(\int \frac{1}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= -\frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} - \frac{\text{Subst}\left(\int \frac{1+x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a\right.}\right.}{bn}$$

$$= -\frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} - \frac{\text{Subst}\left(\int \frac{1}{1+\sqrt{2}x+x^2}\,dx, x,\right.}{2b}$$

$$= \frac{\log\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+\cot\left(a+b\log\left(cx^n\right)\right)\right)}{2\sqrt{2}\,bn} - \frac{\log\left(1+\sqrt{2}\sqrt{c\right.}}{}$$

$$= \frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} - \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right.}{\sqrt{2}\,bn}$$

Mathematica [A] time = 0.14, size = 142, normalized size = 0.81

$$\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)-\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(c\right.\right.}\right.}{2\sqrt{2}\,bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Cot[a + b*Log[c*x^n]]]),x]
```

```
[Out] (2*ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]] - 2*ArcTan[1 + Sqrt[2]*S
qrt[Cot[a + b*Log[c*x^n]]]] + Log[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] +
 Cot[a + b*Log[c*x^n]]] - Log[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot
[a + b*Log[c*x^n]]])/(2*Sqrt[2]*b*n)
```

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/cot(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.04, size = 140, normalized size = 0.80

$$-\frac{\sqrt{2}\ \ln\left(\frac{1+\cot(a+b\ln(c\,x^{n}))+\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^{n}))\right)}{1+\cot(a+b\ln(c\,x^{n}))-\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^{n}))\right)}\right)}{4bn}-\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^{n}))\right)\right)\sqrt{2}}{2bn}-\frac{\arctan\left(-1+\sqrt{2}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/cot(a+b*ln(c*x^n))^(1/2),x)
```

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

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\cot\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/(x*sqrt(cot(b*log(c*x^n) + a))), x)
```

mupad [B] time = 2.94, size = 57, normalized size = 0.32

$$\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)\,1\mathrm{i}}{b\,n}+\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)\,1\mathrm{i}}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cot(a + b*log(c*x^n))^(1/2)),x)
```

```
[Out] ((-1)^(1/4)*atan((-1)^(1/4)*cot(a + b*log(c*x^n))^(1/2))*1i)/(b*n) + ((-1)^
(1/4)*atanh((-1)^(1/4)*cot(a + b*log(c*x^n))^(1/2))*1i)/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\cot\left(a+b\log\left(cx^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(cot(a + b*log(c*x**n)))), x)
```

3.235 $\int \frac{1}{x\cot^{\frac{3}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=199

$$\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right.\right.\right.}}{2\sqrt{2}bn}$$

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

Rubi [A] time = 0.13, antiderivative size = 199, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3474, 3476, 329, 297, 1162, 617, 204, 1165, 628}

$$\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}bn}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right.\right.\right.}}{2\sqrt{2}bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Cot[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] -(ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n)) + ArcTan[1
 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) + 2/(b*n*Sqrt[Cot[a +
 b*Log[c*x^n]]]) + Log[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a + b*
Log[c*x^n]]]/(2*Sqrt[2]*b*n) - Log[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]
+ Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 297

```
Int[(x_)^2/((a_) + (b_.)*(x_)^4), x_Symbol] :> With[{r = Numerator[Rt[a/b,
2]], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*s), Int[(r + s*x^2)/(a + b*x^4
), x], x] - Dist[1/(2*s), Int[(r - s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a,
 b}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &
```

```
& AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3474

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*Tan[c + d*x]
)^(n + 1)/(b*d*(n + 1)), x] - Dist[1/b^2, Int[(b*Tan[c + d*x])^(n + 2), x],
 x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] &&  !
IntegerQ[n]
```

Rubi steps

$$\int \frac{1}{x\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\cot^{\frac{3}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \sqrt{\cot(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}} + \frac{\text{Subst}\left(\int \frac{\sqrt{x}}{1+x^2}\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= \frac{2}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}} + \frac{2\,\text{Subst}\left(\int \frac{x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= \frac{2}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}} - \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} + \frac{\text{Subs}}{}$$

$$= \frac{2}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}} + \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn} +$$

$$= \frac{2}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}} + \frac{\log\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+\cot\left(a+b\log\right.\right.}{2\sqrt{2}\,bn}$$

$$= -\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} + \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right.}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.14, size = 46, normalized size = 0.23

$$\frac{2\,{}_2F_1\left(-\frac{1}{4},1;\frac{3}{4};-\cot^2\left(a+b\log\left(cx^n\right)\right)\right)}{bn\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Cot[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (2*Hypergeometric2F1[-1/4, 1, 3/4, -Cot[a + b*Log[c*x^n]]^2])/(b*n*Sqrt[Cot
[a + b*Log[c*x^n]]])
```

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/cot(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >> Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.04, size = 161, normalized size = 0.81

$$\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\cot}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\sqrt{2}}{2bn}+\frac{\arctan\left(-1+\sqrt{2}\,\left(\sqrt{\cot}\,\left(a+b\ln\left(c\,x^n\right)\right)\right)\right)\sqrt{2}}{2bn}+\frac{\sqrt{2}\,\ln\left(\frac{1+\cot(a+}{1+\cot(a+}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/cot(a+b*ln(c*x^n))^(3/2),x)
```

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

```
n(c*x^n))-2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/(1+cot(a+b*ln(c*x^n))+2^(1/2)*c
ot(a+b*ln(c*x^n))^(1/2)))+2/b/n/cot(a+b*ln(c*x^n))^(1/2)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cot\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*cot(b*log(c*x^n) + a)^(3/2)), x)
```

mupad [B] time = 2.95, size = 79, normalized size = 0.40

$$\frac{2}{b\,n\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}}+\frac{(-1)^{1/4}\,\mathrm{atan}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}{b\,n}-\frac{(-1)^{1/4}\,\mathrm{atanh}\left((-1)^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x\right.\right.}\right.}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cot(a + b*log(c*x^n))^(3/2)),x)
```

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

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(1/(x*cot(a + b*log(c*x**n))**(3/2)), x)
```

3.236 $\int \frac{1}{x\cot^{\frac{5}{2}}\left(a+b\log(cx^n)\right)}\,dx$

Optimal. Leaf size=201

$$\frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}\,bn}+\frac{\log\left(\cot\left(a+b\log\left(cx\right.\right.\right.}{}$$

```
[Out] 2/3/b/n/cot(a+b*ln(c*x^n))^(3/2)+1/2*arctan(-1+2^(1/2)*cot(a+b*ln(c*x^n))^(
1/2))/b/n*2^(1/2)+1/2*arctan(1+2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2
)-1/4*ln(1+cot(a+b*ln(c*x^n))-2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)
+1/4*ln(1+cot(a+b*ln(c*x^n))+2^(1/2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)
```

Rubi [A] time = 0.13, antiderivative size = 201, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.474, Rules used = {3474, 3476, 329, 211, 1165, 628, 1162, 617, 204}

$$\frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}-\frac{\log\left(\cot\left(a+b\log\left(cx^n\right)\right)-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+1\right)}{2\sqrt{2}\,bn}+\frac{\log\left(\cot\left(a+b\log\left(cx\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Cot[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] -(ArcTan[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n)) + ArcTan[1
 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]]]/(Sqrt[2]*b*n) + 2/(3*b*n*Cot[a + b*
Log[c*x^n]]^(3/2)) - Log[1 - Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]] + Cot[a +
b*Log[c*x^n]]]/(2*Sqrt[2]*b*n) + Log[1 + Sqrt[2]*Sqrt[Cot[a + b*Log[c*x^n]]
] + Cot[a + b*Log[c*x^n]]]/(2*Sqrt[2]*b*n)
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 211

```
Int[((a_) + (b_.)*(x_)^4)^(-1), x_Symbol] :> With[{r = Numerator[Rt[a/b, 2]
], s = Denominator[Rt[a/b, 2]]}, Dist[1/(2*r), Int[(r - s*x^2)/(a + b*x^4),
 x], x] + Dist[1/(2*r), Int[(r + s*x^2)/(a + b*x^4), x], x]] /; FreeQ[{a, b
}, x] && (GtQ[a/b, 0] || (PosQ[a/b] && AtomQ[SplitProduct[SumBaseQ, a]] &&
```

```
AtomQ[SplitProduct[SumBaseQ, b]]))
```

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 617

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = 1 - 4*S
implify[(a*c)/b^2]}, Dist[-2/b, Subst[Int[1/(q - x^2), x], x, 1 + (2*c*x)/b
], x] /; RationalQ[q] && (EqQ[q^2, 1] ||  !RationalQ[b^2 - 4*a*c])] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 1162

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(2*d)/e, 2]}, Dist[e/(2*c), Int[1/Simp[d/e + q*x + x^2, x], x], x] + Dist[e
/(2*c), Int[1/Simp[d/e - q*x + x^2, x], x], x]] /; FreeQ[{a, c, d, e}, x] &
& EqQ[c*d^2 - a*e^2, 0] && PosQ[d*e]
```

Rule 1165

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[
(-2*d)/e, 2]}, Dist[e/(2*c*q), Int[(q - 2*x)/Simp[d/e + q*x - x^2, x], x],
x] + Dist[e/(2*c*q), Int[(q + 2*x)/Simp[d/e - q*x - x^2, x], x], x]] /; Fre
eQ[{a, c, d, e}, x] && EqQ[c*d^2 - a*e^2, 0] && NegQ[d*e]
```

Rule 3474

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Simp[(b*Tan[c + d*x]
)^(n + 1)/(b*d*(n + 1)), x] - Dist[1/b^2, Int[(b*Tan[c + d*x])^(n + 2), x],
 x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1]
```

Rule 3476

```
Int[((b_.)*tan[(c_.) + (d_.)*(x_)])^(n_), x_Symbol] :> Dist[b/d, Subst[Int[
x^n/(b^2 + x^2), x], x, b*Tan[c + d*x]], x] /; FreeQ[{b, c, d, n}, x] && !
IntegerQ[n]
```

Rubi steps

$$\int \frac{1}{x\cot^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\cot^{\frac{5}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\cot(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} + \frac{\text{Subst}\left(\int \frac{1}{\sqrt{x}\left(1+x^2\right)}\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

$$= \frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} + \frac{2\,\text{Subst}\left(\int \frac{1}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn}$$

$$= \frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} + \frac{\text{Subst}\left(\int \frac{1-x^2}{1+x^4}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{bn} + \frac{\text{Su}}{}$$

$$= \frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} + \frac{\text{Subst}\left(\int \frac{1}{1-\sqrt{2}x+x^2}\,dx, x, \sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn}$$

$$= \frac{2}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)} - \frac{\log\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}+\cot\left(a+b\log\right.\right.}{2\sqrt{2}\,bn}$$

$$= -\frac{\tan^{-1}\left(1-\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right)\right)}\right)}{\sqrt{2}\,bn} + \frac{\tan^{-1}\left(1+\sqrt{2}\sqrt{\cot\left(a+b\log\left(cx^n\right.\right.}\right.}{\sqrt{2}\,bn}$$

Mathematica [C] time = 0.20, size = 48, normalized size = 0.24

$$\frac{2\,{}_2F_1\left(-\frac{3}{4},1;\frac{1}{4};-\cot^2\left(a+b\log\left(cx^n\right)\right)\right)}{3bn\cot^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Cot[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (2*Hypergeometric2F1[-3/4, 1, 1/4, -Cot[a + b*Log[c*x^n]]^2])/(3*b*n*Cot[a
+ b*Log[c*x^n]]^(3/2))
```

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/cot(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   catde
f: division by zero
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.04, size = 161, normalized size = 0.80

$$\frac{\sqrt{2}\,\ln\left(\frac{1+\cot(a+b\ln(c\,x^n))+\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^n))\right)}{1+\cot(a+b\ln(c\,x^n))-\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^n))\right)}\right)}{4bn}+\frac{\arctan\left(1+\sqrt{2}\,\left(\sqrt{\cot}\,(a+b\ln(c\,x^n))\right)\right)\sqrt{2}}{2bn}+\frac{\arctan\left(-1+\sqrt{2}\,\left(\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/cot(a+b*ln(c*x^n))^(5/2),x)
```

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

```
2)*cot(a+b*ln(c*x^n))^(1/2))/b/n*2^(1/2)+1/2*arctan(-1+2^(1/2)*cot(a+b*ln(c
*x^n))^(1/2))/b/n*2^(1/2)+2/3/b/n/cot(a+b*ln(c*x^n))^(3/2)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\cot\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*cot(b*log(c*x^n) + a)^(5/2)), x)
```

mupad [B] time = 4.13, size = 80, normalized size = 0.40

$$\frac{2}{3\,b\,n\,\cot\left(a+b\,\ln\left(c\,x^n\right)\right)^{3/2}}-\frac{{\left(-1\right)}^{1/4}\,\mathrm{atan}\left({\left(-1\right)}^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)\,1{}\mathrm{i}}{b\,n}-\frac{{\left(-1\right)}^{1/4}\,\mathrm{atanh}\left({\left(-1\right)}^{1/4}\,\sqrt{\cot\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)\,1{}\mathrm{i}}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cot(a + b*log(c*x^n))^(5/2)),x)
```

```
[Out] 2/(3*b*n*cot(a + b*log(c*x^n))^(3/2)) - ((-1)^(1/4)*atan((-1)^(1/4)*cot(a +
 b*log(c*x^n))^(1/2))*1i)/(b*n) - ((-1)^(1/4)*atanh((-1)^(1/4)*cot(a + b*lo
g(c*x^n))^(1/2))*1i)/(b*n)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/cot(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.237 $\int x^2 \sec\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=87

$$\frac{2e^{ia}x^3\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{3i}{bn}\right);\frac{3}{2}\left(1-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3+ibn}$$

```
[Out] 2*exp(I*a)*x^3*(c*x^n)^(I*b)*hypergeom([1, 1/2-3/2*I/b/n],[3/2-3/2*I/b/n],-
exp(2*I*a)*(c*x^n)^(2*I*b))/(3+I*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$\frac{2e^{ia}x^3\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{3i}{bn}\right);\frac{3}{2}\left(1-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3+ibn}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sec[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x^3*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - (3*I)/(b*n))/2, (3*(
1 - I/(b*n)))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(3 + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \sec\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^3 \left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}}\sec(a+b\log(x))\,dx, x, cx^n\right)}{n}$$
$$= \frac{\left(2e^{ia}x^3 \left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int \frac{x^{-1+ib+\frac{3}{n}}}{1+e^{2ia}x^{2ib}}\,dx, x, cx^n\right)}{n}$$
$$= \frac{2e^{ia}x^3\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{3i}{bn}\right);\frac{3}{2}\left(1-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3+ibn}$$

Mathematica [A] time = 0.16, size = 86, normalized size = 0.99

$$-\frac{2ie^{ia}x^3\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{3i}{2bn};\frac{3}{2}-\frac{3i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{bn-3i}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Sec[a + b*Log[c*x^n]],x]
```

```
[Out] ((-2*I)*E^(I*a)*x^3*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - ((3*I)/2)/(b*n
), 3/2 - ((3*I)/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/(-3*I + b*n)
```

fricas [F] time = 0.77, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\sec\left(b\log\left(cx^n\right)+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^2*sec(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

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

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^2*sec(b*log(c*x^n) + a), x)
```

maple [F] time = 0.34, size = 0, normalized size = 0.00

$$\int x^{2} \sec\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sec(a+b*ln(c*x^n)),x)
[Out] int(x^2*sec(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \sec\left(b\log\left(cx^{n}\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^{2}}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/cos(a + b*log(c*x^n)),x)
[Out] int(x^2/cos(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \sec\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sec(a+b*ln(c*x**n)),x)
[Out] Integral(x**2*sec(a + b*log(c*x**n)), x)
```

3.238 $\int x \sec\left(a + b \log\left(cx^n\right)\right) dx$

Optimal. Leaf size=87

$$\frac{2e^{ia}x^2\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{2i}{bn}\right);\frac{1}{2}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+ibn}$$

```
[Out] 2*exp(I*a)*x^2*(c*x^n)^(I*b)*hypergeom([1, 1/2-I/b/n],[3/2-I/b/n],-exp(2*I*
a)*(c*x^n)^(2*I*b))/(2+I*b*n)
```

Rubi [A] time = 0.05, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4509, 4505, 364}

$$\frac{2e^{ia}x^2\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{2i}{bn}\right);\frac{1}{2}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+ibn}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sec[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x^2*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - (2*I)/(b*n))/2, (3 -
 (2*I)/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(2 + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sec\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sec(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(2e^{ia}x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int \frac{x^{-1+ib+\frac{2}{n}}}{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n}$$
$$= \frac{2e^{ia}x^2\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{2i}{bn}\right);\frac{1}{2}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+ibn}$$

Mathematica [A] time = 0.13, size = 82, normalized size = 0.94

$$-\frac{2ie^{ia}x^2\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{i}{bn};\frac{3}{2}-\frac{i}{bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{bn-2i}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sec[a + b*Log[c*x^n]],x]
```

```
[Out] ((-2*I)*E^(I*a)*x^2*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - I/(b*n), 3/2 -
 I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/(-2*I + b*n)
```

fricas [F] time = 1.71, size = 0, normalized size = 0.00

$$\text{integral}\left(x\sec\left(b\log\left(cx^n\right)+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(x*sec(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(b\log\left(cx^n\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(x*sec(b*log(c*x^n) + a), x)
```

maple [F] time = 0.27, size = 0, normalized size = 0.00

$$\int x \sec\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sec(a+b*ln(c*x^n)),x)
[Out] int(x*sec(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \sec\left(b\log\left(cx^{n}\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(x*sec(b*log(c*x^n) + a), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/cos(a + b*log(c*x^n)),x)
[Out] int(x/cos(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \sec\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*ln(c*x**n)),x)
[Out] Integral(x*sec(a + b*log(c*x**n)), x)
```

3.239 $\int \sec\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=85

$$\frac{2e^{ia}x\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+ibn}$$

```
[Out] 2*exp(I*a)*x*(c*x^n)^(I*b)*hypergeom([1, 1/2-1/2*I/b/n],[3/2-1/2*I/b/n],-ex
p(2*I*a)*(c*x^n)^(2*I*b))/(1+I*b*n)
```

Rubi [A] time = 0.05, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273, Rules used = {4503, 4505, 364}

$$\frac{2e^{ia}x\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - I/(b*n))/2, (3 - I/(b*
n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \sec\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=\frac{\left(2e^{ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+ib+\frac{1}{n}}}{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n}$$
$$=\frac{2e^{ia}x\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+ibn}$$

Mathematica [A] time = 0.11, size = 84, normalized size = 0.99

$$-\frac{2ie^{ia}x\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{i}{2bn};\frac{3}{2}-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{bn-i}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]],x]
[Out] ((-2*I)*E^(I*a)*x*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - (I/2)/(b*n), 3/2
 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/(-I + b*n)
```

fricas [F] time = 1.22, size = 0, normalized size = 0.00

$$\text{integral}\left(\sec\left(b\log\left(cx^n\right)+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(sec(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^n\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a), x)
```

maple [F] time = 0.24, size = 0, normalized size = 0.00

$$\int \sec\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n)),x)
```

```
[Out] int(sec(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^{n}\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n)),x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n)),x)
```

```
[Out] int(1/cos(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n)),x)
```

```
[Out] Integral(sec(a + b*log(c*x**n)), x)
```

3.240 $\int \frac{\sec(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=19

$$\frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

```
[Out] arctanh(sin(a+b*ln(c*x^n)))/b/n
```

Rubi [A] time = 0.02, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {3770}

$$\frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]/x,x]
```

```
[Out] ArcTanh[Sin[a + b*Log[c*x^n]]]/(b*n)
```

Rule 3770

```
Int[csc[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[ArcTanh[Cos[c + d*x]]/d, x]
 /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{\sec\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sec(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\
&= \frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}
\end{aligned}$$

Mathematica [A] time = 0.04, size = 19, normalized size = 1.00

$$\frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]/x,x]
```

```
[Out] ArcTanh[Sin[a + b*Log[c*x^n]]]/(b*n)
```

fricas [B] time = 2.86, size = 43, normalized size = 2.26

$$\frac{\log\left(\sin\left(bn\log(x) + b\log(c) + a\right) + 1\right) - \log\left(-\sin\left(bn\log(x) + b\log(c) + a\right) + 1\right)}{2\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] 1/2*(log(sin(b*n*log(x) + b*log(c) + a) + 1) - log(-sin(b*n*log(x) + b*log(
c) + a) + 1))/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^{n}\right) + a\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)/x, x)
```

maple [A] time = 0.01, size = 32, normalized size = 1.68

$$\frac{\ln\left(\sec\left(a + b\ln\left(c\,x^{n}\right)\right) + \tan\left(a + b\ln\left(c\,x^{n}\right)\right)\right)}{nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))/x,x)
```

```
[Out] 1/n/b*ln(sec(a+b*ln(c*x^n))+tan(a+b*ln(c*x^n)))
```

maxima [A] time = 0.40, size = 31, normalized size = 1.63

$$\frac{\log\left(\sec\left(b\log\left(cx^{n}\right) + a\right) + \tan\left(b\log\left(cx^{n}\right) + a\right)\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] log(sec(b*log(c*x^n) + a) + tan(b*log(c*x^n) + a))/(b*n)
```

mupad [B] time = 3.90, size = 66, normalized size = 3.47

$$-\frac{\ln\left(\frac{2\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}-2\mathrm{i}}{x}\right)}{b\,n}+\frac{\ln\left(\frac{2\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}+2\mathrm{i}}{x}\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))),x)
```

```
[Out] log((2*exp(a*1i)*(c*x^n)^(b*1i) + 2i)/x)/(b*n) - log((2*exp(a*1i)*(c*x^n)^(
b*1i) - 2i)/x)/(b*n)
```

sympy [A] time = 2.26, size = 51, normalized size = 2.68

$$-\begin{cases} -\log{\left(x \right)}\sec{\left(a \right)} & \text{for}\: b = 0 \\ -\log{\left(x \right)}\sec{\left(a + b\log{\left(c \right)} \right)} & \text{for}\: n = 0 \\ -\frac{\log{\left(\tan{\left(a + b\log{\left(cx^{n} \right)} \right)} + \sec{\left(a + b\log{\left(cx^{n} \right)} \right)} \right)}}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))/x,x)
```

```
[Out] -Piecewise((-log(x)*sec(a), Eq(b, 0)), (-log(x)*sec(a + b*log(c)), Eq(n, 0)
), (-log(tan(a + b*log(c*x**n)) + sec(a + b*log(c*x**n)))/(b*n), True))
```

3.241 $\int \frac{\sec\left(a+b\log(cx^n)\right)}{x^2}\,dx$

Optimal. Leaf size=87

$$-\frac{2e^{ia}(cx^n)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{i}{bn}\right);\frac{1}{2}\left(3+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-ibn)}$$

```
[Out] -2*exp(I*a)*(c*x^n)^(I*b)*hypergeom([1, 1/2+1/2*I/b/n],[3/2+1/2*I/b/n],-exp
(2*I*a)*(c*x^n)^(2*I*b))/(1-I*b*n)/x
```

Rubi [A] time = 0.06, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$-\frac{2e^{ia}(cx^n)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{i}{bn}\right);\frac{1}{2}\left(3+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]/x^2,x]
```

```
[Out] (-2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 + I/(b*n))/2, (3 + I/(b*n
))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - I*b*n)*x)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec \left(a+b \log \left(c x^n\right)\right)}{x^2} \, dx = \frac{\left(c x^n\right)^{\frac{1}{n}} \operatorname{Subst}\left(\int x^{-1-\frac{1}{n}} \sec(a+b\log(x)) \, dx, x, c x^n\right)}{n x}$$
$$= \frac{\left(2 e^{i a} \left(c x^n\right)^{\frac{1}{n}}\right) \operatorname{Subst}\left(\int \frac{x^{-1+i b-\frac{1}{n}}}{1+e^{2 i a} x^{2 i b}} \, dx, x, c x^n\right)}{n x}$$
$$= -\frac{2 e^{i a} \left(c x^n\right)^{i b} {}_2F_1\left(1, \frac{1}{2}\left(1+\frac{i}{b n}\right); \frac{1}{2}\left(3+\frac{i}{b n}\right); -e^{2 i a} \left(c x^n\right)^{2 i b}\right)}{(1-i b n) x}$$

Mathematica [A] time = 0.14, size = 85, normalized size = 0.98

$$\frac{2 e^{i a} \left(c x^n\right)^{i b} {}_2F_1\left(1, \frac{1}{2}+\frac{i}{2 b n}; \frac{3}{2}+\frac{i}{2 b n}; -e^{2 i \left(a+b \log \left(c x^n\right)\right)}\right)}{x(-1+i b n)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]/x^2,x]
```

```
[Out] (2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 + (I/2)/(b*n), 3/2 + (I/2
)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/((-1 + I*b*n)*x)
```

fricas [F] time = 0.44, size = 0, normalized size = 0.00

$$\operatorname{integral}\left(\frac{\sec \left(b \log \left(c x^n\right)+a\right)}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)/x^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec \left(b \log \left(c x^n\right)+a\right)}{x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)/x^2, x)
```

maple [F] time = 0.33, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))/x^2,x)
```

```
[Out] int(sec(a+b*ln(c*x^n))/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^{n}\right)+a\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)/x^2, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{2}\,\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*cos(a + b*log(c*x^n))),x)
```

```
[Out] int(1/(x^2*cos(a + b*log(c*x^n))), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(a+b\log\left(cx^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))/x**2, x)
```

3.242 $\int \frac{\sec\left(a+b\log(cx^n)\right)}{x^3}\,dx$

Optimal. Leaf size=87

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1+\frac{2i}{bn}\right);\frac{1}{2}\left(3+\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{x^2(2-ibn)}$$

```
[Out] -2*exp(I*a)*(c*x^n)^(I*b)*hypergeom([1, 1/2+I/b/n],[3/2+I/b/n],-exp(2*I*a)*
(c*x^n)^(2*I*b))/(2-I*b*n)/x^2
```

Rubi [A] time = 0.06, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1+\frac{2i}{bn}\right);\frac{1}{2}\left(3+\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{x^2(2-ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]/x^3,x]
```

```
[Out] (-2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 + (2*I)/(b*n))/2, (3 + (2
*I)/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - I*b*n)*x^2)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n}\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sec(a+b\log(x))\,dx,x,cx^n\right)}{nx^2}$$
$$= \frac{\left(2e^{ia}\left(cx^n\right)^{2/n}\right)\text{Subst}\left(\int \frac{x^{-1+ib-\frac{2}{n}}}{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{nx^2}$$
$$= -\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{2i}{bn}\right);\frac{1}{2}\left(3+\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-ibn)x^2}$$

Mathematica [A] time = 0.14, size = 81, normalized size = 0.93

$$\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}+\frac{i}{bn};\frac{3}{2}+\frac{i}{bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{x^2(-2+ibn)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]/x^3,x]
```

```
[Out] (2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 + I/(b*n), 3/2 + I/(b*n),
 -E^((2*I)*(a + b*Log[c*x^n]))])/((-2 + I*b*n)*x^2)
```

fricas [F] time = 0.54, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x^3,x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a)/x^3, x)
```

maple [F] time = 0.39, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(a + b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))/x^3,x)
[Out] int(sec(a+b*ln(c*x^n))/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^{n}\right) + a\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
[Out] integrate(sec(b*log(c*x^n) + a)/x^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{3}\,\cos\left(a + b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*cos(a + b*log(c*x^n))),x)
[Out] int(1/(x^3*cos(a + b*log(c*x^n))), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(a + b\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))/x**3,x)
[Out] Integral(sec(a + b*log(c*x**n))/x**3, x)
```

3.243 $\int x^2 \sec^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=87

$$\frac{4e^{2ia}x^3\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2-\frac{3i}{bn}\right);\frac{1}{2}\left(4-\frac{3i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3+2ibn}$$

```
[Out] 4*exp(2*I*a)*x^3*(c*x^n)^(2*I*b)*hypergeom([2, 1-3/2*I/b/n],[2-3/2*I/b/n],-
exp(2*I*a)*(c*x^n)^(2*I*b))/(3+2*I*b*n)
```

Rubi [A] time = 0.08, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$\frac{4e^{2ia}x^3\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2-\frac{3i}{bn}\right);\frac{1}{2}\left(4-\frac{3i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3+2ibn}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (4*E^((2*I)*a)*x^3*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, (2 - (3*I)/(b*n))
/2, (4 - (3*I)/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(3 + (2*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \sec^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}}\sec^2(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=\frac{\left(4e^{2ia}x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int \frac{x^{-1+2ib+\frac{3}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{n}$$
$$=\frac{4e^{2ia}x^3\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2-\frac{3i}{bn}\right);\frac{1}{2}\left(4-\frac{3i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3+2ibn}$$

Mathematica [A] time = 5.41, size = 160, normalized size = 1.84

$$\frac{x^3\left(3e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(1,1-\frac{3i}{2bn};2-\frac{3i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+(2bn-3i)\left(\tan\left(a+b\log\left(cx^n\right)\right)-i\,{}_2F_1\left(1,-\frac{3i}{2bn};1-\right.\right.\right.}{bn(2bn-3i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^3*(3*E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 - ((3*I)/2)/(b
*n), 2 - ((3*I)/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + (-3*I + 2*b*n)*(
(-I)*Hypergeometric2F1[1, ((-3*I)/2)/(b*n), 1 - ((3*I)/2)/(b*n), -E^((2*I)*
(a + b*Log[c*x^n]))] + Tan[a + b*Log[c*x^n]])))/(b*n*(-3*I + 2*b*n))
```

fricas [F] time = 1.36, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\sec\left(b\log\left(cx^n\right)+a\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sec(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(x^2*sec(b*log(c*x^n) + a)^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2\sec\left(b\log\left(cx^n\right)+a\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sec(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(x^2*sec(b*log(c*x^n) + a)^2, x)
```

maple [F] time = 1.31, size = 0, normalized size = 0.00

$$\int x^{2} \left(\sec^{2}\left(a +b \ln \left(c \,x^{n}\right)\right)\right)d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*sec(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(x^2*sec(a+b*ln(c*x^n))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*sec(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2}{{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/cos(a + b*log(c*x^n))^2,x)
```

```
[Out] int(x^2/cos(a + b*log(c*x^n))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{2} \sec^{2}{\left(a + b \log{\left(c x^{n} \right)} \right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*sec(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(x**2*sec(a + b*log(c*x**n))**2, x)
```

3.244 $\int x \sec^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=79

$$\frac{2e^{2ia}x^2\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,1-\frac{i}{bn};2-\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+ibn}$$

```
[Out] 2*exp(2*I*a)*x^2*(c*x^n)^(2*I*b)*hypergeom([2, 1-I/b/n],[2-I/b/n],-exp(2*I*
a)*(c*x^n)^(2*I*b))/(1+I*b*n)
```

Rubi [A] time = 0.07, antiderivative size = 79, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$\frac{2e^{2ia}x^2\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,1-\frac{i}{bn};2-\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+ibn}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (2*E^((2*I)*a)*x^2*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, 1 - I/(b*n), 2 -
I/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sec^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sec^2(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(4e^{2ia}x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int\frac{x^{-1+2ib+\frac{2}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{n}$$

$$=\frac{2e^{2ia}x^2\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,1-\frac{i}{bn};2-\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+ibn}$$

Mathematica [A] time = 5.20, size = 149, normalized size = 1.89

$$\frac{x^2\left(e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(1,1-\frac{i}{bn};2-\frac{i}{bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+(bn-i)\left(\tan\left(a+b\log\left(cx^n\right)\right)-i\,{}_2F_1\left(1,-\frac{i}{bn};1-\frac{i}{bn};-e^{2i(}\right.\right.}{bn(bn-i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^2*(E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 - I/(b*n), 2 - I
/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + (-I + b*n)*((-I)*Hypergeometric2F1
[1, (-I)/(b*n), 1 - I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Tan[a + b*Log
[c*x^n]])))/(b*n*(-I + b*n))
```

fricas [F] time = 1.09, size = 0, normalized size = 0.00

$$\text{integral}\left(x\sec\left(b\log\left(cx^n\right)+a\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(x*sec(b*log(c*x^n) + a)^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(b\log\left(cx^n\right)+a\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^2,x, algorithm="giac")
[Out] integrate(x*sec(b*log(c*x^n) + a)^2, x)
```

maple [F] time = 1.21, size = 0, normalized size = 0.00

$$\int x \left(\sec^2 (a + b \ln (c x^n))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sec(a+b*ln(c*x^n))^2,x)
[Out] int(x*sec(a+b*ln(c*x^n))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^2,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\cos (a + b \ \ln (c x^n))^2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/cos(a + b*log(c*x^n))^2,x)
[Out] int(x/cos(a + b*log(c*x^n))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \sec^2 \left(a + b \log (c x^n)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*ln(c*x**n))**2,x)
[Out] Integral(x*sec(a + b*log(c*x**n))**2, x)
```

3.245 $\int \sec^2\left(a + b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=85

$$\frac{4e^{2ia}x\left(cx^n\right)^{2ib}\ {}_2F_1\left(2,\frac{1}{2}\left(2-\frac{i}{bn}\right);\frac{1}{2}\left(4-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

```
[Out] 4*exp(2*I*a)*x*(c*x^n)^(2*I*b)*hypergeom([2, 1-1/2*I/b/n],[2-1/2*I/b/n],-ex
p(2*I*a)*(c*x^n)^(2*I*b))/(1+2*I*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4503, 4505, 364}

$$\frac{4e^{2ia}x\left(cx^n\right)^{2ib}\ {}_2F_1\left(2,\frac{1}{2}\left(2-\frac{i}{bn}\right);\frac{1}{2}\left(4-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (4*E^((2*I)*a)*x*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, (2 - I/(b*n))/2, (4
 - I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + (2*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \sec^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^2(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=\frac{\left(4e^{2ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+2ib+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{n}$$
$$=\frac{4e^{2ia}x\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2-\frac{i}{bn}\right);\frac{1}{2}\left(4-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

Mathematica [A] time = 6.18, size = 147, normalized size = 1.73

$$\frac{x\left(\frac{e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(1,1-\frac{i}{2bn};2-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn-i}-i\,{}_2F_1\left(1,-\frac{i}{2bn};1-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+\tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x*((E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 - (I/2)/(b*n), 2
- (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/(-I + 2*b*n) - I*Hypergeomet
ric2F1[1, (-1/2*I)/(b*n), 1 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] +
 Tan[a + b*Log[c*x^n]]))/(b*n)
```

fricas [F] time = 1.21, size = 0, normalized size = 0.00

$$\text{integral}\left(\sec\left(b\log\left(cx^n\right)+a\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^n\right)+a\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2,x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a)^2, x)
```

maple [F] time = 1.09, size = 0, normalized size = 0.00

$$\int \sec^2(a + b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^2,x)
[Out] int(sec(a+b*ln(c*x^n))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\cos(a + b\,\ln(c\,x^n))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n))^2,x)
[Out] int(1/cos(a + b*log(c*x^n))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^2\left(a + b\log(cx^n)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**2,x)
[Out] Integral(sec(a + b*log(c*x**n))**2, x)
```

3.246 $\int \frac{\sec^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=18

$$\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

[Out] tan(a+b*ln(c*x^n))/b/n

Rubi [A] time = 0.03, antiderivative size = 18, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3767, 8}

$$\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

[In] Int[Sec[a + b*Log[c*x^n]]^2/x,x]

[Out] Tan[a + b*Log[c*x^n]]/(b*n)

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3767

```
Int[csc[(c_.) + (d_.)*(x_)]^(n_), x_Symbol] :> -Dist[d^(-1), Subst[Int[Expa
ndIntegrand[(1 + x^2)^(n/2 - 1), x], x], x, Cot[c + d*x]], x] /; FreeQ[{c,
d}, x] && IGtQ[n/2, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\sec^2\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sec^2(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= -\frac{\text{Subst}\left(\int 1\,dx, x, -\tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}\\ &= \frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}\end{aligned}$$

Mathematica [A] time = 0.08, size = 18, normalized size = 1.00

$$\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^2/x,x]
[Out] Tan[a + b*Log[c*x^n]]/(b*n)
```

fricas [A] time = 1.00, size = 33, normalized size = 1.83

$$\frac{\sin\left(bn\log(x)+b\log(c)+a\right)}{bn\cos\left(bn\log(x)+b\log(c)+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
[Out] sin(b*n*log(x) + b*log(c) + a)/(b*n*cos(b*n*log(x) + b*log(c) + a))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x,x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a)^2/x, x)
```

maple [A] time = 0.05, size = 19, normalized size = 1.06

$$\frac{\tan\left(a+b\ln\left(c\,x^n\right)\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^2/x,x)
[Out] tan(a+b*ln(c*x^n))/b/n
```

maxima [B] time = 0.36, size = 165, normalized size = 9.17

$$\frac{2\left(\cos\left(2\,b\log\left(x^n\right)+2\,a\right)\sin\left(2\,b\log(c\right.\right.}{2\,bn\cos\left(2\,b\log(c)\right)\cos\left(2\,b\log\left(x^n\right)+2\,a\right)+\left(b\cos\left(2\,b\log(c)\right)^2+b\sin\left(2\,b\log(c)\right)^2\right)n\cos\left(2\,b\log\left(x^n\right)+2\,a\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] 2*(cos(2*b*log(x^n) + 2*a)*sin(2*b*log(c)) + cos(2*b*log(c))*sin(2*b*log(x^
n) + 2*a))/(2*b*n*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + (b*cos(2*b*log(
c))^2 + b*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2*a)^2 - 2*b*n*sin(2*b*lo
g(c))*sin(2*b*log(x^n) + 2*a) + (b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)
*n*sin(2*b*log(x^n) + 2*a)^2 + b*n)
```

mupad [B] time = 3.84, size = 29, normalized size = 1.61

$$\frac{2\mathrm{i}}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))^2),x)
```

```
[Out] 2i/(b*n*(exp(a*2i)*(c*x^n)^(b*2i) + 1))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^{2}\left(a + b\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**2/x, x)
```

3.247 $\int \frac{\sec^2(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=87

$$-\frac{4e^{2ia}(cx^n)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2+\frac{i}{bn}\right);\frac{1}{2}\left(4+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-2ibn)}$$

```
[Out] -4*exp(2*I*a)*(c*x^n)^(2*I*b)*hypergeom([2, 1+1/2*I/b/n],[2+1/2*I/b/n],-exp
(2*I*a)*(c*x^n)^(2*I*b))/(1-2*I*b*n)/x
```

Rubi [A] time = 0.08, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$-\frac{4e^{2ia}(cx^n)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2+\frac{i}{bn}\right);\frac{1}{2}\left(4+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-2ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^2/x^2,x]
```

```
[Out] (-4*E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, (2 + I/(b*n))/2, (4
+ I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - (2*I)*b*n)*x)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec^2\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\operatorname{Subst}\left(\int x^{-1-\frac{1}{n}}\sec^2(a+b\log(x))\,dx,x,cx^n\right)}{nx}$$
$$= \frac{\left(4e^{2ia}\left(cx^n\right)^{\frac{1}{n}}\right)\operatorname{Subst}\left(\int \frac{x^{-1+2ib-\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{nx}$$
$$= -\frac{4e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2+\frac{i}{bn}\right);\frac{1}{2}\left(4+\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(1-2ibn)x}$$

Mathematica [A] time = 3.74, size = 160, normalized size = 1.84

$$\frac{(1-2ibn)\left({}_2F_1\left(1,\frac{i}{2bn};1+\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+i\tan\left(a+b\log\left(cx^n\right)\right)\right)-e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(1,1+\frac{i}{2bn};2+\frac{i}{2bn};\cdots\right.}{bnx(2bn+i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^2/x^2,x]
```

```
[Out] (-(E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 + (I/2)/(b*n), 2 +
(I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))]) + (1 - (2*I)*b*n)*(Hypergeomet
ric2F1[1, (I/2)/(b*n), 1 + (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + I*
Tan[a + b*Log[c*x^n]]))/(b*n*(I + 2*b*n)*x)
```

fricas [F] time = 0.94, size = 0, normalized size = 0.00

$$\operatorname{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^2}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^2/x^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^2/x^2, x)
```

maple [F] time = 1.33, size = 0, normalized size = 0.00

$$\int \frac{\sec^2\left(a+b\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^2/x^2,x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^2/x^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^2\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*cos(a + b*log(c*x^n))^2),x)
```

```
[Out] int(1/(x^2*cos(a + b*log(c*x^n))^2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^2\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**2/x**2,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**2/x**2, x)
```

3.248 $\int \frac{\sec^2(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=79

$$-\frac{2e^{2ia}(cx^n)^{2ib}\,{}_2F_1\left(2,1+\frac{i}{bn};2+\frac{i}{bn};-e^{2ia}(cx^n)^{2ib}\right)}{x^2(1-ibn)}$$

```
[Out] -2*exp(2*I*a)*(c*x^n)^(2*I*b)*hypergeom([2, 1+I/b/n],[2+I/b/n],-exp(2*I*a)*
(c*x^n)^(2*I*b))/(1-I*b*n)/x^2
```

Rubi [A] time = 0.07, antiderivative size = 79, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$-\frac{2e^{2ia}(cx^n)^{2ib}\,{}_2F_1\left(2,1+\frac{i}{bn};2+\frac{i}{bn};-e^{2ia}(cx^n)^{2ib}\right)}{x^2(1-ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^2/x^3,x]
```

```
[Out] (-2*E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, 1 + I/(b*n), 2 + I/(
b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - I*b*n)*x^2)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec^2\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n}\,\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sec^2(a+b\log(x))\,dx,x,cx^n\right)}{nx^2}$$
$$= \frac{\left(4e^{2ia}\left(cx^n\right)^{2/n}\right)\text{Subst}\left(\int \frac{x^{-1+2ib-\frac{2}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{nx^2}$$
$$= -\frac{2e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,1+\frac{i}{bn};2+\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(1-ibn)x^2}$$

Mathematica [A] time = 3.60, size = 150, normalized size = 1.90

$$\frac{(bn+i)\left(\tan\left(a+b\log\left(cx^n\right)\right)-i\,{}_2F_1\left(1,\frac{i}{bn};1+\frac{i}{bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\right)-e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(1,1+\frac{i}{bn};2+\frac{i}{bn};-e^{2i\left(a+b\right.}\right.}{bnx^2(bn+i)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^2/x^3,x]
```

```
[Out] (-(E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 + I/(b*n), 2 + I/(b
*n), -E^((2*I)*(a + b*Log[c*x^n]))]) + (I + b*n)*((-I)*Hypergeometric2F1[1,
 I/(b*n), 1 + I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Tan[a + b*Log[c*x^n
]]))/(b*n*(I + b*n)*x^2)
```

fricas [F] time = 0.90, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^2}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^2/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^2}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a)^2/x^3, x)
```

maple [F] time = 1.46, size = 0, normalized size = 0.00

$$\int \frac{\sec^2\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^2/x^3,x)
[Out] int(sec(a+b*ln(c*x^n))^2/x^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{3}\,{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*cos(a + b*log(c*x^n))^2),x)
[Out] int(1/(x^3*cos(a + b*log(c*x^n))^2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^{2}{\left(a+b\log{\left(cx^{n}\right)}\right)}}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**2/x**3,x)
[Out] Integral(sec(a + b*log(c*x**n))**2/x**3, x)
```

3.249 $\int x \sec^3\left(a + b\log\left(cx^n\right)\right)\, dx$

Optimal. Leaf size=87

$$\frac{8e^{3ia}x^2\left(cx^n\right)^{3ib}\ {}_2F_1\left(3,\frac{1}{2}\left(3-\frac{2i}{bn}\right);\frac{1}{2}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+3ibn}$$

```
[Out] 8*exp(3*I*a)*x^2*(c*x^n)^(3*I*b)*hypergeom([3, 3/2-I/b/n],[5/2-I/b/n],-exp(
2*I*a)*(c*x^n)^(2*I*b))/(2+3*I*b*n)
```

Rubi [A] time = 0.07, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$\frac{8e^{3ia}x^2\left(cx^n\right)^{3ib}\ {}_2F_1\left(3,\frac{1}{2}\left(3-\frac{2i}{bn}\right);\frac{1}{2}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+3ibn}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sec[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (8*E^((3*I)*a)*x^2*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 - (2*I)/(b*n))
/2, (5 - (2*I)/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(2 + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sec^3\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sec^3(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=\frac{\left(8e^{3ia}x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int\frac{x^{-1+3ib+\frac{2}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^3}\,dx,x,cx^n\right)}{n}$$
$$=\frac{8e^{3ia}x^2\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{2i}{bn}\right);\frac{1}{2}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+3ibn}$$

Mathematica [A] time = 4.71, size = 118, normalized size = 1.36

$$\frac{x^2\left(\left(bn\tan\left(a+b\log\left(cx^n\right)\right)-2\right)\sec\left(a+b\log\left(cx^n\right)\right)+2e^{ia}(2-ibn)\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{i}{bn};\frac{3}{2}-\frac{i}{bn};-e^{2i\left(a+b\log(cx\right.}\right.\right.}{2b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sec[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^2*(2*E^(I*a)*(2 - I*b*n)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - I/(b*n
), 3/2 - I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Sec[a + b*Log[c*x^n]]*(-
2 + b*n*Tan[a + b*Log[c*x^n]])))/(2*b^2*n^2)
```

fricas [F] time = 0.59, size = 0, normalized size = 0.00

$$\text{integral}\left(x\sec\left(b\log\left(cx^n\right)+a\right)^3,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] integral(x*sec(b*log(c*x^n) + a)^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(b\log\left(cx^n\right)+a\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] integrate(x*sec(b*log(c*x^n) + a)^3, x)
```

maple [F] time = 1.75, size = 0, normalized size = 0.00

$$\int x\left(\sec^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sec(a+b*ln(c*x^n))^3,x)
[Out] int(x*sec(a+b*ln(c*x^n))^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/cos(a + b*log(c*x^n))^3,x)
[Out] int(x/cos(a + b*log(c*x^n))^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec^{3}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*ln(c*x**n))**3,x)
[Out] Integral(x*sec(a + b*log(c*x**n))**3, x)
```

3.250 $\int \sec^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=85

$$\frac{8e^{3ia}x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+3ibn}$$

```
[Out] 8*exp(3*I*a)*x*(c*x^n)^(3*I*b)*hypergeom([3, 3/2-1/2*I/b/n],[5/2-1/2*I/b/n]
,-exp(2*I*a)*(c*x^n)^(2*I*b))/(1+3*I*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4503, 4505, 364}

$$\frac{8e^{3ia}x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+3ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (8*E^((3*I)*a)*x*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 - I/(b*n))/2, (5
 - I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \sec^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^3(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=\frac{\left(8e^{3ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+3ib+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^3}\,dx,x,cx^n\right)}{n}$$
$$=\frac{8e^{3ia}x\left(cx^n\right)^{3ib}\ {}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+3ibn}$$

Mathematica [A] time = 4.41, size = 120, normalized size = 1.41

$$\frac{x\left(\left(bn\tan\left(a+b\log\left(cx^n\right)\right)-1\right)\sec\left(a+b\log\left(cx^n\right)\right)+2e^{ia}(1-ibn)\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}-\frac{i}{2bn};\frac{3}{2}-\frac{i}{2bn};-e^{2i\left(a+b\log(cx^n\right.}\right.\right.}{2b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x*(2*E^(I*a)*(1 - I*b*n)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - (I/2)/(b
*n), 3/2 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Sec[a + b*Log[c*x^
n]]*(-1 + b*n*Tan[a + b*Log[c*x^n]])))/(2*b^2*n^2)
```

fricas [F] time = 0.99, size = 0, normalized size = 0.00

$$\text{integral}\left(\sec\left(b\log\left(cx^n\right)+a\right)^3,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^n\right)+a\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^3, x)
```

maple [F] time = 1.54, size = 0, normalized size = 0.00

$$\int \sec^3(a + b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^3,x)
[Out] int(sec(a+b*ln(c*x^n))^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\cos\left(a + b\,\ln\left(c\,x^n\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n))^3,x)
[Out] int(1/cos(a + b*log(c*x^n))^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^3\left(a + b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**3,x)
[Out] Integral(sec(a + b*log(c*x**n))**3, x)
```

3.251 $\int \frac{\sec^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=55

$$\frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{2bn}+\frac{\tan\left(a+b\log\left(cx^n\right)\right)\sec\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

```
[Out] 1/2*arctanh(sin(a+b*ln(c*x^n)))/b/n+1/2*sec(a+b*ln(c*x^n))*tan(a+b*ln(c*x^n
))/b/n
```

Rubi [A] time = 0.04, antiderivative size = 55, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3768, 3770}

$$\frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{2bn}+\frac{\tan\left(a+b\log\left(cx^n\right)\right)\sec\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] ArcTanh[Sin[a + b*Log[c*x^n]]]/(2*b*n) + (Sec[a + b*Log[c*x^n]]*Tan[a + b*L
og[c*x^n]])/(2*b*n)
```

Rule 3768

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Csc[c + d*x])^(n - 1))/(d*(n - 1)), x] + Dist[(b^2*(n - 2))/(n - 1), I
nt[(b*Csc[c + d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] &&
IntegerQ[2*n]
```

Rule 3770

```
Int[csc[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[ArcTanh[Cos[c + d*x]]/d, x]
 /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\sec^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \sec^3(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{\sec\left(a+b\log\left(cx^n\right)\right)\tan\left(a+b\log\left(cx^n\right)\right)}{2bn} + \frac{\text{Subst}\left(\int \sec(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{2n}$$
$$= \frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{2bn} + \frac{\sec\left(a+b\log\left(cx^n\right)\right)\tan\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Mathematica [A] time = 0.07, size = 55, normalized size = 1.00

$$\frac{\tanh^{-1}\left(\sin\left(a+b\log\left(cx^n\right)\right)\right)}{2bn} + \frac{\tan\left(a+b\log\left(cx^n\right)\right)\sec\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] ArcTanh[Sin[a + b*Log[c*x^n]]]/(2*b*n) + (Sec[a + b*Log[c*x^n]]*Tan[a + b*L
og[c*x^n]])/(2*b*n)
```

fricas [A] time = 3.08, size = 100, normalized size = 1.82

$$\frac{\cos\left(bn\log(x)+b\log(c)+a\right)^2\log\left(\sin\left(bn\log(x)+b\log(c)+a\right)+1\right) - \cos\left(bn\log(x)+b\log(c)+a\right)^2\log\left(-\right.}{4\,bn\cos\left(bn\log(x)+b\log(c)+a\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x,x, algorithm="fricas")
```

```
[Out] 1/4*(cos(b*n*log(x) + b*log(c) + a)^2*log(sin(b*n*log(x) + b*log(c) + a) +
1) - cos(b*n*log(x) + b*log(c) + a)^2*log(-sin(b*n*log(x) + b*log(c) + a) +
 1) + 2*sin(b*n*log(x) + b*log(c) + a))/(b*n*cos(b*n*log(x) + b*log(c) + a)
^2)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^3/x, x)
```

maple [A] time = 0.11, size = 64, normalized size = 1.16

$$\frac{\sec\left(a+b\ln\left(c\,x^{n}\right)\right)\tan\left(a+b\ln\left(c\,x^{n}\right)\right)}{2bn}+\frac{\ln\left(\sec\left(a+b\ln\left(c\,x^{n}\right)\right)+\tan\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{2nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^3/x,x)
```

```
[Out] 1/2*sec(a+b*ln(c*x^n))*tan(a+b*ln(c*x^n))/b/n+1/2/n/b*ln(sec(a+b*ln(c*x^n))
+tan(a+b*ln(c*x^n)))
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [B] time = 6.30, size = 178, normalized size = 3.24

$$\frac{\ln\left(-\frac{1\mathrm{i}}{x}-\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{x}\right)}{2\,b\,n}-\frac{\ln\left(\frac{1\mathrm{i}}{x}-\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{x}\right)}{2\,b\,n}+\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}\,2\mathrm{i}}{b\,n\,\left(2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}+1\right)}-\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}\,1\mathrm{i}}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))^3),x)
```

```
[Out] log(- 1i/x - (exp(a*1i)*(c*x^n)^(b*1i))/x)/(2*b*n) - log(1i/x - (exp(a*1i)*
(c*x^n)^(b*1i))/x)/(2*b*n) + (exp(a*1i)*(c*x^n)^(b*1i)*2i)/(b*n*(2*exp(a*2i
)*(c*x^n)^(b*2i) + exp(a*4i)*(c*x^n)^(b*4i) + 1)) - (exp(a*1i)*(c*x^n)^(b*1
i)*1i)/(b*n*(exp(a*2i)*(c*x^n)^(b*2i) + 1))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^{3}\left(a+b\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**3/x,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**3/x, x)
```

3.252 $\int \frac{\sec^3(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=87

$$-\frac{8e^{3ia}(cx^n)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3+\frac{i}{bn}\right);\frac{1}{2}\left(5+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-3ibn)}$$

```
[Out] -8*exp(3*I*a)*(c*x^n)^(3*I*b)*hypergeom([3, 3/2+1/2*I/b/n],[5/2+1/2*I/b/n],
-exp(2*I*a)*(c*x^n)^(2*I*b))/(1-3*I*b*n)/x
```

Rubi [A] time = 0.07, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$-\frac{8e^{3ia}(cx^n)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3+\frac{i}{bn}\right);\frac{1}{2}\left(5+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-3ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^3/x^2,x]
```

```
[Out] (-8*E^((3*I)*a)*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 + I/(b*n))/2, (5
+ I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - (3*I)*b*n)*x)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec^3\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\,\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sec^3(a+b\log(x))\,dx,x,cx^n\right)}{nx}$$
$$= \frac{\left(8e^{3ia}\left(cx^n\right)^{\frac{1}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+3ib-\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^3}\,dx,x,cx^n\right)}{nx}$$
$$= -\frac{8e^{3ia}\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3+\frac{i}{bn}\right);\frac{1}{2}\left(5+\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(1-3ibn)x}$$

Mathematica [A] time = 4.61, size = 123, normalized size = 1.41

$$\frac{\left(bn\tan\left(a+b\log\left(cx^n\right)\right)+1\right)\sec\left(a+b\log\left(cx^n\right)\right)-2ie^{ia}(bn-i)\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}+\frac{i}{2bn};\frac{3}{2}+\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{2b^2n^2x}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^3/x^2,x]
```

```
[Out] ((-2*I)*E^(I*a)*(-I + b*n)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 + (I/2)/(
b*n), 3/2 + (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Sec[a + b*Log[c*x
^n]]*(1 + b*n*Tan[a + b*Log[c*x^n]]))/(2*b^2*n^2*x)
```

fricas [F] time = 0.57, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^3}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x^2,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^3/x^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x^2,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^3/x^2, x)
```

maple [F] time = 1.63, size = 0, normalized size = 0.00

$$\int \frac{\sec^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^3/x^2,x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^3/x^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{2}\,{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*cos(a + b*log(c*x^n))^3),x)
```

```
[Out] int(1/(x^2*cos(a + b*log(c*x^n))^3), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^{3}\left(a+b\log\left(cx^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**3/x**2,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**3/x**2, x)
```

3.253 $\int \frac{\sec^3(a+b\log(cx^n))}{x^3}\,dx$

Optimal. Leaf size=87

$$-\frac{8e^{3ia}(cx^n)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3+\frac{2i}{bn}\right);\frac{1}{2}\left(5+\frac{2i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x^2(2-3ibn)}$$

```
[Out] -8*exp(3*I*a)*(c*x^n)^(3*I*b)*hypergeom([3, 3/2+I/b/n],[5/2+I/b/n],-exp(2*I
*a)*(c*x^n)^(2*I*b))/(2-3*I*b*n)/x^2
```

Rubi [A] time = 0.07, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$-\frac{8e^{3ia}(cx^n)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3+\frac{2i}{bn}\right);\frac{1}{2}\left(5+\frac{2i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x^2(2-3ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^3/x^3,x]
```

```
[Out] (-8*E^((3*I)*a)*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 + (2*I)/(b*n))/2,
 (5 + (2*I)/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - (3*I)*b*n)*x
^2)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\begin{aligned}\int \frac{\sec^3(a+b\log(cx^n))}{x^3}\,dx &= \frac{(cx^n)^{2/n}\,\text{Subst}\left(\int x^{-1-\frac{2}{n}}\sec^3(a+b\log(x))\,dx,x,cx^n\right)}{nx^2}\\ &= \frac{\left(8e^{3ia}(cx^n)^{2/n}\right)\text{Subst}\left(\int \frac{x^{-1+3ib-\frac{2}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^3}\,dx,x,cx^n\right)}{nx^2}\\ &= -\frac{8e^{3ia}(cx^n)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3+\frac{2i}{bn}\right);\frac{1}{2}\left(5+\frac{2i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{(2-3ibn)x^2}\end{aligned}$$

Mathematica [A] time = 4.63, size = 119, normalized size = 1.37

$$\frac{\left(bn\tan\left(a+b\log(cx^n)\right)+2\right)\sec\left(a+b\log(cx^n)\right)-2ie^{ia}(bn-2i)(cx^n)^{ib}\,{}_2F_1\left(1,\frac{1}{2}+\frac{i}{bn};\frac{3}{2}+\frac{i}{bn};-e^{2i\left(a+b\log(cx^n)\right)}\right)}{2b^2n^2x^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^3/x^3,x]
```

```
[Out] ((-2*I)*E^(I*a)*(-2*I + b*n)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 + I/(b*
n), 3/2 + I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Sec[a + b*Log[c*x^n]]*(
2 + b*n*Tan[a + b*Log[c*x^n]]))/(2*b^2*n^2*x^2)
```

fricas [F] time = 0.87, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log(cx^n)+a\right)^3}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x^3,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^3/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log(cx^n)+a\right)^3}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x^3,x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a)^3/x^3, x)
```

maple [F] time = 1.76, size = 0, normalized size = 0.00

$$\int \frac{\sec^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^3/x^3,x)
[Out] int(sec(a+b*ln(c*x^n))^3/x^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^3/x^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{3}\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*cos(a + b*log(c*x^n))^3),x)
[Out] int(1/(x^3*cos(a + b*log(c*x^n))^3), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^{3}\left(a+b\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**3/x**3,x)
[Out] Integral(sec(a + b*log(c*x**n))**3/x**3, x)
```

3.254 $\int x \sec^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=79

$$\frac{8e^{4ia}x^2\left(cx^n\right)^{4ib}\,{}_2F_1\left(4,2-\frac{i}{bn};3-\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

```
[Out] 8*exp(4*I*a)*x^2*(c*x^n)^(4*I*b)*hypergeom([4, 2-I/b/n],[3-I/b/n],-exp(2*I*
a)*(c*x^n)^(2*I*b))/(1+2*I*b*n)
```

Rubi [A] time = 0.07, antiderivative size = 79, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$\frac{8e^{4ia}x^2\left(cx^n\right)^{4ib}\,{}_2F_1\left(4,2-\frac{i}{bn};3-\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sec[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (8*E^((4*I)*a)*x^2*(c*x^n)^((4*I)*b)*Hypergeometric2F1[4, 2 - I/(b*n), 3 -
I/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + (2*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sec^4\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\mathrm{Subst}\left(\int x^{-1+\frac{2}{n}}\sec^4(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(16e^{4ia}x^2\left(cx^n\right)^{-2/n}\right)\mathrm{Subst}\left(\int\frac{x^{-1+4ib+\frac{2}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^4}\,dx,x,cx^n\right)}{n}$$

$$=\frac{8e^{4ia}x^2\left(cx^n\right)^{4ib}\ {}_2F_1\left(4,2-\frac{i}{bn};3-\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

Mathematica [B] time = 12.41, size = 204, normalized size = 2.58

$$\frac{x^2\left(-2i\left(b^2n^2+1\right)\,{}_2F_1\left(1,-\frac{i}{bn};1-\frac{i}{bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+\sec^2\left(a+b\log\left(cx^n\right)\right)\left(\tan\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2+1\right)\right.\right.\right.}{3b^3n^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sec[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x^2*(2*E^((2*I)*a)*(I + b*n)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 - I/
(b*n), 2 - I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] - (2*I)*(1 + b^2*n^2)*Hy
pergeometric2F1[1, (-I)/(b*n), 1 - I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))]
+ Sec[a + b*Log[c*x^n]]^2*(-(b*n) + (1 + 2*b^2*n^2 + (1 + b^2*n^2)*Cos[2*(a
 + b*Log[c*x^n])])*Tan[a + b*Log[c*x^n]])))/(3*b^3*n^3)
```

fricas [F] time = 0.64, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(x\sec\left(b\log\left(cx^n\right)+a\right)^4,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] integral(x*sec(b*log(c*x^n) + a)^4, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(b\log\left(cx^n\right)+a\right)^4\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] integrate(x*sec(b*log(c*x^n) + a)^4, x)
```

maple [F] time = 1.36, size = 0, normalized size = 0.00

$$\int x\left(\sec^{4}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sec(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(x*sec(a+b*ln(c*x^n))^4,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] -4/3*(3*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*x^2*cos(4*b*log(x^n)
+ 4*a)^2 + 3*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*x^2*cos(2*b*log(
x^n) + 2*a)^2 + 3*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*x^2*sin(4*b
*log(x^n) + 4*a)^2 + 3*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*x^2*si
n(2*b*log(x^n) + 2*a)^2 + (b*n*cos(2*b*log(c)) - sin(2*b*log(c)))*x^2*cos(2
*b*log(x^n) + 2*a) - (b*n*sin(2*b*log(c)) + cos(2*b*log(c)))*x^2*sin(2*b*lo
g(x^n) + 2*a) + (((b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*log(c))*si
n(4*b*log(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*
b*log(c)))*x^2*cos(4*b*log(x^n) + 4*a) - (3*(b^2*cos(2*b*log(c))*sin(6*b*lo
g(c)) - b^2*cos(6*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(6*b*log(c))*cos(2
*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n + 2*cos(2*b*log(c))*sin(6
*b*log(c)) - 2*cos(6*b*log(c))*sin(2*b*log(c)))*x^2*cos(2*b*log(x^n) + 2*a)
 + ((b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))
*n + cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*x^2
*sin(4*b*log(x^n) + 4*a) + (3*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) + b^2*si
n(6*b*log(c))*sin(2*b*log(c)))*n^2 + (b*cos(2*b*log(c))*sin(6*b*log(c)) - b
*cos(6*b*log(c))*sin(2*b*log(c)))*n + 2*cos(6*b*log(c))*cos(2*b*log(c)) + 2
*sin(6*b*log(c))*sin(2*b*log(c)))*x^2*sin(2*b*log(x^n) + 2*a) - (b^2*n^2*si
n(6*b*log(c)) + sin(6*b*log(c)))*x^2)*cos(6*b*log(x^n) + 6*a) - (3*(3*(b^2*
cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*log(c)))*n^2
- 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))
*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*x^2
*cos(2*b*log(x^n) + 2*a) - 3*(3*(b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*
sin(4*b*log(c))*sin(2*b*log(c)))*n^2 + 2*(b*cos(2*b*log(c))*sin(4*b*log(c))
```

```
 - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) +
 sin(4*b*log(c))*sin(2*b*log(c)))*x^2*sin(2*b*log(x^n) + 2*a) + (3*b^2*n^2*
sin(4*b*log(c)) - b*n*cos(4*b*log(c)) + 2*sin(4*b*log(c)))*x^2)*cos(4*b*log
(x^n) + 4*a) + 18*(b^8*n^8 + b^6*n^6 + ((b^8*cos(6*b*log(c))^2 + b^8*sin(6*
b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*cos
(6*b*log(x^n) + 6*a)^2 + 9*((b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log(c))^2)
*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*cos(4*b*log(x^n
) + 4*a)^2 + 9*((b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*
cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6)*cos(2*b*log(x^n) + 2*a)^2 +
 ((b^8*cos(6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c)
)^2 + b^6*sin(6*b*log(c))^2)*n^6)*sin(6*b*log(x^n) + 6*a)^2 + 9*((b^8*cos(4
*b*log(c))^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*si
n(4*b*log(c))^2)*n^6)*sin(4*b*log(x^n) + 4*a)^2 + 9*((b^8*cos(2*b*log(c))^2
 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c)
)^2)*n^6)*sin(2*b*log(x^n) + 2*a)^2 + 2*(b^8*n^8*cos(6*b*log(c)) + b^6*n^6*
cos(6*b*log(c)) + 3*((b^8*cos(6*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log
(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(
6*b*log(c))*sin(4*b*log(c)))*n^6)*cos(4*b*log(x^n) + 4*a) + 3*((b^8*cos(6*b
*log(c))*cos(2*b*log(c)) + b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*
cos(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)
*cos(2*b*log(x^n) + 2*a) + 3*((b^8*cos(4*b*log(c))*sin(6*b*log(c)) - b^8*co
s(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*log(c)) -
 b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*sin(4*b*log(x^n) + 4*a) + 3*((b^
8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(2*b*log(c)))*n^
8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(2*b*log(
c)))*n^6)*sin(2*b*log(x^n) + 2*a))*cos(6*b*log(x^n) + 6*a) + 6*(b^8*n^8*cos
(4*b*log(c)) + b^6*n^6*cos(4*b*log(c)) + 3*((b^8*cos(4*b*log(c))*cos(2*b*lo
g(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*cos
(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) +
 2*a) + 3*((b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2
*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c)
)*sin(2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) +
6*(b^8*n^8*cos(2*b*log(c)) + b^6*n^6*cos(2*b*log(c)))*cos(2*b*log(x^n) + 2*
a) - 2*(b^8*n^8*sin(6*b*log(c)) + b^6*n^6*sin(6*b*log(c)) + 3*((b^8*cos(4*b
*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*
cos(4*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)
*cos(4*b*log(x^n) + 4*a) + 3*((b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*co
s(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) -
 b^6*cos(6*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) - 3*((b^
8*cos(6*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^
8 + (b^6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(
c)))*n^6)*sin(4*b*log(x^n) + 4*a) - 3*((b^8*cos(6*b*log(c))*cos(2*b*log(c))
 + b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*
log(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a)
)*sin(6*b*log(x^n) + 6*a) - 6*(b^8*n^8*sin(4*b*log(c)) + b^6*n^6*sin(4*b*lo
```

```
g(c)) + 3*((b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2
*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c)
)*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) - 3*((b^8*cos(4*b*log(c))*c
os(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*lo
g(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*l
og(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a) - 6*(b^8*n^8*sin(2*b*log(c)) + b^6*
n^6*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*integrate(1/9*(x*cos(2*b*log(
x^n) + 2*a)*sin(2*b*log(c)) + x*cos(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/(2
*b^6*n^6*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 2*b^6*n^6*sin(2*b*log(c)
)*sin(2*b*log(x^n) + 2*a) + b^6*n^6 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*
log(c))^2)*n^6*cos(2*b*log(x^n) + 2*a)^2 + (b^6*cos(2*b*log(c))^2 + b^6*sin
(2*b*log(c))^2)*n^6*sin(2*b*log(x^n) + 2*a)^2), x) - (((b*cos(4*b*log(c))*s
in(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n + cos(6*b*log(c))*cos
(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*x^2*cos(4*b*log(x^n) + 4*a)
 + (3*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) + b^2*sin(6*b*log(c))*sin(2*b*lo
g(c)))*n^2 + (b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b
*log(c)))*n + 2*cos(6*b*log(c))*cos(2*b*log(c)) + 2*sin(6*b*log(c))*sin(2*b
*log(c)))*x^2*cos(2*b*log(x^n) + 2*a) - ((b*cos(6*b*log(c))*cos(4*b*log(c))
 + b*sin(6*b*log(c))*sin(4*b*log(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) +
 cos(6*b*log(c))*sin(4*b*log(c)))*x^2*sin(4*b*log(x^n) + 4*a) + (3*(b^2*cos
(2*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(2*b*log(c)))*n^2 - (
b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n +
2*cos(2*b*log(c))*sin(6*b*log(c)) - 2*cos(6*b*log(c))*sin(2*b*log(c)))*x^2*
sin(2*b*log(x^n) + 2*a) + (b^2*n^2*cos(6*b*log(c)) + cos(6*b*log(c)))*x^2)*
sin(6*b*log(x^n) + 6*a) - (3*(3*(b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*
sin(4*b*log(c))*sin(2*b*log(c)))*n^2 + 2*(b*cos(2*b*log(c))*sin(4*b*log(c))
 - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) +
 sin(4*b*log(c))*sin(2*b*log(c)))*x^2*cos(2*b*log(x^n) + 2*a) + 3*(3*(b^2*c
os(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*log(c)))*n^2 -
 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*
n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*x^2*
sin(2*b*log(x^n) + 2*a) + (3*b^2*n^2*cos(4*b*log(c)) + b*n*sin(4*b*log(c))
+ 2*cos(4*b*log(c)))*x^2)*sin(4*b*log(x^n) + 4*a))/(6*b^3*n^3*cos(2*b*log(c
))*cos(2*b*log(x^n) + 2*a) - 6*b^3*n^3*sin(2*b*log(c))*sin(2*b*log(x^n) + 2
*a) + b^3*n^3 + (b^3*cos(6*b*log(c))^2 + b^3*sin(6*b*log(c))^2)*n^3*cos(6*b
*log(x^n) + 6*a)^2 + 9*(b^3*cos(4*b*log(c))^2 + b^3*sin(4*b*log(c))^2)*n^3*
cos(4*b*log(x^n) + 4*a)^2 + 9*(b^3*cos(2*b*log(c))^2 + b^3*sin(2*b*log(c))^
2)*n^3*cos(2*b*log(x^n) + 2*a)^2 + (b^3*cos(6*b*log(c))^2 + b^3*sin(6*b*log
(c))^2)*n^3*sin(6*b*log(x^n) + 6*a)^2 + 9*(b^3*cos(4*b*log(c))^2 + b^3*sin(
4*b*log(c))^2)*n^3*sin(4*b*log(x^n) + 4*a)^2 + 9*(b^3*cos(2*b*log(c))^2 + b
^3*sin(2*b*log(c))^2)*n^3*sin(2*b*log(x^n) + 2*a)^2 + 2*(b^3*n^3*cos(6*b*lo
g(c)) + 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*log(c))*sin(4*
b*log(c)))*n^3*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(6*b*log(c))*cos(2*b*log
(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*log(x^n) + 2*a) + 3
*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c))
```

```
)*n^3*sin(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*log(c))*sin(6*b*log(c)) - b^
3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*cos(6*b*log
(x^n) + 6*a) + 6*(b^3*n^3*cos(4*b*log(c)) + 3*(b^3*cos(4*b*log(c))*cos(2*b*
log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*log(x^n) + 2*a)
+ 3*(b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(
c)))*n^3*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*(b^3*n^3*sin(
6*b*log(c)) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*
sin(4*b*log(c)))*n^3*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*log(c))*sin(6
*b*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*log(x^n) + 2*
a) - 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*log(c))*sin(4*b*l
og(c)))*n^3*sin(4*b*log(x^n) + 4*a) - 3*(b^3*cos(6*b*log(c))*cos(2*b*log(c)
) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*sin(6
*b*log(x^n) + 6*a) - 6*(b^3*n^3*sin(4*b*log(c)) + 3*(b^3*cos(2*b*log(c))*si
n(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*log(x^n) +
 2*a) - 3*(b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*
b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/cos(a + b*log(c*x^n))^4,x)
```

```
[Out] int(x/cos(a + b*log(c*x^n))^4, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec^4\left(a+b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*ln(c*x**n))**4,x)
```

```
[Out] Integral(x*sec(a + b*log(c*x**n))**4, x)
```

3.255 $\int \sec^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=85

$$\frac{16e^{4ia}x\left(cx^n\right)^{4ib}\,{}_2F_1\left(4,\frac{1}{2}\left(4-\frac{i}{bn}\right);\frac{1}{2}\left(6-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+4ibn}$$

```
[Out] 16*exp(4*I*a)*x*(c*x^n)^(4*I*b)*hypergeom([4, 2-1/2*I/b/n],[3-1/2*I/b/n],-e
xp(2*I*a)*(c*x^n)^(2*I*b))/(1+4*I*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4503, 4505, 364}

$$\frac{16e^{4ia}x\left(cx^n\right)^{4ib}\,{}_2F_1\left(4,\frac{1}{2}\left(4-\frac{i}{bn}\right);\frac{1}{2}\left(6-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+4ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (16*E^((4*I)*a)*x*(c*x^n)^((4*I)*b)*Hypergeometric2F1[4, (4 - I/(b*n))/2, (
6 - I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + (4*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \sec^4\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^4(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(16e^{4ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+4ib+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^4}\,dx,x,cx^n\right)}{n}$$
$$= \frac{16e^{4ia}x\left(cx^n\right)^{4ib}\ {}_2F_1\left(4,\frac{1}{2}\left(4-\frac{i}{bn}\right);\frac{1}{2}\left(6-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+4ibn}$$

Mathematica [B] time = 10.55, size = 213, normalized size = 2.51

$$\frac{x\left(-2i\left(4b^2n^2+1\right)\ {}_2F_1\left(1,-\frac{i}{2bn};1-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+\sec^2\left(a+b\log\left(cx^n\right)\right)\left(\tan\left(a+b\log\left(cx^n\right)\right)\left(\left(4b^2n^2+\right.\right.\right.}{12b}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x*(2*E^((2*I)*a)*(I + 2*b*n)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 - (I
/2)/(b*n), 2 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] - (2*I)*(1 + 4*b
^2*n^2)*Hypergeometric2F1[1, (-1/2*I)/(b*n), 1 - (I/2)/(b*n), -E^((2*I)*(a
+ b*Log[c*x^n]))] + Sec[a + b*Log[c*x^n]]^2*(-2*b*n + (1 + 8*b^2*n^2 + (1 +
 4*b^2*n^2)*Cos[2*(a + b*Log[c*x^n])])*Tan[a + b*Log[c*x^n]])))/(12*b^3*n^3
)
```

fricas [F] time = 0.76, size = 0, normalized size = 0.00

$$\text{integral}\left(\sec\left(b\log\left(cx^n\right)+a\right)^4,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^4, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^n\right)+a\right)^4\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^4, x)
```

maple [F] time = 0.76, size = 0, normalized size = 0.00

$$\int \sec^{4}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^4,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] -1/3*(6*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*x*cos(4*b*log(x^n) +
4*a)^2 + 6*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*x*cos(2*b*log(x^n)
 + 2*a)^2 + 6*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*x*sin(4*b*log(x
^n) + 4*a)^2 + 6*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*x*sin(2*b*lo
g(x^n) + 2*a)^2 + (2*b*n*cos(2*b*log(c)) - sin(2*b*log(c)))*x*cos(2*b*log(x
^n) + 2*a) - (2*b*n*sin(2*b*log(c)) + cos(2*b*log(c)))*x*sin(2*b*log(x^n) +
 2*a) + ((2*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*
log(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*b*log(
c)))*x*cos(4*b*log(x^n) + 4*a) - 2*(6*(b^2*cos(2*b*log(c))*sin(6*b*log(c))
- b^2*cos(6*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(6*b*log(c))*cos(2*b*log
(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(6*b*log(c
)) - cos(6*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) + (2*(b*cos
(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n + cos(6
*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*x*sin(4*b*log
(x^n) + 4*a) + 2*(6*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) + b^2*sin(6*b*log(
c))*sin(2*b*log(c)))*n^2 + (b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*l
og(c))*sin(2*b*log(c)))*n + cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c
))*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) - (4*b^2*n^2*sin(6*b*log(c))
+ sin(6*b*log(c)))*x)*cos(6*b*log(x^n) + 6*a) - (3*(12*(b^2*cos(2*b*log(c))
*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*log(c)))*n^2 - 4*(b*cos(4*b*
log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*lo
g(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n)
 + 2*a) - 3*(12*(b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*
sin(2*b*log(c)))*n^2 + 4*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log
```

```
(c))*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))
*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) + 2*(6*b^2*n^2*sin(4*b*log(c))
- b*n*cos(4*b*log(c)) + sin(4*b*log(c)))*x)*cos(4*b*log(x^n) + 4*a) + 9*(4*
b^8*n^8 + b^6*n^6 + (4*(b^8*cos(6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8
+ (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*cos(6*b*log(x^n) + 6
*a)^2 + 9*(4*(b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos
(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*cos(4*b*log(x^n) + 4*a)^2 + 9*
(4*(b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c
))^2 + b^6*sin(2*b*log(c))^2)*n^6)*cos(2*b*log(x^n) + 2*a)^2 + (4*(b^8*cos(
6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6*s
in(6*b*log(c))^2)*n^6)*sin(6*b*log(x^n) + 6*a)^2 + 9*(4*(b^8*cos(4*b*log(c)
)^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log
(c))^2)*n^6)*sin(4*b*log(x^n) + 4*a)^2 + 9*(4*(b^8*cos(2*b*log(c))^2 + b^8*
sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^
6)*sin(2*b*log(x^n) + 2*a)^2 + 2*(4*b^8*n^8*cos(6*b*log(c)) + b^6*n^6*cos(6
*b*log(c)) + 3*(4*(b^8*cos(6*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c)
)*sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b
*log(c))*sin(4*b*log(c)))*n^6)*cos(4*b*log(x^n) + 4*a) + 3*(4*(b^8*cos(6*b*
log(c))*cos(2*b*log(c)) + b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*c
os(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*
cos(2*b*log(x^n) + 2*a) + 3*(4*(b^8*cos(4*b*log(c))*sin(6*b*log(c)) - b^8*c
os(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*log(c))
- b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*sin(4*b*log(x^n) + 4*a) + 3*(4*
(b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(2*b*log(c)))
*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(2*b*l
og(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*cos(6*b*log(x^n) + 6*a) + 6*(4*b^8*n^
8*cos(4*b*log(c)) + b^6*n^6*cos(4*b*log(c)) + 3*(4*(b^8*cos(4*b*log(c))*cos
(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*log(
c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log
(x^n) + 2*a) + 3*(4*(b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(
c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4
*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n)
+ 4*a) + 6*(4*b^8*n^8*cos(2*b*log(c)) + b^6*n^6*cos(2*b*log(c)))*cos(2*b*lo
g(x^n) + 2*a) - 2*(4*b^8*n^8*sin(6*b*log(c)) + b^6*n^6*sin(6*b*log(c)) + 3*
(4*(b^8*cos(4*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c
)))*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*
b*log(c)))*n^6)*cos(4*b*log(x^n) + 4*a) + 3*(4*(b^8*cos(2*b*log(c))*sin(6*b
*log(c)) - b^8*cos(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*
sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n
) + 2*a) - 3*(4*(b^8*cos(6*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*
sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b*l
og(c))*sin(4*b*log(c)))*n^6)*sin(4*b*log(x^n) + 4*a) - 3*(4*(b^8*cos(6*b*lo
g(c))*cos(2*b*log(c)) + b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos
(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*si
n(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(4*b^8*n^8*sin(4*b*log(c
```

```
)) + b^6*n^6*sin(4*b*log(c)) + 3*(4*(b^8*cos(2*b*log(c))*sin(4*b*log(c)) -
b^8*cos(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log
(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) -
3*(4*(b^8*cos(4*b*log(c))*cos(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log
(c)))*n^8 + (b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(
2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a) - 6*(4*b
^8*n^8*sin(2*b*log(c)) + b^6*n^6*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*
integrate(1/9*(cos(2*b*log(x^n) + 2*a)*sin(2*b*log(c)) + cos(2*b*log(c))*si
n(2*b*log(x^n) + 2*a))/(2*b^6*n^6*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) -
 2*b^6*n^6*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + b^6*n^6 + (b^6*cos(2*b
*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6*cos(2*b*log(x^n) + 2*a)^2 + (b^6*co
s(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6*sin(2*b*log(x^n) + 2*a)^2), x)
 - ((2*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c
)))*n + cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*
x*cos(4*b*log(x^n) + 4*a) + 2*(6*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) + b^2
*sin(6*b*log(c))*sin(2*b*log(c)))*n^2 + (b*cos(2*b*log(c))*sin(6*b*log(c))
- b*cos(6*b*log(c))*sin(2*b*log(c)))*n + cos(6*b*log(c))*cos(2*b*log(c)) +
sin(6*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) - (2*(b*cos(6*b*
log(c))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n - cos(4*b*lo
g(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*b*log(c)))*x*sin(4*b*log(x^n)
 + 4*a) + 2*(6*(b^2*cos(2*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*s
in(2*b*log(c)))*n^2 - (b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c)
)*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*si
n(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) + (4*b^2*n^2*cos(6*b*log(c)) + cos
(6*b*log(c)))*x)*sin(6*b*log(x^n) + 6*a) - (3*(12*(b^2*cos(4*b*log(c))*cos(
2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 + 4*(b*cos(2*b*log(c
))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*b*log(c))
*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*
a) + 3*(12*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2
*b*log(c)))*n^2 - 4*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*
sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(
2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) + 2*(6*b^2*n^2*cos(4*b*log(c)) + b*n
*sin(4*b*log(c)) + cos(4*b*log(c)))*x)*sin(4*b*log(x^n) + 4*a))/(6*b^3*n^3*
cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 6*b^3*n^3*sin(2*b*log(c))*sin(2*b
*log(x^n) + 2*a) + b^3*n^3 + (b^3*cos(6*b*log(c))^2 + b^3*sin(6*b*log(c))^2
)*n^3*cos(6*b*log(x^n) + 6*a)^2 + 9*(b^3*cos(4*b*log(c))^2 + b^3*sin(4*b*lo
g(c))^2)*n^3*cos(4*b*log(x^n) + 4*a)^2 + 9*(b^3*cos(2*b*log(c))^2 + b^3*sin
(2*b*log(c))^2)*n^3*cos(2*b*log(x^n) + 2*a)^2 + (b^3*cos(6*b*log(c))^2 + b^
3*sin(6*b*log(c))^2)*n^3*sin(6*b*log(x^n) + 6*a)^2 + 9*(b^3*cos(4*b*log(c))
^2 + b^3*sin(4*b*log(c))^2)*n^3*sin(4*b*log(x^n) + 4*a)^2 + 9*(b^3*cos(2*b*
log(c))^2 + b^3*sin(2*b*log(c))^2)*n^3*sin(2*b*log(x^n) + 2*a)^2 + 2*(b^3*n
^3*cos(6*b*log(c)) + 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*l
og(c))*sin(4*b*log(c)))*n^3*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(6*b*log(c)
)*cos(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*log(x^
n) + 2*a) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*si
```

```
n(4*b*log(c)))*n^3*sin(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*log(c))*sin(6*b
*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a)
)*cos(6*b*log(x^n) + 6*a) + 6*(b^3*n^3*cos(4*b*log(c)) + 3*(b^3*cos(4*b*log
(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*log
(x^n) + 2*a) + 3*(b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))
*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*
(b^3*n^3*sin(6*b*log(c)) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos
(6*b*log(c))*sin(4*b*log(c)))*n^3*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*
log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b*
log(x^n) + 2*a) - 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*log(
c))*sin(4*b*log(c)))*n^3*sin(4*b*log(x^n) + 4*a) - 3*(b^3*cos(6*b*log(c))*c
os(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n)
+ 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(b^3*n^3*sin(4*b*log(c)) + 3*(b^3*cos(2
*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3*cos(2
*b*log(x^n) + 2*a) - 3*(b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*l
og(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a
))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + b*log(c*x^n))^4,x)
```

```
[Out] int(1/cos(a + b*log(c*x^n))^4, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^4\left(a+b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**4,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**4, x)
```

3.256 $\int \frac{\sec^4(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=42

$$\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] tan(a+b*ln(c*x^n))/b/n+1/3*tan(a+b*ln(c*x^n))^3/b/n
```

Rubi [A] time = 0.03, antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {3767}

$$\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] Tan[a + b*Log[c*x^n]]/(b*n) + Tan[a + b*Log[c*x^n]]^3/(3*b*n)
```

Rule 3767

```
Int[csc[(c_.) + (d_.)*(x_)]^(n_), x_Symbol] :> -Dist[d^(-1), Subst[Int[Expa
ndIntegrand[(1 + x^2)^(n/2 - 1), x], x], x, Cot[c + d*x]], x] /; FreeQ[{c,
d}, x] && IGtQ[n/2, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\sec^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \sec^4(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\ &= -\frac{\text{Subst}\left(\int \left(1+x^2\right)\,dx, x, -\tan\left(a+b\log\left(cx^n\right)\right)\right)}{bn}\\ &= \frac{\tan\left(a+b\log\left(cx^n\right)\right)}{bn}+\frac{\tan^3\left(a+b\log\left(cx^n\right)\right)}{3bn}\end{aligned}$$

Mathematica [A] time = 0.11, size = 36, normalized size = 0.86

$$\frac{\frac{1}{3}\tan^3\left(a+b\log\left(cx^n\right)\right)+\tan\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] (Tan[a + b*Log[c*x^n]] + Tan[a + b*Log[c*x^n]]^3/3)/(b*n)
```

fricas [A] time = 0.80, size = 52, normalized size = 1.24

$$\frac{\left(2\,\cos\left(bn\log(x)+b\log(c)+a\right)^2+1\right)\sin\left(bn\log(x)+b\log(c)+a\right)}{3\,bn\cos\left(bn\log(x)+b\log(c)+a\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x,x, algorithm="fricas")
```

```
[Out] 1/3*(2*cos(b*n*log(x) + b*log(c) + a)^2 + 1)*sin(b*n*log(x) + b*log(c) + a)
/(b*n*cos(b*n*log(x) + b*log(c) + a)^3)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^4}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^4/x, x)
```

maple [A] time = 0.13, size = 37, normalized size = 0.88

$$-\frac{\left(-\frac{2}{3}-\frac{\left(\sec^2(a+b\ln(c\,x^n))\right)}{3}\right)\tan\left(a+b\ln\left(c\,x^n\right)\right)}{nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^4/x,x)
```

```
[Out] -1/n/b*(-2/3-1/3*sec(a+b*ln(c*x^n))^2)*tan(a+b*ln(c*x^n))
```

maxima [B] time = 0.40, size = 1323, normalized size = 31.50

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x,x, algorithm="maxima")
```

```
[Out] 4/3*((3*(cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))
*cos(2*b*log(x^n) + 2*a) - 3*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log
(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(6*b*log(c)))*cos(6*b*lo
g(x^n) + 6*a) + 3*(3*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin
(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 3*(cos(4*b*log(c))*cos(2*b*log(c))
+ sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(4*b*log(c)
))*cos(4*b*log(x^n) + 4*a) + (3*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*
log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 3*(cos(2*b*log(c))*sin(6
*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos
(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) + 3*(3*(cos(4*b*log(c))*cos(2*b*log(c
)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 3*(cos(2*b*
log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n)
 + 2*a) + cos(4*b*log(c)))*sin(4*b*log(x^n) + 4*a))/((b*cos(6*b*log(c))^2 +
 b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*log(c))^2
+ b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 + 6*b*n*cos(2*b*log(c))*
cos(2*b*log(x^n) + 2*a) + 9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*c
os(2*b*log(x^n) + 2*a)^2 + (b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2)*n*si
n(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*s
in(4*b*log(x^n) + 4*a)^2 - 6*b*n*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) +
9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) + 2*a)^2 +
 b*n + 2*(b*n*cos(6*b*log(c)) + 3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*si
n(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) + 3*(b*cos(6*b*log
(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n
) + 2*a) + 3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b
*log(c)))*n*sin(4*b*log(x^n) + 4*a) + 3*(b*cos(2*b*log(c))*sin(6*b*log(c))
- b*cos(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(6*b*log
(x^n) + 6*a) + 6*(b*n*cos(4*b*log(c)) + 3*(b*cos(4*b*log(c))*cos(2*b*log(c)
) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) + 3*(b*cos
(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b
*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*(3*(b*cos(4*b*log(c))*sin(6*b
*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) + 3
*(b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*
cos(2*b*log(x^n) + 2*a) + b*n*sin(6*b*log(c)) - 3*(b*cos(6*b*log(c))*cos(4*
b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) -
3*(b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n
*sin(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(3*(b*cos(2*b*log(c))
*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) +
2*a) + b*n*sin(4*b*log(c)) - 3*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4
*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4
*a))
```

mupad [B] time = 9.06, size = 49, normalized size = 1.17

$$\frac{4\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}\,3\mathrm{i}+1\mathrm{i}\right)}{3\,b\,n\,{\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}+1\right)}^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*cos(a + b*log(c*x^n))^4),x)
```

```
[Out] (4*(exp(a*2i)*(c*x^n)^(b*2i)*3i + 1i))/(3*b*n*(exp(a*2i)*(c*x^n)^(b*2i) + 1
)^3)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**4/x,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**4/x, x)
```

3.257 $\int \frac{\sec^4(a+b\log(cx^n))}{x^2}\,dx$

Optimal. Leaf size=87

$$-\frac{16e^{4ia}(cx^n)^{4ib}\,{}_2F_1\left(4,\frac{1}{2}\left(4+\frac{i}{bn}\right);\frac{1}{2}\left(6+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-4ibn)}$$

```
[Out] -16*exp(4*I*a)*(c*x^n)^(4*I*b)*hypergeom([4, 2+1/2*I/b/n],[3+1/2*I/b/n],-ex
p(2*I*a)*(c*x^n)^(2*I*b))/(1-4*I*b*n)/x
```

Rubi [A] time = 0.08, antiderivative size = 87, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$-\frac{16e^{4ia}(cx^n)^{4ib}\,{}_2F_1\left(4,\frac{1}{2}\left(4+\frac{i}{bn}\right);\frac{1}{2}\left(6+\frac{i}{bn}\right);-e^{2ia}(cx^n)^{2ib}\right)}{x(1-4ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^4/x^2,x]
```

```
[Out] (-16*E^((4*I)*a)*(c*x^n)^((4*I)*b)*Hypergeometric2F1[4, (4 + I/(b*n))/2, (6
 + I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - (4*I)*b*n)*x)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec^4\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{(cx^n)^{\frac{1}{n}}\,\text{Subst}\left(\int x^{-1-\frac{1}{n}}\sec^4(a+b\log(x))\,dx,x,cx^n\right)}{nx}$$
$$= \frac{\left(16e^{4ia}\left(cx^n\right)^{\frac{1}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+4ib-\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^4}\,dx,x,cx^n\right)}{nx}$$
$$= -\frac{16e^{4ia}\left(cx^n\right)^{4ib}\,{}_2F_1\left(4,\frac{1}{2}\left(4+\frac{i}{bn}\right);\frac{1}{2}\left(6+\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(1-4ibn)x}$$

Mathematica [B] time = 9.40, size = 215, normalized size = 2.47

$$\frac{-2i\left(4b^2n^2+1\right)\,{}_2F_1\left(1,\frac{i}{2bn};1+\frac{i}{2bn};-e^{2i\left(a+b\log(cx^n)\right)}\right)+\sec^2\left(a+b\log\left(cx^n\right)\right)\left(\tan\left(a+b\log\left(cx^n\right)\right)\left(\left(4b^2n^2+1\right)c\right.\right.}{12b^3n^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^4/x^2,x]
```

```
[Out] (-2*E^((2*I)*a)*(-I + 2*b*n)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 + (I/
2)/(b*n), 2 + (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] - (2*I)*(1 + 4*b^
2*n^2)*Hypergeometric2F1[1, (I/2)/(b*n), 1 + (I/2)/(b*n), -E^((2*I)*(a + b*
Log[c*x^n]))] + Sec[a + b*Log[c*x^n]]^2*(2*b*n + (1 + 8*b^2*n^2 + (1 + 4*b^
2*n^2)*Cos[2*(a + b*Log[c*x^n])])*Tan[a + b*Log[c*x^n]]))/(12*b^3*n^3*x)
```

fricas [F] time = 2.03, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^4}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x^2,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^4/x^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^4}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x^2,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^4/x^2, x)
```

maple [F] time = 1.46, size = 0, normalized size = 0.00

$$\int \frac{\sec^{4}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^4/x^2,x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^4/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x^2,x, algorithm="maxima")
```

```
[Out] 1/3*(6*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a
)^2 + 6*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2*
a)^2 + 6*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*sin(4*b*log(x^n) + 4
*a)^2 + 6*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) +
2*a)^2 + (4*b^2*n^2*sin(6*b*log(c)) + (2*(b*cos(6*b*log(c))*cos(4*b*log(c))
 + b*sin(6*b*log(c))*sin(4*b*log(c)))*n + cos(4*b*log(c))*sin(6*b*log(c)) -
 cos(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + 2*(6*(b^2*cos(2
*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(2*b*log(c)))*n^2 + (b*
cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n + co
s(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*lo
g(x^n) + 2*a) + (2*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*s
in(4*b*log(c)))*n - cos(6*b*log(c))*cos(4*b*log(c)) - sin(6*b*log(c))*sin(4
*b*log(c)))*sin(4*b*log(x^n) + 4*a) - 2*(6*(b^2*cos(6*b*log(c))*cos(2*b*log
(c)) + b^2*sin(6*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(2*b*log(c))*sin(6*
b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n + cos(6*b*log(c))*cos(2*b*
log(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(6*
b*log(c)))*cos(6*b*log(x^n) + 6*a) + (12*b^2*n^2*sin(4*b*log(c)) + 2*b*n*co
s(4*b*log(c)) + 3*(12*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*lo
g(c))*sin(2*b*log(c)))*n^2 + 4*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4
*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*l
og(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 3*(12*(b^2*cos(4*b*log(c)
)*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 - 4*(b*cos(2*b
```

```
*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*b*l
og(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n)
+ 2*a) + 2*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + (2*b*n*cos(2*b*log(c)
) + sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 9*((4*(b^8*cos(6*b*log(c))^2
 + b^8*sin(6*b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c)
)^2)*n^6)*x*cos(6*b*log(x^n) + 6*a)^2 + 9*(4*(b^8*cos(4*b*log(c))^2 + b^8*s
in(4*b*log(c))^2)*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6
)*x*cos(4*b*log(x^n) + 4*a)^2 + 9*(4*(b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*l
og(c))^2)*n^8 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6)*x*cos(
2*b*log(x^n) + 2*a)^2 + (4*(b^8*cos(6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*
n^8 + (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*x*sin(6*b*log(x^
n) + 6*a)^2 + 9*(4*(b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b
^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*x*sin(4*b*log(x^n) + 4*a
)^2 + 9*(4*(b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*cos(2
*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6)*x*sin(2*b*log(x^n) + 2*a)^2 + 6*
(4*b^8*n^8*cos(2*b*log(c)) + b^6*n^6*cos(2*b*log(c)))*x*cos(2*b*log(x^n) +
2*a) - 6*(4*b^8*n^8*sin(2*b*log(c)) + b^6*n^6*sin(2*b*log(c)))*x*sin(2*b*lo
g(x^n) + 2*a) + (4*b^8*n^8 + b^6*n^6)*x + 2*(3*(4*(b^8*cos(6*b*log(c))*cos(
4*b*log(c)) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c
))*cos(4*b*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(c)))*n^6)*x*cos(4*b*lo
g(x^n) + 4*a) + 3*(4*(b^8*cos(6*b*log(c))*cos(2*b*log(c)) + b^8*sin(6*b*log
(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(
6*b*log(c))*sin(2*b*log(c)))*n^6)*x*cos(2*b*log(x^n) + 2*a) + 3*(4*(b^8*cos
(4*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c)))*n^8 + (
b^6*cos(4*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*b*log(c)))*
n^6)*x*sin(4*b*log(x^n) + 4*a) + 3*(4*(b^8*cos(2*b*log(c))*sin(6*b*log(c))
- b^8*cos(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*l
og(c)) - b^6*cos(6*b*log(c))*sin(2*b*log(c)))*n^6)*x*sin(2*b*log(x^n) + 2*a
) + (4*b^8*n^8*cos(6*b*log(c)) + b^6*n^6*cos(6*b*log(c)))*x)*cos(6*b*log(x^
n) + 6*a) + 6*(3*(4*(b^8*cos(4*b*log(c))*cos(2*b*log(c)) + b^8*sin(4*b*log(
c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4
*b*log(c))*sin(2*b*log(c)))*n^6)*x*cos(2*b*log(x^n) + 2*a) + 3*(4*(b^8*cos(
2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b
^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n
^6)*x*sin(2*b*log(x^n) + 2*a) + (4*b^8*n^8*cos(4*b*log(c)) + b^6*n^6*cos(4*
b*log(c)))*x)*cos(4*b*log(x^n) + 4*a) - 2*(3*(4*(b^8*cos(4*b*log(c))*sin(6*
b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))
*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*x*cos(4*b*log(
x^n) + 4*a) + 3*(4*(b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c
))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*
b*log(c))*sin(2*b*log(c)))*n^6)*x*cos(2*b*log(x^n) + 2*a) - 3*(4*(b^8*cos(6
*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^
6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(c)))*n^
6)*x*sin(4*b*log(x^n) + 4*a) - 3*(4*(b^8*cos(6*b*log(c))*cos(2*b*log(c)) +
b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*log
```

```
(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*x*sin(2*b*log(x^n) + 2*a)
+ (4*b^8*n^8*sin(6*b*log(c)) + b^6*n^6*sin(6*b*log(c)))*x)*sin(6*b*log(x^n)
 + 6*a) - 6*(3*(4*(b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c)
)*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b
*log(c))*sin(2*b*log(c)))*n^6)*x*cos(2*b*log(x^n) + 2*a) - 3*(4*(b^8*cos(4*
b*log(c))*cos(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6
*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6
)*x*sin(2*b*log(x^n) + 2*a) + (4*b^8*n^8*sin(4*b*log(c)) + b^6*n^6*sin(4*b*
log(c)))*x)*sin(4*b*log(x^n) + 4*a))*integrate(1/9*(cos(2*b*log(x^n) + 2*a)
*sin(2*b*log(c)) + cos(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/(2*b^6*n^6*x^2*
cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 2*b^6*n^6*x^2*sin(2*b*log(c))*sin
(2*b*log(x^n) + 2*a) + b^6*n^6*x^2 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*l
og(c))^2)*n^6*x^2*cos(2*b*log(x^n) + 2*a)^2 + (b^6*cos(2*b*log(c))^2 + b^6*
sin(2*b*log(c))^2)*n^6*x^2*sin(2*b*log(x^n) + 2*a)^2), x) + (4*b^2*n^2*cos(
6*b*log(c)) - (2*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin
(4*b*log(c)))*n - cos(6*b*log(c))*cos(4*b*log(c)) - sin(6*b*log(c))*sin(4*b
*log(c)))*cos(4*b*log(x^n) + 4*a) + 2*(6*(b^2*cos(6*b*log(c))*cos(2*b*log(c
)) + b^2*sin(6*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(2*b*log(c))*sin(6*b*
log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n + cos(6*b*log(c))*cos(2*b*lo
g(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + (2*(b*co
s(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n + cos(
4*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(
x^n) + 4*a) + 2*(6*(b^2*cos(2*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c
))*sin(2*b*log(c)))*n^2 + (b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*lo
g(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c)
)*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos(6*b*log(c)))*sin(6*b*log(x
^n) + 6*a) + (12*b^2*n^2*cos(4*b*log(c)) - 2*b*n*sin(4*b*log(c)) + 3*(12*(b
^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n
^2 - 4*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c
)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*
cos(2*b*log(x^n) + 2*a) + 3*(12*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*
cos(4*b*log(c))*sin(2*b*log(c)))*n^2 + 4*(b*cos(4*b*log(c))*cos(2*b*log(c))
 + b*sin(4*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) -
 cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + 2*cos(4*b*log(c
)))*sin(4*b*log(x^n) + 4*a) - (2*b*n*sin(2*b*log(c)) - cos(2*b*log(c)))*sin
(2*b*log(x^n) + 2*a))/(6*b^3*n^3*x*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a)
- 6*b^3*n^3*x*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + b^3*n^3*x + (b^3*co
s(6*b*log(c))^2 + b^3*sin(6*b*log(c))^2)*n^3*x*cos(6*b*log(x^n) + 6*a)^2 +
9*(b^3*cos(4*b*log(c))^2 + b^3*sin(4*b*log(c))^2)*n^3*x*cos(4*b*log(x^n) +
4*a)^2 + 9*(b^3*cos(2*b*log(c))^2 + b^3*sin(2*b*log(c))^2)*n^3*x*cos(2*b*lo
g(x^n) + 2*a)^2 + (b^3*cos(6*b*log(c))^2 + b^3*sin(6*b*log(c))^2)*n^3*x*sin
(6*b*log(x^n) + 6*a)^2 + 9*(b^3*cos(4*b*log(c))^2 + b^3*sin(4*b*log(c))^2)*
n^3*x*sin(4*b*log(x^n) + 4*a)^2 + 9*(b^3*cos(2*b*log(c))^2 + b^3*sin(2*b*lo
g(c))^2)*n^3*x*sin(2*b*log(x^n) + 2*a)^2 + 2*(b^3*n^3*x*cos(6*b*log(c)) + 3
*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*log(c))*sin(4*b*log(c))
```

```
)*n^3*x*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(6*b*log(c))*cos(2*b*log(c)) +
b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*x*cos(2*b*log(x^n) + 2*a) + 3*(b^3
*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)))*n^3
*x*sin(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*log(c))*sin(6*b*log(c)) - b^3*c
os(6*b*log(c))*sin(2*b*log(c)))*n^3*x*sin(2*b*log(x^n) + 2*a))*cos(6*b*log(
x^n) + 6*a) + 6*(b^3*n^3*x*cos(4*b*log(c)) + 3*(b^3*cos(4*b*log(c))*cos(2*b
*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3*x*cos(2*b*log(x^n) + 2*
a) + 3*(b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*l
og(c)))*n^3*x*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 2*(b^3*n^3
*x*sin(6*b*log(c)) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*l
og(c))*sin(4*b*log(c)))*n^3*x*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*log(
c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*x*cos(2*b*lo
g(x^n) + 2*a) - 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*log(c)
)*sin(4*b*log(c)))*n^3*x*sin(4*b*log(x^n) + 4*a) - 3*(b^3*cos(6*b*log(c))*c
os(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*x*sin(2*b*log(x^n
) + 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(b^3*n^3*x*sin(4*b*log(c)) + 3*(b^3*c
os(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^3*x
*cos(2*b*log(x^n) + 2*a) - 3*(b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3*sin
(4*b*log(c))*sin(2*b*log(c)))*n^3*x*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^
n) + 4*a))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^2 \cos\left(a + b\,\ln\left(c\,x^n\right)\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*cos(a + b*log(c*x^n))^4),x)
[Out] int(1/(x^2*cos(a + b*log(c*x^n))^4), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^4\left(a + b\log\left(cx^n\right)\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**4/x**2,x)
[Out] Integral(sec(a + b*log(c*x**n))**4/x**2, x)
```

3.258 $\int \frac{\sec^4\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx$

Optimal. Leaf size=79

$$-\frac{8e^{4ia}\left(cx^n\right)^{4ib}\ {}_2F_1\left(4,2+\frac{i}{bn};3+\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{x^2(1-2ibn)}$$

```
[Out] -8*exp(4*I*a)*(c*x^n)^(4*I*b)*hypergeom([4, 2+I/b/n],[3+I/b/n],-exp(2*I*a)*
(c*x^n)^(2*I*b))/(1-2*I*b*n)/x^2
```

Rubi [A] time = 0.07, antiderivative size = 79, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$-\frac{8e^{4ia}\left(cx^n\right)^{4ib}\ {}_2F_1\left(4,2+\frac{i}{bn};3+\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{x^2(1-2ibn)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^4/x^3,x]
```

```
[Out] (-8*E^((4*I)*a)*(c*x^n)^((4*I)*b)*Hypergeometric2F1[4, 2 + I/(b*n), 3 + I/(
b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((1 - (2*I)*b*n)*x^2)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\sec^4\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n}\operatorname{Subst}\left(\int x^{-1-\frac{2}{n}}\sec^4(a+b\log(x))\,dx,x,cx^n\right)}{nx^2}$$
$$= \frac{\left(16e^{4ia}\left(cx^n\right)^{2/n}\right)\operatorname{Subst}\left(\int \frac{x^{-1+4ib-\frac{2}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^4}\,dx,x,cx^n\right)}{nx^2}$$
$$= -\frac{8e^{4ia}\left(cx^n\right)^{4ib}\,{}_2F_1\left(4,2+\frac{i}{bn};3+\frac{i}{bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(1-2ibn)x^2}$$

Mathematica [B] time = 9.24, size = 203, normalized size = 2.57

$$\frac{-2i\left(b^2n^2+1\right)\,{}_2F_1\left(1,\frac{i}{bn};1+\frac{i}{bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+\sec^2\left(a+b\log\left(cx^n\right)\right)\left(\tan\left(a+b\log\left(cx^n\right)\right)\left(\left(b^2n^2+1\right)\cos\left(2\right.\right.\right.}{3b^3n^3x^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^4/x^3,x]
```

```
[Out] (-2*E^((2*I)*a)*(-I + b*n)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 + I/(b*
n), 2 + I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] - (2*I)*(1 + b^2*n^2)*Hyper
geometric2F1[1, I/(b*n), 1 + I/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] + Sec[
a + b*Log[c*x^n]]^2*(b*n + (1 + 2*b^2*n^2 + (1 + b^2*n^2)*Cos[2*(a + b*Log[
c*x^n])])*Tan[a + b*Log[c*x^n]]))/(3*b^3*n^3*x^2)
```

fricas [F] time = 0.53, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^4}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x^3,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^4/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^n\right)+a\right)^4}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x^3,x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^4/x^3, x)
```

maple [F] time = 0.82, size = 0, normalized size = 0.00

$$\int \frac{\sec^4(a + b\ln(c\,x^n))}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^4/x^3,x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^4/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^4/x^3,x, algorithm="maxima")
```

```
[Out] 4/3*(3*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a
)^2 + 3*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2*
a)^2 + 3*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*sin(4*b*log(x^n) + 4
*a)^2 + 3*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) +
2*a)^2 + (b^2*n^2*sin(6*b*log(c)) + ((b*cos(6*b*log(c))*cos(4*b*log(c)) + b
*sin(6*b*log(c))*sin(4*b*log(c)))*n + cos(4*b*log(c))*sin(6*b*log(c)) - cos
(6*b*log(c))*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + (3*(b^2*cos(2*b*log
(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(2*b*log(c)))*n^2 + (b*cos(6*
b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n + 2*cos(2*
b*log(c))*sin(6*b*log(c)) - 2*cos(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(
x^n) + 2*a) + ((b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4
*b*log(c)))*n - cos(6*b*log(c))*cos(4*b*log(c)) - sin(6*b*log(c))*sin(4*b*l
og(c)))*sin(4*b*log(x^n) + 4*a) - (3*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) +
 b^2*sin(6*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(2*b*log(c))*sin(6*b*log(
c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n + 2*cos(6*b*log(c))*cos(2*b*log(
c)) + 2*sin(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(6*b*
log(c)))*cos(6*b*log(x^n) + 6*a) + (3*b^2*n^2*sin(4*b*log(c)) + b*n*cos(4*b
*log(c)) + 3*(3*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))*
sin(2*b*log(c)))*n^2 + 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log
(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))
*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 3*(3*(b^2*cos(4*b*log(c))*cos(2
*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 - 2*(b*cos(2*b*log(c)
```

)*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*b*log(c))*
cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a)
+ 2*sin(4*b*log(c)))*cos(4*b*log(x^n) + 4*a) + (b*n*cos(2*b*log(c)) + sin(2
*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 18*(((b^8*cos(6*b*log(c))^2 + b^8*sin
(6*b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*
x^2*cos(6*b*log(x^n) + 6*a)^2 + 9*((b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log
(c))^2)*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*x^2*cos(
4*b*log(x^n) + 4*a)^2 + 9*((b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*
n^8 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6)*x^2*cos(2*b*log(
x^n) + 2*a)^2 + ((b^8*cos(6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8 + (b^6
*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*x^2*sin(6*b*log(x^n) + 6*a
)^2 + 9*((b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos(4*b
*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*x^2*sin(4*b*log(x^n) + 4*a)^2 + 9*
((b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c))
^2 + b^6*sin(2*b*log(c))^2)*n^6)*x^2*sin(2*b*log(x^n) + 2*a)^2 + 6*(b^8*n^8
*cos(2*b*log(c)) + b^6*n^6*cos(2*b*log(c)))*x^2*cos(2*b*log(x^n) + 2*a) - 6
*(b^8*n^8*sin(2*b*log(c)) + b^6*n^6*sin(2*b*log(c)))*x^2*sin(2*b*log(x^n) +
2*a) + (b^8*n^8 + b^6*n^6)*x^2 + 2*(3*((b^8*cos(6*b*log(c))*cos(4*b*log(c)
) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(4*b
*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(c)))*n^6)*x^2*cos(4*b*log(x^n) +
4*a) + 3*((b^8*cos(6*b*log(c))*cos(2*b*log(c)) + b^8*sin(6*b*log(c))*sin(2
*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(6*b*log(c)
)*sin(2*b*log(c)))*n^6)*x^2*cos(2*b*log(x^n) + 2*a) + 3*((b^8*cos(4*b*log(c
))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*
b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*x^2*s
in(4*b*log(x^n) + 4*a) + 3*((b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(
6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b
^6*cos(6*b*log(c))*sin(2*b*log(c)))*n^6)*x^2*sin(2*b*log(x^n) + 2*a) + (b^8
*n^8*cos(6*b*log(c)) + b^6*n^6*cos(6*b*log(c)))*x^2)*cos(6*b*log(x^n) + 6*a
) + 6*(3*((b^8*cos(4*b*log(c))*cos(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*
b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))
*sin(2*b*log(c)))*n^6)*x^2*cos(2*b*log(x^n) + 2*a) + 3*((b^8*cos(2*b*log(c)
)*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b
*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n^6)*x^2*si
n(2*b*log(x^n) + 2*a) + (b^8*n^8*cos(4*b*log(c)) + b^6*n^6*cos(4*b*log(c)))
*x^2)*cos(4*b*log(x^n) + 4*a) - 2*(3*((b^8*cos(4*b*log(c))*sin(6*b*log(c))
- b^8*cos(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*l
og(c)) - b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*x^2*cos(4*b*log(x^n) + 4
a) + 3((b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(2*b
*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*
sin(2*b*log(c)))*n^6)*x^2*cos(2*b*log(x^n) + 2*a) - 3*((b^8*cos(6*b*log(c))
*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*
log(c))*cos(4*b*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(c)))*n^6)*x^2*sin
(4*b*log(x^n) + 4*a) - 3*((b^8*cos(6*b*log(c))*cos(2*b*log(c)) + b^8*sin(6*
b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*log(c)) + b^6

```
*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*x^2*sin(2*b*log(x^n) + 2*a) + (b^8*n
^8*sin(6*b*log(c)) + b^6*n^6*sin(6*b*log(c)))*x^2)*sin(6*b*log(x^n) + 6*a)
- 6*(3*((b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2*b*
log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c))*s
in(2*b*log(c)))*n^6)*x^2*cos(2*b*log(x^n) + 2*a) - 3*((b^8*cos(4*b*log(c))*
cos(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*l
og(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6)*x^2*sin(
2*b*log(x^n) + 2*a) + (b^8*n^8*sin(4*b*log(c)) + b^6*n^6*sin(4*b*log(c)))*x
^2)*sin(4*b*log(x^n) + 4*a))*integrate(1/9*(cos(2*b*log(x^n) + 2*a)*sin(2*b
*log(c)) + cos(2*b*log(c))*sin(2*b*log(x^n) + 2*a))/(2*b^6*n^6*x^3*cos(2*b*
log(c))*cos(2*b*log(x^n) + 2*a) - 2*b^6*n^6*x^3*sin(2*b*log(c))*sin(2*b*log
(x^n) + 2*a) + b^6*n^6*x^3 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2
)*n^6*x^3*cos(2*b*log(x^n) + 2*a)^2 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*
log(c))^2)*n^6*x^3*sin(2*b*log(x^n) + 2*a)^2), x) + (b^2*n^2*cos(6*b*log(c)
) - ((b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c))
)*n - cos(6*b*log(c))*cos(4*b*log(c)) - sin(6*b*log(c))*sin(4*b*log(c)))*co
s(4*b*log(x^n) + 4*a) + (3*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) + b^2*sin(6
*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(2*b*log(c))*sin(6*b*log(c)) - b*co
s(6*b*log(c))*sin(2*b*log(c)))*n + 2*cos(6*b*log(c))*cos(2*b*log(c)) + 2*si
n(6*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + ((b*cos(6*b*log(c)
)*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n + cos(4*b*log(c))*
sin(6*b*log(c)) - cos(6*b*log(c))*sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a)
+ (3*(b^2*cos(2*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*log(c))*sin(2*b*log
(c)))*n^2 + (b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*
log(c)))*n + 2*cos(2*b*log(c))*sin(6*b*log(c)) - 2*cos(6*b*log(c))*sin(2*b*
log(c)))*sin(2*b*log(x^n) + 2*a) + cos(6*b*log(c)))*sin(6*b*log(x^n) + 6*a)
 + (3*b^2*n^2*cos(4*b*log(c)) - b*n*sin(4*b*log(c)) + 3*(3*(b^2*cos(4*b*log
(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 - 2*(b*cos(
2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*
b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^
n) + 2*a) + 3*(3*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c))
*sin(2*b*log(c)))*n^2 + 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*lo
g(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c)
)*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + 2*cos(4*b*log(c)))*sin(4*b*log
(x^n) + 4*a) - (b*n*sin(2*b*log(c)) - cos(2*b*log(c)))*sin(2*b*log(x^n) + 2
*a))/(6*b^3*n^3*x^2*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 6*b^3*n^3*x^2
*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + b^3*n^3*x^2 + (b^3*cos(6*b*log(c
))^2 + b^3*sin(6*b*log(c))^2)*n^3*x^2*cos(6*b*log(x^n) + 6*a)^2 + 9*(b^3*co
s(4*b*log(c))^2 + b^3*sin(4*b*log(c))^2)*n^3*x^2*cos(4*b*log(x^n) + 4*a)^2
+ 9*(b^3*cos(2*b*log(c))^2 + b^3*sin(2*b*log(c))^2)*n^3*x^2*cos(2*b*log(x^n
) + 2*a)^2 + (b^3*cos(6*b*log(c))^2 + b^3*sin(6*b*log(c))^2)*n^3*x^2*sin(6*
b*log(x^n) + 6*a)^2 + 9*(b^3*cos(4*b*log(c))^2 + b^3*sin(4*b*log(c))^2)*n^3
*x^2*sin(4*b*log(x^n) + 4*a)^2 + 9*(b^3*cos(2*b*log(c))^2 + b^3*sin(2*b*log
(c))^2)*n^3*x^2*sin(2*b*log(x^n) + 2*a)^2 + 2*(b^3*n^3*x^2*cos(6*b*log(c))
+ 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6*b*log(c))*sin(4*b*log(
```

```
c)))*n^3*x^2*cos(4*b*log(x^n) + 4*a) + 3*(b^3*cos(6*b*log(c))*cos(2*b*log(c
)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*x^2*cos(2*b*log(x^n) + 2*a) +
 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c
)))*n^3*x^2*sin(4*b*log(x^n) + 4*a) + 3*(b^3*cos(2*b*log(c))*sin(6*b*log(c)
) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*x^2*sin(2*b*log(x^n) + 2*a))*c
os(6*b*log(x^n) + 6*a) + 6*(b^3*n^3*x^2*cos(4*b*log(c)) + 3*(b^3*cos(4*b*lo
g(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3*x^2*cos(2*
b*log(x^n) + 2*a) + 3*(b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*lo
g(c))*sin(2*b*log(c)))*n^3*x^2*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) +
4*a) - 2*(b^3*n^3*x^2*sin(6*b*log(c)) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(
c)) - b^3*cos(6*b*log(c))*sin(4*b*log(c)))*n^3*x^2*cos(4*b*log(x^n) + 4*a)
+ 3*(b^3*cos(2*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(
c)))*n^3*x^2*cos(2*b*log(x^n) + 2*a) - 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c
)) + b^3*sin(6*b*log(c))*sin(4*b*log(c)))*n^3*x^2*sin(4*b*log(x^n) + 4*a) -
 3*(b^3*cos(6*b*log(c))*cos(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c
)))*n^3*x^2*sin(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(b^3*n^3*x
^2*sin(4*b*log(c)) + 3*(b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*l
og(c))*sin(2*b*log(c)))*n^3*x^2*cos(2*b*log(x^n) + 2*a) - 3*(b^3*cos(4*b*lo
g(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3*x^2*sin(2*
b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^3 \cos(a + b\ \ln(c\,x^n))^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*cos(a + b*log(c*x^n))^4),x)
```

```
[Out] int(1/(x^3*cos(a + b*log(c*x^n))^4), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^4\left(a + b\log(cx^n)\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**4/x**3,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**4/x**3, x)
```

3.259 $\int \left(-\left(\left(1+b^2n^2\right)\sec\left(a+b\log\left(cx^n\right)\right)\right)+2b^2n^2\sec^3\left(a\right.\right.$

Optimal. Leaf size=41

$$bnx\tan\left(a+b\log\left(cx^n\right)\right)\sec\left(a+b\log\left(cx^n\right)\right)-x\sec\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -x*sec(a+b*ln(c*x^n))+b*n*x*sec(a+b*ln(c*x^n))*tan(a+b*ln(c*x^n))
```

Rubi [C] time = 0.13, antiderivative size = 175, normalized size of antiderivative = 4.27, number of steps used = 7, number of rules used = 3, integrand size = 44, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.068, Rules used = {4503, 4505, 364}

$$\frac{16e^{3ia}b^2n^2x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+3ibn}-2e^{ia}x(1-ibn)\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3\right.\right.$$

Warning: Unable to verify antiderivative.

```
[In] Int[-((1 + b^2*n^2)*Sec[a + b*Log[c*x^n]]) + 2*b^2*n^2*Sec[a + b*Log[c*x^n]
]^3,x]
```

```
[Out] -2*E^(I*a)*(1 - I*b*n)*x*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - I/(b*n))/2
, (3 - I/(b*n))/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))] + (16*b^2*E^((3*I)*a)*
n^2*x*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 - I/(b*n))/2, (5 - I/(b*n))
/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1 + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \left(-\left(1+b^2n^2\right)\sec\left(a+b\log\left(cx^n\right)\right)+2b^2n^2\sec^3\left(a+b\log\left(cx^n\right)\right)\right)dx=\left(2b^2n^2\right)\int\sec^3\left(a+b\log\left(cx^n\right)\right)dx+$$

$$=\left(2b^2nx\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^3\right.$$

$$=\left(16b^2e^{3ia}nx\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\frac{x^{-1}}{\left(1+e\right.}\right.$$

$$=-2e^{ia}(1-ibn)x\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{}{b}\right.\right.$$

Mathematica [A] time = 0.46, size = 29, normalized size = 0.71

$$x\left(bn\tan\left(a+b\log\left(cx^n\right)\right)-1\right)\sec\left(a+b\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[-((1 + b^2*n^2)*Sec[a + b*Log[c*x^n]]) + 2*b^2*n^2*Sec[a + b*Log[
c*x^n]]^3,x]
```

```
[Out] x*Sec[a + b*Log[c*x^n]]*(-1 + b*n*Tan[a + b*Log[c*x^n]])
```

fricas [A] time = 3.98, size = 47, normalized size = 1.15

$$\frac{bnx\sin\left(bn\log(x)+b\log(c)+a\right)-x\cos\left(bn\log(x)+b\log(c)+a\right)}{\cos\left(bn\log(x)+b\log(c)+a\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b^2*n^2+1)*sec(a+b*log(c*x^n))+2*b^2*n^2*sec(a+b*log(c*x^n))^3,
x, algorithm="fricas")
```

```
[Out] (b*n*x*sin(b*n*log(x) + b*log(c) + a) - x*cos(b*n*log(x) + b*log(c) + a))/c
os(b*n*log(x) + b*log(c) + a)^2
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int 2\,b^2n^2\sec\left(b\log\left(cx^n\right)+a\right)^3-\left(b^2n^2+1\right)\sec\left(b\log\left(cx^n\right)+a\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b^2*n^2+1)*sec(a+b*log(c*x^n))+2*b^2*n^2*sec(a+b*log(c*x^n))^3,
x, algorithm="giac")
```

```
[Out] integrate(2*b^2*n^2*sec(b*log(c*x^n) + a)^3 - (b^2*n^2 + 1)*sec(b*log(c*x^n
) + a), x)
```

maple [C] time = 0.64, size = 525, normalized size = 12.80

$$-\frac{2ic^{ib}\left(x^{n}\right)^{ib}x\left(nb\,c^{2ib}\left(x^{n}\right)^{2ib}\mathrm{e}^{\frac{3b\pi\mathrm{csgn}\left(icx^{n}\right)^{3}}{2}}\mathrm{e}^{-\frac{3b\pi\mathrm{csgn}\left(icx^{n}\right)^{2}\mathrm{csgn}(ic)}{2}}\mathrm{e}^{-\frac{3b\pi\mathrm{csgn}\left(icx^{n}\right)^{2}\mathrm{csgn}\left(ix^{n}\right)}{2}}\mathrm{e}^{\frac{3b\pi\,\mathrm{csgn}\left(icx^{n}\right)\mathrm{csgn}(ic)\mathrm{csgn}\left(ix^{n}\right)}{2}}\mathrm{e}^{3ia}-bn\,\mathrm{e}\cdots\right.}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(b^2*n^2+1)*sec(a+b*ln(c*x^n))+2*b^2*n^2*sec(a+b*ln(c*x^n))^3,x)
```

```
[Out] -2*I*c^(I*b)*(x^n)^(I*b)*x/(((x^n)^(I*b))^2*(c^(I*b))^2*exp(b*Pi*csgn(I*c*x
^n)^3)*exp(-b*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-b*Pi*csgn(I*c*x^n)^2*csgn(
I*x^n))*exp(b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(2*I*a)+1)^2*(n*b*
(c^(I*b))^2*((x^n)^(I*b))^2*exp(3/2*b*Pi*csgn(I*c*x^n)^3)*exp(-3/2*b*Pi*csg
n(I*c*x^n)^2*csgn(I*c))*exp(-3/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*x^n))*exp(3/2*
b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(3*I*a)-b*n*exp(1/2*b*Pi*csgn(
I*c*x^n)^3)*exp(-1/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-1/2*b*Pi*csgn(I*c
*x^n)^2*csgn(I*x^n))*exp(1/2*b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(
I*a)-I*(c^(I*b))^2*((x^n)^(I*b))^2*exp(3/2*b*Pi*csgn(I*c*x^n)^3)*exp(-3/2*b
*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-3/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*x^n))*e
xp(3/2*b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(3*I*a)-I*exp(1/2*b*Pi*
csgn(I*c*x^n)^3)*exp(-1/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-1/2*b*Pi*csg
n(I*c*x^n)^2*csgn(I*x^n))*exp(1/2*b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))
*exp(I*a))
```

maxima [B] time = 2.33, size = 1696, normalized size = 41.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b^2*n^2+1)*sec(a+b*log(c*x^n))+2*b^2*n^2*sec(a+b*log(c*x^n))^3,
x, algorithm="maxima")
```

```
[Out] -2*((b*n*sin(b*log(c)) + cos(b*log(c)))*x*cos(b*log(x^n) + a) + (b*n*cos(b*
log(c)) - sin(b*log(c)))*x*sin(b*log(x^n) + a) + (((b*cos(3*b*log(c))*sin(4
*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)))*n + cos(4*b*log(c))*cos(3*b
```

```
*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)))*x*cos(3*b*log(x^n) + 3*a) - ((b
*cos(b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(b*log(c)))*n - cos(4
*b*log(c))*cos(b*log(c)) - sin(4*b*log(c))*sin(b*log(c)))*x*cos(b*log(x^n)
+ a) - ((b*cos(4*b*log(c))*cos(3*b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(
c)))*n - cos(3*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(3*b*log(c)))
*x*sin(3*b*log(x^n) + 3*a) + ((b*cos(4*b*log(c))*cos(b*log(c)) + b*sin(4*b*
log(c))*sin(b*log(c)))*n + cos(b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*
sin(b*log(c)))*x*sin(b*log(x^n) + a))*cos(4*b*log(x^n) + 4*a) - (2*((b*cos(
2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n - cos(3*
b*log(c))*cos(2*b*log(c)) - sin(3*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(
x^n) + 2*a) - 2*((b*cos(3*b*log(c))*cos(2*b*log(c)) + b*sin(3*b*log(c))*sin
(2*b*log(c)))*n + cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b
*log(c)))*x*sin(2*b*log(x^n) + 2*a) + (b*n*sin(3*b*log(c)) - cos(3*b*log(c)
))*x)*cos(3*b*log(x^n) + 3*a) - 2*(((b*cos(b*log(c))*sin(2*b*log(c)) - b*co
s(2*b*log(c))*sin(b*log(c)))*n - cos(2*b*log(c))*cos(b*log(c)) - sin(2*b*lo
g(c))*sin(b*log(c)))*x*cos(b*log(x^n) + a) - ((b*cos(2*b*log(c))*cos(b*log(
c)) + b*sin(2*b*log(c))*sin(b*log(c)))*n + cos(b*log(c))*sin(2*b*log(c)) -
cos(2*b*log(c))*sin(b*log(c)))*x*sin(b*log(x^n) + a))*cos(2*b*log(x^n) + 2*
a) + (((b*cos(4*b*log(c))*cos(3*b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c
)))*n - cos(3*b*log(c))*sin(4*b*log(c)) + cos(4*b*log(c))*sin(3*b*log(c)))*
x*cos(3*b*log(x^n) + 3*a) - ((b*cos(4*b*log(c))*cos(b*log(c)) + b*sin(4*b*l
og(c))*sin(b*log(c)))*n + cos(b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*s
in(b*log(c)))*x*cos(b*log(x^n) + a) + ((b*cos(3*b*log(c))*sin(4*b*log(c)) -
 b*cos(4*b*log(c))*sin(3*b*log(c)))*n + cos(4*b*log(c))*cos(3*b*log(c)) + s
in(4*b*log(c))*sin(3*b*log(c)))*x*sin(3*b*log(x^n) + 3*a) - ((b*cos(b*log(c
))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(b*log(c)))*n - cos(4*b*log(c))*c
os(b*log(c)) - sin(4*b*log(c))*sin(b*log(c)))*x*sin(b*log(x^n) + a))*sin(4*
b*log(x^n) + 4*a) - (2*((b*cos(3*b*log(c))*cos(2*b*log(c)) + b*sin(3*b*log(
c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*
sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) + 2*((b*cos(2*b*log(c))*sin(3*b*
log(c)) - b*cos(3*b*log(c))*sin(2*b*log(c)))*n - cos(3*b*log(c))*cos(2*b*lo
g(c)) - sin(3*b*log(c))*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) + (b*n*c
os(3*b*log(c)) + sin(3*b*log(c)))*x)*sin(3*b*log(x^n) + 3*a) - 2*(((b*cos(2
*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)))*n + cos(b*log(c
))*sin(2*b*log(c)) - cos(2*b*log(c))*sin(b*log(c)))*x*cos(b*log(x^n) + a) +
 ((b*cos(b*log(c))*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)))*n - c
os(2*b*log(c))*cos(b*log(c)) - sin(2*b*log(c))*sin(b*log(c)))*x*sin(b*log(x
^n) + a))*sin(2*b*log(x^n) + 2*a))/((cos(4*b*log(c))^2 + sin(4*b*log(c))^2)
*cos(4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(
2*b*log(x^n) + 2*a)^2 + (cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log
(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n)
 + 2*a)^2 + 2*(2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b
*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log(c)) - co
s(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + cos(4*b*log(c)))*c
os(4*b*log(x^n) + 4*a) + 4*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 2*(2*(
```

```
cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*
log(x^n) + 2*a) - 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(
2*b*log(c)))*sin(2*b*log(x^n) + 2*a) + sin(4*b*log(c)))*sin(4*b*log(x^n) +
4*a) - 4*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)
```

mupad [B] time = 3.42, size = 87, normalized size = 2.12

$$\frac{2\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,(c\,x^n)^{b\,1\mathrm{i}}\,(-1+b\,n\,1\mathrm{i})-2\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,1\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}\,(1+b\,n\,1\mathrm{i})}{\left(\mathrm{e}^{a\,2\mathrm{i}}\,(c\,x^n)^{b\,2\mathrm{i}}+1\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((2*b^2*n^2)/cos(a + b*log(c*x^n))^3 - (b^2*n^2 + 1)/cos(a + b*log(c*x^n
)),x)
```

```
[Out] (2*x*exp(a*1i)*(c*x^n)^(b*1i)*(b*n*1i - 1) - 2*x*exp(a*1i)*exp(a*2i)*(c*x^n
)^(b*1i)*(c*x^n)^(b*2i)*(b*n*1i + 1))/(exp(a*2i)*(c*x^n)^(b*2i) + 1)^2
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\left(2b^2n^2\sec^2\left(a+b\log\left(cx^n\right)\right)-b^2n^2-1\right)\sec\left(a+b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b**2*n**2+1)*sec(a+b*ln(c*x**n))+2*b**2*n**2*sec(a+b*ln(c*x**n)
)**3,x)
```

```
[Out] Integral((2*b**2*n**2*sec(a + b*log(c*x**n))**2 - b**2*n**2 - 1)*sec(a + b*
log(c*x**n)), x)
```

3.260 $\int x^m \sec^3\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)\right)\,dx$

Optimal. Leaf size=110

$$\frac{x^{m+1}\sec\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)}{2(m+1)}+\frac{x^{m+1}\tan\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)\sec\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)}{2\sqrt{-(m+1)^2}}$$

```
[Out] 1/2*x^(1+m)*sec(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))/(1+m)+1/2*x^(1+m)*sec(a
+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))*tan(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))/
(-(1+m)^2)^(1/2)
```

Rubi [C] time = 0.22, antiderivative size = 146, normalized size of antiderivative = 1.33, number of steps used = 3, number of rules used = 3, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.097, Rules used = {4509, 4505, 364}

$$\frac{8e^{3ia}x^{m+1}\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)^{6i}{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i(m+1)}{\sqrt{-(m+1)^2}}\right);\frac{1}{2}\left(5-\frac{i(m+1)}{\sqrt{-(m+1)^2}}\right);-e^{2ia}\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)^{4i}\right)}{1-i\left(-3\sqrt{-(m+1)^2}+im\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Int[x^m*Sec[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]]^3,x]
```

```
[Out] (8*E^((3*I)*a)*x^(1 + m)*(c*x^(Sqrt[-(1 + m)^2]/2))^(6*I)*Hypergeometric2F1
[3, (3 - (I*(1 + m))/Sqrt[-(1 + m)^2])/2, (5 - (I*(1 + m))/Sqrt[-(1 + m)^2]
)/2, -(E^((2*I)*a)*(c*x^(Sqrt[-(1 + m)^2]/2))^(4*I))])/(1 - I*(I*m - 3*Sqrt
[-(1 + m)^2]))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sec^3\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)\right)dx = \frac{\left(2x^{1+m}\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{-\frac{2(1+m)}{\sqrt{-(1+m)^2}}}\right)\text{Subst}\left(\int x^{-1+\frac{2(1+m)}{\sqrt{-(1+m)^2}}}\sec^3(a+2\text{lo}\right.}{\sqrt{-(1+m)^2}}$$

$$= \frac{\left(16e^{3ia}x^{1+m}\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{-\frac{2(1+m)}{\sqrt{-(1+m)^2}}}\right)\text{Subst}\left(\int \frac{x^{(-1+6i)+\frac{2(1+m)}{\sqrt{-(1+m)^2}}}}{\left(1+e^{2ia}x^{4i}\right)^3}dx, x,\right.}{\sqrt{-(1+m)^2}}$$

$$= \frac{8e^{3ia}x^{1+m}\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{6i}{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i(1+m)}{\sqrt{-(1+m)^2}}\right);\frac{1}{2}\left(5-\frac{i(1+m)}{\sqrt{-(1+m)^2}}\right.\right.}{1-i\left(im-3\sqrt{-(1+m)^2}\right)}$$

Mathematica [A] time = 2.07, size = 198, normalized size = 1.80

$$\frac{x^{m+1}\left((m+1)\cos\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)-\sqrt{-(m+1)^2}\sin\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right.\right.}{2(m+1)^2\left(\cos\left(\frac{a}{2}+\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)-\sin\left(\frac{a}{2}+\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)\right)^2\left(\sin\left(\frac{a}{2}+\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)+\cos\left(\frac{a}{2}\right.\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Sec[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]]^3,x]
```

```
[Out] (x^(1 + m)*((1 + m)*Cos[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]] - Sqrt[-(1 + m
)^2]*Sin[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]]))/(2*(1 + m)^2*(Cos[a/2 + Log
[c*x^(Sqrt[-(1 + m)^2]/2)]] - Sin[a/2 + Log[c*x^(Sqrt[-(1 + m)^2]/2)]])^2*(
Cos[a/2 + Log[c*x^(Sqrt[-(1 + m)^2]/2)]] + Sin[a/2 + Log[c*x^(Sqrt[-(1 + m)
^2]/2)]])^2)
```

fricas [C] time = 0.95, size = 81, normalized size = 0.74

$$-\frac{2\left(2x^2x^{2m}e^{\left(3ia+6i\log(c)\right)}+e^{\left(5ia+10i\log(c)\right)}\right)}{(m+1)x^4x^{4m}+2(m+1)x^2x^{2m}e^{\left(2ia+4i\log(c)\right)}+(m+1)e^{\left(4ia+8i\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+2*log(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x, algorithm="fric
as")
```

```
[Out] -2*(2*x^2*x^(2*m)*e^(3*I*a + 6*I*log(c)) + e^(5*I*a + 10*I*log(c)))/((m + 1
)*x^4*x^(4*m) + 2*(m + 1)*x^2*x^(2*m)*e^(2*I*a + 4*I*log(c)) + (m + 1)*e^(4
*I*a + 8*I*log(c)))
```

giac [C] time = 18.02, size = 834, normalized size = 7.58

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+2*log(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x, algorithm="giac
")
```

```
[Out] c^(6*I)*m*x*x^m*x^abs(m + 1)*e^(3*I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^(8*I)*m
*e^(4*I*a) + c^(8*I)*e^(4*I*a) + 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2*I*a) +
 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) + 2*c^(4*I)*x^(2*abs(m + 1))*e^(2*I
*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1))) - c^(
6*I)*x*x^m*x^abs(m + 1)*abs(m + 1)*e^(3*I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^(
8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) + 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2*
I*a) + 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) + 2*c^(4*I)*x^(2*abs(m + 1))*
e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1)))
 + c^(6*I)*x*x^m*x^abs(m + 1)*e^(3*I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^(8*I)*
m*e^(4*I*a) + c^(8*I)*e^(4*I*a) + 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2*I*a)
+ 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) + 2*c^(4*I)*x^(2*abs(m + 1))*e^(2*
I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1))) + c^
(2*I)*m*x*x^m*x^(3*abs(m + 1))*e^(I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^(8*I)*m
*e^(4*I*a) + c^(8*I)*e^(4*I*a) + 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2*I*a) +
 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) + 2*c^(4*I)*x^(2*abs(m + 1))*e^(2*I
*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1))) + c^(
2*I)*x*x^m*x^(3*abs(m + 1))*abs(m + 1)*e^(I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c
^(8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) + 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(
2*I*a) + 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) + 2*c^(4*I)*x^(2*abs(m + 1)
)*e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1)
)) + c^(2*I)*x*x^m*x^(3*abs(m + 1))*e^(I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^(8
*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) + 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2*I
*a) + 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) + 2*c^(4*I)*x^(2*abs(m + 1))*e
^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1)))
```

maple [F] time = 0.29, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sec^{3}\left(a + 2\ln\left(c\, x^{\frac{\sqrt{-(1+m)^{2}}}{2}}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x)
```

```
[Out] int(x^m*sec(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x)
```

maxima [B] time = 1.17, size = 976, normalized size = 8.87

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+2*log(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x, algorithm="maxi
ma")
```

```
[Out] 2*((cos(a)*cos(2*log(c)) - sin(a)*sin(2*log(c)))*x*e^(m*log(x) + 14*arctan2
(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 14*arctan2(sin(1/2*log(x)), cos(1/
2*log(x)))) + 2*(((cos(2*a)*cos(a) + sin(2*a)*sin(a))*cos(2*log(c)) + (cos(
a)*sin(2*a) - cos(2*a)*sin(a))*sin(2*log(c)))*cos(4*log(c)) - ((cos(a)*sin(
2*a) - cos(2*a)*sin(a))*cos(2*log(c)) - (cos(2*a)*cos(a) + sin(2*a)*sin(a))
*sin(2*log(c)))*sin(4*log(c)))*x*e^(m*log(x) + 10*arctan2(sin(1/2*m*log(x))
, cos(1/2*m*log(x))) + 10*arctan2(sin(1/2*log(x)), cos(1/2*log(x)))) + (((c
os(4*a)*cos(a) + sin(4*a)*sin(a))*cos(2*log(c)) + (cos(a)*sin(4*a) - cos(4*
a)*sin(a))*sin(2*log(c)))*cos(8*log(c)) - ((cos(a)*sin(4*a) - cos(4*a)*sin(
a))*cos(2*log(c)) - (cos(4*a)*cos(a) + sin(4*a)*sin(a))*sin(2*log(c)))*sin(
8*log(c)))*x*e^(m*log(x) + 6*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x)))
+ 6*arctan2(sin(1/2*log(x)), cos(1/2*log(x)))))/((cos(4*a)^2 + sin(4*a)^2)*
cos(8*log(c))^2 + (cos(4*a)^2 + sin(4*a)^2)*sin(8*log(c))^2 + ((cos(4*a)^2
+ sin(4*a)^2)*cos(8*log(c))^2 + (cos(4*a)^2 + sin(4*a)^2)*sin(8*log(c))^2)*
m + (m + 1)*e^(16*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 16*arctan
2(sin(1/2*log(x)), cos(1/2*log(x)))) + 4*((cos(2*a)*cos(4*log(c)) - sin(2*a
)*sin(4*log(c)))*m + cos(2*a)*cos(4*log(c)) - sin(2*a)*sin(4*log(c)))*e^(12
*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 12*arctan2(sin(1/2*log(x))
, cos(1/2*log(x)))) + 2*(2*(cos(2*a)^2 + sin(2*a)^2)*cos(4*log(c))^2 + 2*(c
os(2*a)^2 + sin(2*a)^2)*sin(4*log(c))^2 + (2*(cos(2*a)^2 + sin(2*a)^2)*cos(
4*log(c))^2 + 2*(cos(2*a)^2 + sin(2*a)^2)*sin(4*log(c))^2 + cos(4*a)*cos(8*
log(c)) - sin(4*a)*sin(8*log(c)))*m + cos(4*a)*cos(8*log(c)) - sin(4*a)*sin
(8*log(c)))*e^(8*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 8*arctan2(
sin(1/2*log(x)), cos(1/2*log(x)))) + 4*((((cos(4*a)*cos(2*a) + sin(4*a)*sin
(2*a))*cos(4*log(c)) + (cos(2*a)*sin(4*a) - cos(4*a)*sin(2*a))*sin(4*log(c)
))*cos(8*log(c)) - ((cos(2*a)*sin(4*a) - cos(4*a)*sin(2*a))*cos(4*log(c)) -
 (cos(4*a)*cos(2*a) + sin(4*a)*sin(2*a))*sin(4*log(c)))*sin(8*log(c)))*m +
((cos(4*a)*cos(2*a) + sin(4*a)*sin(2*a))*cos(4*log(c)) + (cos(2*a)*sin(4*a)
 - cos(4*a)*sin(2*a))*sin(4*log(c)))*cos(8*log(c)) - ((cos(2*a)*sin(4*a) -
cos(4*a)*sin(2*a))*cos(4*log(c)) - (cos(4*a)*cos(2*a) + sin(4*a)*sin(2*a))*
sin(4*log(c)))*sin(8*log(c)))*e^(4*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log
(x))) + 4*arctan2(sin(1/2*log(x)), cos(1/2*log(x)))))
```

mupad [B] time = 6.96, size = 176, normalized size = 1.60

$$\frac{\frac{x^{m+1}\,\mathrm{e}^{a\,1\mathrm{i}}\left(c\,x^{\frac{\sqrt{-m^2-2\,m-1}}{2}}\right)^{2\mathrm{i}}\left(m\,1\mathrm{i}+\sqrt{-(m+1)^2}+1\mathrm{i}\right)}{\sqrt{-(m+1)^2}}-\frac{x^{m+1}\,\mathrm{e}^{a\,1\mathrm{i}}\left(c\,x^{\frac{\sqrt{-m^2-2\,m-1}}{2}}\right)^{6\mathrm{i}}\left(\mathrm{e}^{a\,2\mathrm{i}}\,1\mathrm{i}-\mathrm{e}^{a\,2\mathrm{i}}\,\sqrt{-(m+1)^2}+m\,\mathrm{e}^{a\,2\mathrm{i}}\,1\mathrm{i}\right)}{\sqrt{-(m+1)^2}}}{(m+1)\left(\mathrm{e}^{a\,2\mathrm{i}}\left(c\,x^{\frac{\sqrt{-m^2-2\,m-1}}{2}}\right)^{4\mathrm{i}}+1\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + 2*log(c*x^((-(m + 1)^2)^(1/2)/2)))^3,x)
```

```
[Out] ((x^(m + 1)*exp(a*1i)*(c*x^((- 2*m - m^2 - 1)^(1/2)/2))^2i*(m*1i + (-(m + 1
)^2)^(1/2) + 1i))/(-(m + 1)^2)^(1/2) - (x^(m + 1)*exp(a*1i)*(c*x^((- 2*m -
m^2 - 1)^(1/2)/2))^6i*(exp(a*2i)*1i - exp(a*2i)*(-(m + 1)^2)^(1/2) + m*exp(
a*2i)*1i))/(-(m + 1)^2)^(1/2))/((m + 1)*(exp(a*2i)*(c*x^((- 2*m - m^2 - 1)^
(1/2)/2))^4i + 1)^2)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+2*ln(c*x**(1/2*(-(1+m)**2)**(1/2))))**3,x)
```

```
[Out] Timed out
```

3.261 $\int x \sec^3\left(a+2\log\left(cx^i\right)\right)\,dx$

Optimal. Leaf size=45

$$\frac{e^{ia}x^2\left(cx^i\right)^{2i}}{\left(1+e^{2ia}\left(cx^i\right)^{4i}\right)^2}$$

[Out] exp(I*a)*(c*x^I)^(2*I)*x^2/(1+exp(2*I*a)*(c*x^I)^(4*I))^2

Rubi [A] time = 0.04, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 261}

$$\frac{e^{ia}x^2\left(cx^i\right)^{2i}}{\left(1+e^{2ia}\left(cx^i\right)^{4i}\right)^2}$$

Antiderivative was successfully verified.

[In] Int[x*Sec[a + 2*Log[c*x^I]]^3,x]

[Out] (E^(I*a)*(c*x^I)^(2*I)*x^2)/(1 + E^((2*I)*a)*(c*x^I)^(4*I))^2

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sec^3\left(a+2\log\left(cx^i\right)\right)\,dx=-\left(\left(i\left(cx^i\right)^{2i}x^2\right)\text{Subst}\left(\int x^{-1-2i}\sec^3(a+2\log(x))\,dx,x,cx^i\right)\right)$$
$$=-\left(\left(8ie^{3ia}\left(cx^i\right)^{2i}x^2\right)\text{Subst}\left(\int\frac{x^{-1+4i}}{\left(1+e^{2ia}x^{4i}\right)^3}\,dx,x,cx^i\right)\right)$$
$$=\frac{e^{ia}\left(cx^i\right)^{2i}x^2}{\left(1+e^{2ia}\left(cx^i\right)^{4i}\right)^2}$$

Mathematica [B] time = 0.17, size = 127, normalized size = 2.82

$$-\frac{\sec^2\left(a+2\log\left(cx^i\right)\right)\left(i\left(1-2x^4\right)\sin\left(a+2\log\left(cx^i\right)-2i\log(x)\right)+\left(2x^4+1\right)\cos\left(a+2\log\left(cx^i\right)-2i\log(x)\right)\right)\left(\right.}{4x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Sec[a + 2*Log[c*x^I]]^3,x]
```

```
[Out] -1/4*(Sec[a + 2*Log[c*x^I]]^2*((1 + 2*x^4)*Cos[a + 2*Log[c*x^I] - (2*I)*Log
[x]] + I*(1 - 2*x^4)*Sin[a + 2*Log[c*x^I] - (2*I)*Log[x]])*(Cos[2*(a + 2*Lo
g[c*x^I] - (2*I)*Log[x])] + I*Sin[2*(a + 2*Log[c*x^I] - (2*I)*Log[x])]))/x^
4
```

fricas [A] time = 0.81, size = 55, normalized size = 1.22

$$-\frac{2\,x^4e^{\left(3i\,a+6i\,\log(c)\right)}+e^{\left(5i\,a+10i\,\log(c)\right)}}{x^8+2\,x^4e^{\left(2i\,a+4i\,\log(c)\right)}+e^{\left(4i\,a+8i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+2*log(c*x^I))^3,x, algorithm="fricas")
```

```
[Out] -(2*x^4*e^(3*I*a + 6*I*log(c)) + e^(5*I*a + 10*I*log(c)))/(x^8 + 2*x^4*e^(2
*I*a + 4*I*log(c)) + e^(4*I*a + 8*I*log(c)))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(a+2\,\log\left(cx^i\right)\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+2*log(c*x^I))^3,x, algorithm="giac")
```

```
[Out] integrate(x*sec(a + 2*log(c*x^I))^3, x)
```

maple [C] time = 0.23, size = 209, normalized size = 4.64

$$\frac{x^{2} c^{2 i} \left(x^{i}\right)^{2 i} {\mathrm e}^{\pi \operatorname{csgn}\left(i c\,x^{i}\right)^{3}-\pi \operatorname{csgn}\left(i c\,x^{i}\right)^{2} \operatorname{csgn}\left(i c\right)-\pi \operatorname{csgn}\left(i c\,x^{i}\right)^{2} \operatorname{csgn}\left(i x^{i}\right)+\pi \operatorname{csgn}\left(i c\,x^{i}\right) \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i x^{i}\right)+i a}}{\left(\left(x^{i}\right)^{4 i} c^{4 i} {\mathrm e}^{2 \pi \operatorname{csgn}\left(i c\,x^{i}\right)^{3}} {\mathrm e}^{-2 \pi \operatorname{csgn}\left(i c\,x^{i}\right)^{2} \operatorname{csgn}\left(i c\right)} {\mathrm e}^{-2 \pi \operatorname{csgn}\left(i c\,x^{i}\right)^{2} \operatorname{csgn}\left(i x^{i}\right)} {\mathrm e}^{2 \pi \operatorname{csgn}\left(i c\,x^{i}\right) \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i x^{i}\right)} {\mathrm e}^{2 i a}+1\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sec(a+2*ln(c*x^I))^3,x)
```

```
[Out] x^2*c^(2*I)*(x^I)^(2*I)*exp(Pi*csgn(I*c*x^I)^3-Pi*csgn(I*c*x^I)^2*csgn(I*c)
-Pi*csgn(I*c*x^I)^2*csgn(I*x^I)+Pi*csgn(I*c*x^I)*csgn(I*c)*csgn(I*x^I)+I*a)
/(((x^I)^(2*I))^2*(c^(2*I))^2*exp(2*Pi*csgn(I*c*x^I)^3)*exp(-2*Pi*csgn(I*c*
x^I)^2*csgn(I*c))*exp(-2*Pi*csgn(I*c*x^I)^2*csgn(I*x^I))*exp(2*Pi*csgn(I*c*
x^I)*csgn(I*c)*csgn(I*x^I))*exp(2*I*a)+1)^2
```

maxima [B] time = 0.37, size = 140, normalized size = 3.11

$$\frac{\left(\left(\cos\left(a\right) + i \, \sin\left(a\right)\right) \cos\left(2 \, \log\left(c\right)\right) - \left(-i \, \cos\left(a\right) + s\right.\right.}{\left(\cos\left(4 \, a\right) + i \, \sin\left(4 \, a\right)\right) \cos\left(8 \, \log\left(c\right)\right) + \left(\left(2 \, \cos\left(2 \, a\right) + 2 i \, \sin\left(2 \, a\right)\right) \cos\left(4 \, \log\left(c\right)\right) - 2 \, \left(-i \, \cos\left(2 \, a\right) + \sin\left(2 \, a\right)\right) s\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+2*log(c*x^I))^3,x, algorithm="maxima")
```

```
[Out] ((cos(a) + I*sin(a))*cos(2*log(c)) - (-I*cos(a) + sin(a))*sin(2*log(c)))*x^
2*e^(6*arctan2(sin(log(x)), cos(log(x))))/((cos(4*a) + I*sin(4*a))*cos(8*lo
g(c)) + ((2*cos(2*a) + 2*I*sin(2*a))*cos(4*log(c)) - 2*(-I*cos(2*a) + sin(2
*a))*sin(4*log(c)))*e^(4*arctan2(sin(log(x)), cos(log(x)))) + (I*cos(4*a) -
 sin(4*a))*sin(8*log(c)) + e^(8*arctan2(sin(log(x)), cos(log(x)))))
```

mupad [B] time = 4.43, size = 46, normalized size = 1.02

$$\frac{x^2\,{\mathrm{e}}^{a\,1{}\mathrm{i}}\,{\left(c\,x^{1{}\mathrm{i}}\right)}^{2{}\mathrm{i}}}{2\,{\mathrm{e}}^{a\,2{}\mathrm{i}}\,{\left(c\,x^{1{}\mathrm{i}}\right)}^{4{}\mathrm{i}}+{\mathrm{e}}^{a\,4{}\mathrm{i}}\,{\left(c\,x^{1{}\mathrm{i}}\right)}^{8{}\mathrm{i}}+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/cos(a + 2*log(c*x^1i))^3,x)
```

```
[Out] (x^2*exp(a*1i)*(c*x^1i)^2i)/(2*exp(a*2i)*(c*x^1i)^4i + exp(a*4i)*(c*x^1i)^8
i + 1)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec^3\left(a+2\log\left(cx^i\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+2*ln(c*x**I))**3,x)
```

```
[Out] Integral(x*sec(a + 2*log(c*x**I))**3, x)
```

3.262 $\int \sec^3\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\,dx$

Optimal. Leaf size=58

$$\frac{1}{2}x\sec\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)-\frac{1}{2}ix\tan\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\sec\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)$$

```
[Out] 1/2*x*sec(a+2*ln(c*x^(1/2*I)))-1/2*I*x*sec(a+2*ln(c*x^(1/2*I)))*tan(a+2*ln(
c*x^(1/2*I)))
```

Rubi [A] time = 0.03, antiderivative size = 48, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4503, 4505, 261}

$$\frac{2e^{ia}x\left(cx^{\frac{i}{2}}\right)^{2i}}{\left(1+e^{2ia}\left(cx^{\frac{i}{2}}\right)^{4i}\right)^2}$$

Warning: Unable to verify antiderivative.

```
[In] Int[Sec[a + 2*Log[c*x^(I/2)]]^3,x]
```

```
[Out] (2*E^(I*a)*(c*x^(I/2))^(2*I)*x)/(1 + E^((2*I)*a)*(c*x^(I/2))^(4*I))^2
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \sec^3\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\,dx = -\left(\left(2i\left(cx^{\frac{i}{2}}\right)^{2i}x\right)\text{Subst}\left(\int x^{-1-2i}\sec^3(a+2\log(x))\,dx,x,cx^{\frac{i}{2}}\right)\right)$$
$$= -\left(\left(16ie^{3ia}\left(cx^{\frac{i}{2}}\right)^{2i}x\right)\text{Subst}\left(\int \frac{x^{-1+4i}}{\left(1+e^{2ia}x^{4i}\right)^3}\,dx,x,cx^{\frac{i}{2}}\right)\right)$$
$$= \frac{2e^{ia}\left(cx^{\frac{i}{2}}\right)^{2i}x}{\left(1+e^{2ia}\left(cx^{\frac{i}{2}}\right)^{4i}\right)^2}$$

Mathematica [B] time = 0.14, size = 137, normalized size = 2.36

$$-\frac{\sec^2\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\left(i\left(1-2x^2\right)\sin\left(a+2\log\left(cx^{\frac{i}{2}}\right)-i\log(x)\right)+\left(2x^2+1\right)\cos\left(a+2\log\left(cx^{\frac{i}{2}}\right)-i\log(x)\right)\right)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + 2*Log[c*x^(I/2)]]^3,x]
```

```
[Out] -1/2*(Sec[a + 2*Log[c*x^(I/2)]]^2*((1 + 2*x^2)*Cos[a + 2*Log[c*x^(I/2)] - I
*Log[x]] + I*(1 - 2*x^2)*Sin[a + 2*Log[c*x^(I/2)] - I*Log[x]])*(Cos[2*(a +
2*Log[c*x^(I/2)] - I*Log[x])] + I*Sin[2*(a + 2*Log[c*x^(I/2)] - I*Log[x])])
)/x^2
```

fricas [A] time = 1.67, size = 55, normalized size = 0.95

$$-\frac{2\left(2\,x^2e^{\left(3i\,a+6i\,\log(c)\right)}+e^{\left(5i\,a+10i\,\log(c)\right)}\right)}{x^4+2\,x^2e^{\left(2i\,a+4i\,\log(c)\right)}+e^{\left(4i\,a+8i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*log(c*x^(1/2*I)))^3,x, algorithm="fricas")
```

```
[Out] -2*(2*x^2*e^(3*I*a + 6*I*log(c)) + e^(5*I*a + 10*I*log(c)))/(x^4 + 2*x^2*e^
(2*I*a + 4*I*log(c)) + e^(4*I*a + 8*I*log(c)))
```

giac [A] time = 3.04, size = 74, normalized size = 1.28

$$-\frac{2\,c^{10i}e^{(5i\,a)}}{c^{8i}e^{(4i\,a)}+2\,c^{4i}x^2e^{(2i\,a)}+x^4}-\frac{4\,c^{6i}x^2e^{(3i\,a)}}{c^{8i}e^{(4i\,a)}+2\,c^{4i}x^2e^{(2i\,a)}+x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*log(c*x^(1/2*I)))^3,x, algorithm="giac")
```

```
[Out] -2*c^(10*I)*e^(5*I*a)/(c^(8*I)*e^(4*I*a) + 2*c^(4*I)*x^2*e^(2*I*a) + x^4) -
 4*c^(6*I)*x^2*e^(3*I*a)/(c^(8*I)*e^(4*I*a) + 2*c^(4*I)*x^2*e^(2*I*a) + x^4
)
```

maple [C] time = 0.20, size = 208, normalized size = 3.59

$$\frac{2x\,c^{2i}\left(x^{\frac{i}{2}}\right)^{2i} \mathrm{e}^{\pi \mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)^{3}-\pi \mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)^{2} \mathrm{csgn}(ic)-\pi \mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)^{2} \mathrm{csgn}\left(ix^{\frac{i}{2}}\right)+\pi\,\mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)\mathrm{csgn}(ic)\mathrm{csgn}\left(ix^{\frac{i}{2}}\right)+ia}}{\left(\left(x^{\frac{i}{2}}\right)^{4i} c^{4i}\mathrm{e}^{2\pi \mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)^{3}} \mathrm{e}^{-2\pi \mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)^{2} \mathrm{csgn}(ic)} \mathrm{e}^{-2\pi \mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)^{2} \mathrm{csgn}\left(ix^{\frac{i}{2}}\right)} \mathrm{e}^{2\pi\,\mathrm{csgn}\left(ic\,x^{\frac{i}{2}}\right)\mathrm{csgn}(ic)\mathrm{csgn}\left(ix^{\frac{i}{2}}\right)} \mathrm{e}^{2ia}+1\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+2*ln(c*x^(1/2*I)))^3,x)
```

```
[Out] 2*x*c^(2*I)*(x^(1/2*I))^(2*I)*exp(Pi*csgn(I*c*x^(1/2*I))^3-Pi*csgn(I*c*x^(1
/2*I))^2*csgn(I*c)-Pi*csgn(I*c*x^(1/2*I))^2*csgn(I*x^(1/2*I))+Pi*csgn(I*c*x
^(1/2*I))*csgn(I*c)*csgn(I*x^(1/2*I))+I*a)/(((x^(1/2*I))^(2*I))^2*(c^(2*I))
^2*exp(2*Pi*csgn(I*c*x^(1/2*I))^3)*exp(-2*Pi*csgn(I*c*x^(1/2*I))^2*csgn(I*c
))*exp(-2*Pi*csgn(I*c*x^(1/2*I))^2*csgn(I*x^(1/2*I)))*exp(2*Pi*csgn(I*c*x^(
1/2*I))*csgn(I*c)*csgn(I*x^(1/2*I)))*exp(2*I*a)+1)^2
```

maxima [B] time = 0.77, size = 154, normalized size = 2.66

$$\frac{\left((2\,\cos(a)+2i\,\sin(a))\cos\left(2\,\log(c)\right)+2\,(i\,\cos(a\right.}{(\cos(4\,a)+i\,\sin(4\,a))\cos\left(8\,\log(c)\right)+\left((2\,\cos(2\,a)+2i\,\sin(2\,a))\cos\left(4\,\log(c)\right)-2\,(-i\,\cos(2\,a)+\sin(2\,a))\,\mathrm{s}\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*log(c*x^(1/2*I)))^3,x, algorithm="maxima")
```

```
[Out] ((2*cos(a) + 2*I*sin(a))*cos(2*log(c)) + 2*(I*cos(a) - sin(a))*sin(2*log(c)
))*x*e^(6*arctan2(sin(1/2*log(x)), cos(1/2*log(x))))/((cos(4*a) + I*sin(4*a
))*cos(8*log(c)) + ((2*cos(2*a) + 2*I*sin(2*a))*cos(4*log(c)) - 2*(-I*cos(2
*a) + sin(2*a))*sin(4*log(c)))*e^(4*arctan2(sin(1/2*log(x)), cos(1/2*log(x)
))) + (I*cos(4*a) - sin(4*a))*sin(8*log(c)) + e^(8*arctan2(sin(1/2*log(x)),
 cos(1/2*log(x)))))
```

mupad [B] time = 4.48, size = 56, normalized size = 0.97

$$\frac{2\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^{\frac{1}{2}\mathrm{i}}\right)}^{2\mathrm{i}}}{2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^{\frac{1}{2}\mathrm{i}}\right)}^{4\mathrm{i}}+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^{\frac{1}{2}\mathrm{i}}\right)}^{8\mathrm{i}}+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + 2*log(c*x^(1i/2)))^3,x)
```

```
[Out] (2*x*exp(a*1i)*(c*x^(1i/2))^2i)/(2*exp(a*2i)*(c*x^(1i/2))^4i + exp(a*4i)*(c
*x^(1i/2))^8i + 1)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^{3}\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*ln(c*x**(1/2*I)))**3,x)
```

```
[Out] Integral(sec(a + 2*log(c*x**(I/2)))**3, x)
```

3.263 $\int \sec^3\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)\,dx$

Optimal. Leaf size=48

$$\frac{2e^{3ia}x\left(cx^{-\frac{i}{2}}\right)^{6i}}{\left(1+e^{2ia}\left(cx^{-\frac{i}{2}}\right)^{4i}\right)^2}$$

```
[Out] 2*exp(3*I*a)*(c/(x^(1/2*I)))^(6*I)*x/(1+exp(2*I*a)*(c/(x^(1/2*I)))^(4*I))^2
```

Rubi [A] time = 0.04, antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4503, 4505, 264}

$$\frac{2e^{3ia}x\left(cx^{-\frac{i}{2}}\right)^{6i}}{\left(1+e^{2ia}\left(cx^{-\frac{i}{2}}\right)^{4i}\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + 2*Log[c/x^(I/2)]]^3,x]
```

```
[Out] (2*E^((3*I)*a)*(c/x^(I/2))^(6*I)*x)/(1 + E^((2*I)*a)*(c/x^(I/2))^(4*I))^2
```

Rule 264

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[((c
*x)^(m + 1)*(a + b*x^n)^(p + 1))/(a*c*(m + 1)), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \sec^3\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)\,dx=\left(2i\left(cx^{-\frac{i}{2}}\right)^{-2i}x\right)\mathrm{Subst}\left(\int x^{-1+2i}\sec^3(a+2\log(x))\,dx,x,cx^{-\frac{i}{2}}\right)$$
$$=\left(16ie^{3ia}\left(cx^{-\frac{i}{2}}\right)^{-2i}x\right)\mathrm{Subst}\left(\int\frac{x^{-1+8i}}{\left(1+e^{2ia}x^{4i}\right)^3}\,dx,x,cx^{-\frac{i}{2}}\right)$$
$$=\frac{2e^{3ia}\left(cx^{-\frac{i}{2}}\right)^{6i}x}{\left(1+e^{2ia}\left(cx^{-\frac{i}{2}}\right)^{4i}\right)^2}$$

Mathematica [B] time = 0.17, size = 139, normalized size = 2.90

$$\frac{\sec^2\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)\left(i\left(2x^2-1\right)\sin\left(a+2\log\left(cx^{-\frac{i}{2}}\right)+i\log(x)\right)+\left(2x^2+1\right)\cos\left(a+2\log\left(cx^{-\frac{i}{2}}\right)+i\log(x)\right)\right.}{4x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + 2*Log[c/x^(I/2)]]^3,x]
```

```
[Out] (Sec[a + 2*Log[c/x^(I/2)]]^2*((1 + 2*x^2)*Cos[a + 2*Log[c/x^(I/2)] + I*Log[
x]] + I*(-1 + 2*x^2)*Sin[a + 2*Log[c/x^(I/2)] + I*Log[x]])*(-2*Cos[2*(a + 2
*Log[c/x^(I/2)] + I*Log[x])] + (2*I)*Sin[2*(a + 2*Log[c/x^(I/2)] + I*Log[x]
)]))/(4*x^2)
```

fricas [B] time = 0.80, size = 57, normalized size = 1.19

$$-\frac{2\left(2\,x^2e^{\left(2i\,a+4i\,\log(c)\right)}+1\right)}{x^4e^{\left(5i\,a+10i\,\log(c)\right)}+2\,x^2e^{\left(3i\,a+6i\,\log(c)\right)}+e^{\left(i\,a+2i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*log(c/(x^(1/2*I))))^3,x, algorithm="fricas")
```

```
[Out] -2*(2*x^2*e^(2*I*a + 4*I*log(c)) + 1)/(x^4*e^(5*I*a + 10*I*log(c)) + 2*x^2*
e^(3*I*a + 6*I*log(c)) + e^(I*a + 2*I*log(c)))
```

giac [B] time = 3.16, size = 83, normalized size = 1.73

$$-\frac{4\,c^{4i}x^2e^{(2i\,a)}}{c^{10i}x^4e^{(5i\,a)}+2\,c^{6i}x^2e^{(3i\,a)}+c^{2i}e^{(i\,a)}}-\frac{2}{c^{10i}x^4e^{(5i\,a)}+2\,c^{6i}x^2e^{(3i\,a)}+c^{2i}e^{(i\,a)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*log(c/(x^(1/2*I))))^3,x, algorithm="giac")
```

```
[Out] -4*c^(4*I)*x^2*e^(2*I*a)/(c^(10*I)*x^4*e^(5*I*a) + 2*c^(6*I)*x^2*e^(3*I*a)
+ c^(2*I)*e^(I*a)) - 2/(c^(10*I)*x^4*e^(5*I*a) + 2*c^(6*I)*x^2*e^(3*I*a) +
c^(2*I)*e^(I*a))
```

maple [C] time = 0.20, size = 238, normalized size = 4.96

$$\frac{2x\left(x^{\frac{i}{2}}\right)^{-6i}c^{6i}\mathrm{e}^{3\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)^{3}-3\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}(ic)-3\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)+3\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)\mathrm{csgn}(ic)\,\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)+3ia}}{\left(\left(x^{\frac{i}{2}}\right)^{-4i}c^{4i}\mathrm{e}^{2\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)^{3}}\mathrm{e}^{-2\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}(ic)}\mathrm{e}^{-2\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)}\mathrm{e}^{2\pi\,\mathrm{csgn}\left(icx^{-\frac{i}{2}}\right)\mathrm{csgn}(ic)\,\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)}\mathrm{e}^{2ia}+1\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+2*ln(c/(x^(1/2*I))))^3,x)
```

```
[Out] 2*x*((x^(1/2*I))^(-2*I))^3*(c^(2*I))^3*exp(3*Pi*csgn(I*c/(x^(1/2*I)))^3-3*P
i*csgn(I*c/(x^(1/2*I)))^2*csgn(I*c)-3*Pi*csgn(I*c/(x^(1/2*I)))^2*csgn(I/(x^
(1/2*I)))+3*Pi*csgn(I*c/(x^(1/2*I)))*csgn(I*c)*csgn(I/(x^(1/2*I)))+3*I*a)/(
((x^(1/2*I))^(-2*I))^2*(c^(2*I))^2*exp(2*Pi*csgn(I*c/(x^(1/2*I)))^3)*exp(-2
*Pi*csgn(I*c/(x^(1/2*I)))^2*csgn(I*c))*exp(-2*Pi*csgn(I*c/(x^(1/2*I)))^2*cs
gn(I/(x^(1/2*I))))*exp(2*Pi*csgn(I*c/(x^(1/2*I)))*csgn(I*c)*csgn(I/(x^(1/2*
I))))*exp(2*I*a)+1)^2
```

maxima [B] time = 0.40, size = 166, normalized size = 3.46

$$\frac{\left((2\cos(3a)+2i\sin(3a))\cos\left(6\log(c)\right)+2(i\cos\right.}{\left((\cos(4a)+i\sin(4a))\cos\left(8\log(c)\right)-(-i\cos(4a)+\sin(4a))\sin\left(8\log(c)\right)\right)e^{\left(8\arctan\left(\sin\left(\frac{1}{2}\log(x)\right),\cos\left(\frac{1}{2}\log(x)\right)\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*log(c/(x^(1/2*I))))^3,x, algorithm="maxima")
```

```
[Out] ((2*cos(3*a) + 2*I*sin(3*a))*cos(6*log(c)) + 2*(I*cos(3*a) - sin(3*a))*sin(
6*log(c)))*x*e^(6*arctan2(sin(1/2*log(x)), cos(1/2*log(x))))/(((cos(4*a) +
I*sin(4*a))*cos(8*log(c)) - (-I*cos(4*a) + sin(4*a))*sin(8*log(c)))*e^(8*ar
ctan2(sin(1/2*log(x)), cos(1/2*log(x)))) + ((2*cos(2*a) + 2*I*sin(2*a))*cos
(4*log(c)) + 2*(I*cos(2*a) - sin(2*a))*sin(4*log(c)))*e^(4*arctan2(sin(1/2*
log(x)), cos(1/2*log(x)))) + 1)
```

mupad [B] time = 6.28, size = 39, normalized size = 0.81

$$\frac{2\,x\,\mathrm{e}^{a\,3\mathrm{i}}\,{\left(\frac{c}{x^{\frac{1}{2}\mathrm{i}}}\right)}^{6\mathrm{i}}}{{\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(\frac{c}{x^{\frac{1}{2}\mathrm{i}}}\right)}^{4\mathrm{i}}+1\right)}^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/cos(a + 2*log(c/x^(1i/2)))^3,x)
[Out] (2*x*exp(a*3i)*(c/x^(1i/2))^6i)/(exp(a*2i)*(c/x^(1i/2))^4i + 1)^2
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^3\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+2*ln(c/(x**(1/2*I))))**3,x)
[Out] Integral(sec(a + 2*log(c*x**(-I/2)))**3, x)
```

3.264 $\int \sec^p\left(a+\frac{i\log(cx^n)}{n(-2+p)}\right)\,dx$

Optimal. Leaf size=95

$$\frac{e^{-2ia}(2-p)x\left(cx^n\right)^{-\frac{2}{n(2-p)}}\left(1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(2-p)}}\right)\sec^p\left(a-\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

```
[Out] 1/2*(2-p)*x*(1+exp(2*I*a)*(c*x^n)^(2/n/(2-p)))*sec(a-I*ln(c*x^n)/n/(2-p))^p
/exp(2*I*a)/(1-p)/((c*x^n)^(2/n/(2-p)))
```

Rubi [A] time = 0.09, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4503, 4507, 261}

$$\frac{e^{-2ia}(2-p)x\left(cx^n\right)^{-\frac{2}{n(2-p)}}\left(1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(2-p)}}\right)\sec^p\left(a-\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] ((2 - p)*x*(1 + E^((2*I)*a)*(c*x^n)^(2/(n*(2 - p))))*Sec[a - (I*Log[c*x^n])
/(n*(2 - p))]^p)/(2*E^((2*I)*a)*(1 - p)*(c*x^n)^(2/(n*(2 - p))))
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sec^p\left(a+\frac{i\log\left(cx^n\right)}{n(-2+p)}\right)dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^p\left(a+\frac{i\log(x)}{n(-2+p)}\right)dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x\left(cx^n\right)^{-\frac{1}{n}+\frac{p}{n(-2+p)}}\left(1+e^{2ia}\left(cx^n\right)^{-\frac{2}{n(-2+p)}}\right)^p\sec^p\left(a+\frac{i\log(cx^n)}{n(-2+p)}\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}-\frac{p}{n(-2+}}\right.}{n}$$

$$=\frac{e^{-2ia}(2-p)x\left(cx^n\right)^{-\frac{2}{n(2-p)}}\left(1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(2-p)}}\right)\sec^p\left(a-\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Mathematica [A] time = 0.86, size = 67, normalized size = 0.71

$$\frac{e^{-2ia}(p-2)x\left(\left(cx^n\right)^{\frac{2}{n(p-2)}}+e^{2ia}\right)\sec^p\left(a+\frac{i\log(cx^n)}{n(p-2)}\right)}{2(p-1)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] ((-2 + p)*x*(E^((2*I)*a) + (c*x^n)^(2/(n*(-2 + p)))))*Sec[a + (I*Log[c*x^n])
/(n*(-2 + p))]^p)/(2*E^((2*I)*a)*(-1 + p))
```

fricas [A] time = 2.36, size = 149, normalized size = 1.57

$$\frac{\left((p-2)xe^{\left(\frac{2\left(ianp-2ian-n\log(x)-\log(c)\right)}{np-2n}\right)}+(p-2)x\right)\left(\frac{2e^{\left(\frac{ianp-2ian-n\log(x)-\log(c)}{np-2n}\right)}}{e^{\left(\frac{2\left(ianp-2ian-n\log(x)-\log(c)\right)}{np-2n}\right)}+1}\right)^p e^{\left(-\frac{2\left(ianp-2ian-n\log(x)-\log(c)\right)}{np-2n}\right)}}{2(p-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+I*log(c*x^n)/n/(-2+p))^p,x, algorithm="fricas")
```

```
[Out] 1/2*((p - 2)*x*e^(2*(I*a*n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) +
(p - 2)*x)*(2*e^((I*a*n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(e^(2
*(I*a*n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) + 1))^p*e^(-2*(I*a*n*
p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(p - 1)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(a + \frac{i\log\left(cx^n\right)}{n\left(p-2\right)}\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+I*log(c*x^n)/n/(-2+p))^p,x, algorithm="giac")
[Out] integrate(sec(a + I*log(c*x^n)/(n*(p - 2)))^p, x)
```

maple [F] time = 0.42, size = 0, normalized size = 0.00

$$\int \sec^p\left(a + \frac{i\ln\left(c\,x^n\right)}{n\left(-2+p\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+I*ln(c*x^n)/n/(-2+p))^p,x)
[Out] int(sec(a+I*ln(c*x^n)/n/(-2+p))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(a + \frac{i\log\left(cx^n\right)}{n\left(p-2\right)}\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+I*log(c*x^n)/n/(-2+p))^p,x, algorithm="maxima")
[Out] integrate(sec(a + I*log(c*x^n)/(n*(p - 2)))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \left(\frac{1}{\cos\left(a + \frac{\ln\left(c\,x^n\right)\,1\mathrm{i}}{n\,\left(p-2\right)}\right)}\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + (log(c*x^n)*1i)/(n*(p - 2))))^p,x)
[Out] int((1/cos(a + (log(c*x^n)*1i)/(n*(p - 2))))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^p\left(a+\frac{i\log\left(cx^n\right)}{n\left(p-2\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+I*ln(c*x**n)/n/(-2+p))**p,x)
```

```
[Out] Integral(sec(a + I*log(c*x**n)/(n*(p - 2)))**p, x)
```

3.265 $\int \sec^p\left(a-\frac{i\log(cx^n)}{n(-2+p)}\right)\,dx$

Optimal. Leaf size=70

$$\frac{(2-p)x\left(1+e^{2ia}\left(cx^n\right)^{-\frac{2}{n(2-p)}}\right)\sec^p\left(a+\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

```
[Out] 1/2*(2-p)*x*(1+exp(2*I*a)/((c*x^n)^(2/n/(2-p))))*sec(a+I*ln(c*x^n)/n/(2-p))
^p/(1-p)
```

Rubi [A] time = 0.08, antiderivative size = 70, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4503, 4507, 264}

$$\frac{(2-p)x\left(1+e^{2ia}\left(cx^n\right)^{-\frac{2}{n(2-p)}}\right)\sec^p\left(a+\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a - (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] ((2 - p)*x*(1 + E^((2*I)*a)/(c*x^n)^(2/(n*(2 - p))))*Sec[a + (I*Log[c*x^n])
/(n*(2 - p))]^p)/(2*(1 - p))
```

Rule 264

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[((c
*x)^(m + 1)*(a + b*x^n)^(p + 1))/(a*c*(m + 1)), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sec^p\left(a-\frac{i\log\left(cx^n\right)}{n(-2+p)}\right)dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^p\left(a-\frac{i\log(x)}{n(-2+p)}\right)dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x\left(cx^n\right)^{-\frac{1}{n}-\frac{p}{n(-2+p)}}\left(1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(-2+p)}}\right)^p\sec^p\left(a-\frac{i\log(cx^n)}{n(-2+p)}\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}+\frac{p}{n(-2+p)}}\right.}{n}$$

$$=\frac{(2-p)x\left(1+e^{2ia}\left(cx^n\right)^{-\frac{2}{n(2-p)}}\right)\sec^p\left(a+\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Mathematica [A] time = 0.84, size = 62, normalized size = 0.89

$$\frac{(p-2)x\left(1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(p-2)}}\right)\sec^p\left(a-\frac{i\log(cx^n)}{n(p-2)}\right)}{2(p-1)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a - (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] ((-2 + p)*x*(1 + E^((2*I)*a)*(c*x^n)^(2/(n*(-2 + p))))*Sec[a - (I*Log[c*x^n
])/(n*(-2 + p))]^p)/(2*(-1 + p))
```

fricas [B] time = 0.65, size = 149, normalized size = 2.13

$$\frac{\left((p-2)xe^{\left(\frac{2\left(-i\,anp+2i\,an-n\log(x)-\log(c)\right)}{np-2\,n}\right)}+(p-2)x\right)\left(\frac{2\,e^{\left(\frac{-i\,anp+2i\,an-n\log(x)-\log(c)}{np-2\,n}\right)}}{e^{\left(\frac{2\left(-i\,anp+2i\,an-n\log(x)-\log(c)\right)}{np-2\,n}\right)}+1}\right)^p e^{\left(-\frac{2\left(-i\,anp+2i\,an-n\log(x)-\log(c)\right)}{np-2\,n}\right)}}{2\left(p-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a-I*log(c*x^n)/n/(-2+p))^p,x, algorithm="fricas")
```

```
[Out] 1/2*((p - 2)*x*e^(2*(-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) +
 (p - 2)*x)*(2*e^((-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(e^
(2*(-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) + 1))^p*e^(-2*(-I*
a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(p - 1)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(a - \frac{i\,\log\left(cx^{n}\right)}{n\left(p-2\right)}\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a-I*log(c*x^n)/n/(-2+p))^p,x, algorithm="giac")
[Out] integrate(sec(a - I*log(c*x^n)/(n*(p - 2)))^p, x)
```

maple [F] time = 0.38, size = 0, normalized size = 0.00

$$\int \sec^{p}\left(a - \frac{i\ln\left(c\,x^{n}\right)}{n\left(-2+p\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a-I*ln(c*x^n)/n/(-2+p))^p,x)
[Out] int(sec(a-I*ln(c*x^n)/n/(-2+p))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(-a + \frac{i\,\log\left(cx^{n}\right)}{n\left(p-2\right)}\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a-I*log(c*x^n)/n/(-2+p))^p,x, algorithm="maxima")
[Out] integrate(sec(-a + I*log(c*x^n)/(n*(p - 2)))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\cos\left(a-\frac{\ln\left(c\,x^n\right)\,1{}\mathrm{i}}{n\,\left(p-2\right)}\right)}\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a - (log(c*x^n)*1i)/(n*(p - 2))))^p,x)
[Out] int((1/cos(a - (log(c*x^n)*1i)/(n*(p - 2))))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^{p}\left(a-\frac{i\log\left(cx^{n}\right)}{n\left(p-2\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a-I*ln(c*x**n)/n/(-2+p))**p,x)
```

```
[Out] Integral(sec(a - I*log(c*x**n)/(n*(p - 2)))**p, x)
```

3.266 $\int \sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,dx$

Optimal. Leaf size=109

$$\frac{2x\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\;{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{2+ibn}$$

```
[Out] 2*x*hypergeom([1/2, 1/4-1/2*I/b/n],[5/4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2*I
*b))*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)*sec(a+b*ln(c*x^n))^(1/2)/(2+I*b*n
)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4503, 4507, 364}

$$\frac{2x\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\;{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{2+ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2, (1 - (2
*I)/(b*n))/4, (5 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sqrt[S
ec[a + b*Log[c*x^n]]])/(2 + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
```

```
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sqrt{\sec(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(x\left(cx^n\right)^{-\frac{ib}{2}-\frac{1}{n}}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{ib}{2}+\frac{1}{n}}}{\sqrt{1+e^{2ia}x^{2ib}}}\,dx,x,\right.}{n}$$
$$= \frac{2x\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sec\left(a+b\log\right.}}{2+ibn}$$

Mathematica [A] time = 0.46, size = 99, normalized size = 0.91

$$-\frac{2ix\left(1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{bn-2i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] ((-2*I)*(1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Hypergeometric2F1[1, 3/4 - (I/
2)/(b*n), 5/4 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))]*Sqrt[Sec[a + b*
Log[c*x^n]]])/(-2*I + b*n)
```

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(sec(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)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(sec(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.38, size = 0, normalized size = 0.00

$$\int \sqrt{\sec}\,(a+b\ln(c\,x^n))\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^(1/2),x)
[Out] int(sec(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
[Out] integrate(sqrt(sec(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^(1/2),x)
[Out] int((1/cos(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(sqrt(sec(a + b*log(c*x**n))), x)
```

3.267 $\int \frac{\sqrt{\sec(a+b\log(cx^n))}}{x}\,dx$

Optimal. Leaf size=54

$$\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

```
[Out] 2*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticF
(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))*cos(a+b*ln(c*x^n))^(1/2)*sec(a+b*ln(c*
x^n))^(1/2)/b/n
```

Rubi [A] time = 0.04, antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {3771, 2641}

$$\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Sec[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticF[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec[
a + b*Log[c*x^n]]])/(b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx = \frac{\text{Subst}\left(\int\sqrt{\sec(a+bx)}\,dx,x,\log\left(cx^n\right)\right)}{n}$$
$$= \frac{\left(\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int\frac{1}{\sqrt{\cos(a+bx)}}\,dx,x,\log(\right.}{n}$$
$$= \frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{bn}$$

Mathematica [A] time = 0.12, size = 54, normalized size = 1.00

$$\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Sec[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticF[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec[
a + b*Log[c*x^n]]])/(b*n)
```

fricas [F] time = 1.16, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(sec(b*log(c*x^n) + a))/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(sec(b*log(c*x^n) + a))/x, x)
```

maple [B] time = 0.16, size = 181, normalized size = 3.35

$$-\frac{2\sqrt{\left(2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)-1\right)\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)}\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(cx^n))}{2}}\sqrt{-2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)+1}\ \mathrm{Ellipt}}{n\sqrt{-2\left(\sin^4\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)+\sin^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)}\ \sin\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\sqrt{2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^(1/2)/x,x)
```

```
[Out] -2/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2
)*(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(-2*cos(1/2*a+1/2*b*ln(c*x^n))^2+1)^
(1/2)/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*
EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/sin(1/2*a+1/2*b*ln(c*x^n))/(2
*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(1/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(sec(b*log(c*x^n) + a))/x, x)
```

mupad [B] time = 2.57, size = 51, normalized size = 0.94

$$\frac{2\sqrt{\cos\left(a+b\ \ln\left(c\,x^n\right)\right)}\ \sqrt{\frac{1}{\cos(a+b\ \ln(c\,x^n))}}\ \mathrm{F}\left(\frac{a}{2}+\frac{b\ \ln(c\,x^n)}{2}\middle|2\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^(1/2)/x,x)
```

```
[Out] (2*cos(a + b*log(c*x^n))^(1/2)*(1/cos(a + b*log(c*x^n)))^(1/2)*ellipticF(a/
2 + (b*log(c*x^n))/2, 2))/(b*n)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**(1/2)/x,x)
```

```
[Out] Integral(sqrt(sec(a + b*log(c*x**n)))/x, x)
```

3.268 $\int \sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{2+3ibn}$$

```
[Out] 2*x*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*hypergeom([3/2, 3/4-1/2*I/b/n],[7/
4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*sec(a+b*ln(c*x^n))^(3/2)/(2+3*I*b
*n)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4503, 4507, 364}

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{2+3ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Hypergeometric2F1[3/2, (3 -
(2*I)/(b*n))/4, (7 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sec[
a + b*Log[c*x^n]]^(3/2))/(2 + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int \frac{x^{-1+\frac{3ib}{2}+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^{3/2}}\,d\right.}{n}$$

$$= \frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{3}{2}}\left(a+b\right.}{2+3ibn}$$

Mathematica [B] time = 5.77, size = 415, normalized size = 3.81

$$\frac{\sqrt{2}\,x^{1-ibn}\left((3bn-2i)\left((-bn+2i)\sqrt{\frac{e^{ia}\left(cx^n\right)^{ib}}{1+e^{2ia}\left(cx^n\right)^{2ib}}}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},-\frac{bn+2i}{4bn};\frac{3}{4}-\frac{i}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)+\sqrt{2}\,x^{ibn}\right.\right.}{bn(3bn-2i)\left(bn\sin\left(a\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (Sqrt[2]*x^(1 - I*b*n)*(-((4 + b^2*n^2)*x^((2*I)*b*n)*Sqrt[(E^(I*a)*(c*x^n)
^(I*b))/(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sqrt[1 + E^((2*I)*a)*(c*x^n)^(
(2*I)*b)]*Hypergeometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(b*n), -(E^
((2*I)*a)*(c*x^n)^((2*I)*b))]) + (-2*I + 3*b*n)*((2*I - b*n)*Sqrt[(E^(I*a)*
(c*x^n)^(I*b))/(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sqrt[1 + E^((2*I)*a)*(c
*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)
/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))] + Sqrt[2]*x^(I*b*n)*Sqrt[Sec[a +
b*Log[c*x^n]]]*(b*n*Cos[b*n*Log[x]] - 2*Sin[b*n*Log[x]]))))/(b*n*(-2*I + 3*
b*n)*(-2*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + b*n*Sin[a - b*n*Log[x] + b*Lo
g[c*x^n]]))
```

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(sec(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac **[F(-1)]** time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple **[F]** time = 0.12, size = 0, normalized size = 0.00

$$\int \sec^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^(3/2),x)
```

maxima **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(3/2), x)
```

mupad **[F]** time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int((1/cos(a + b*log(c*x^n)))^(3/2), x)
```

sympy **[F]** time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**(3/2), x)
```

3.269 $\int \frac{\sec^{\frac{3}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=89

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{bn}-\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx\right.\right.\right.}{bn}$$

```
[Out] 2*sin(a+b*ln(c*x^n))*sec(a+b*ln(c*x^n))^(1/2)/b/n-2*(cos(1/2*a+1/2*b*ln(c*x
^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticE(sin(1/2*a+1/2*b*ln(c*x^n
)),2^(1/2))*cos(a+b*ln(c*x^n))^(1/2)*sec(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3768, 3771, 2639}

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{bn}-\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx\right.\right.\right.}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (-2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticE[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec
[a + b*Log[c*x^n]]])/(b*n) + (2*Sqrt[Sec[a + b*Log[c*x^n]]]*Sin[a + b*Log[c
*x^n]])/(b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3768

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Csc[c + d*x])^(n - 1))/(d*(n - 1)), x] + Dist[(b^2*(n - 2))/(n - 1), I
nt[(b*Csc[c + d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] &&
IntegerQ[2*n]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
```

```
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \sec^{\frac{3}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,\sin\left(a+b\log\left(cx^n\right)\right)}{bn} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\sec(a+bx)}}\,dx, x, \log(cx\right.}{n}$$
$$= \frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,\sin\left(a+b\log\left(cx^n\right)\right)}{bn} - \frac{\left(\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sec\left(a\right.\right.}}{}$$
$$= -\frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{bn} + \frac{2\sqrt{}}{}$$

Mathematica [A] time = 0.15, size = 68, normalized size = 0.76

$$\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\left(\sin\left(a+b\log\left(cx^n\right)\right)-\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (2*Sqrt[Sec[a + b*Log[c*x^n]]]*(-(Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticE[(a
+ b*Log[c*x^n])/2, 2]) + Sin[a + b*Log[c*x^n]]))/(b*n)
```

fricas [F] time = 0.47, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(3/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^(3/2)/x, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(3/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.19, size = 139, normalized size = 1.56

$$-\frac{2\left(\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(cx^{n}))}{2}}\,\sqrt{2\left(\sin^{2}\left(\frac{a}{2}+\frac{b\ln(cx^{n})}{2}\right)\right)-1}\ \mathrm{EllipticE}\left(\cos\left(\frac{a}{2}+\frac{b\ln(cx^{n})}{2}\right),\sqrt{2}\right)-2\left(\sin^{2}\left(\frac{a}{2}+\frac{b\ln(cx^{n})}{2}\right)\right.}{n\sin\left(\frac{a}{2}+\frac{b\ln(cx^{n})}{2}\right)\sqrt{2\left(\cos^{2}\left(\frac{a}{2}+\frac{b\ln(cx^{n})}{2}\right)\right)-1}\ b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^(3/2)/x,x)
```

```
[Out] -2/n*((sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n))^2-
1)^(1/2)*EllipticE(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+1/2*b*ln
(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*x^n)))/sin(1/2*a+1/2*b*ln(c*x^n))/(2*cos(1/
2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(3/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(3/2)/x, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)}^{3/2}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^(3/2)/x,x)
```

```
[Out] int((1/cos(a + b*log(c*x^n)))^(3/2)/x, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**(3/2)/x,x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**(3/2)/x, x)
```

3.270 $\int \sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2} {}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{2+5ibn}$$

```
[Out] 2*x*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*hypergeom([5/2, 5/4-1/2*I/b/n],[9/
4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*sec(a+b*ln(c*x^n))^(5/2)/(2+5*I*b
*n)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4503, 4507, 364}

$$\frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2} {}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{2+5ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Hypergeometric2F1[5/2, (5 -
(2*I)/(b*n))/4, (9 - (2*I)/(b*n))/4, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sec[
a + b*Log[c*x^n]]^(5/2))/(2 + (5*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^{\frac{5}{2}}(a+b\log(x))\,dx, x, cx^n\right)}{n}$$
$$= \frac{\left(x\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}+\frac{1}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^{5/2}}\,d\right.}{n}$$
$$= \frac{2x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{5}{2}}\left(a+b\,\mathrm{l}\right.}{2+5ibn}$$

Mathematica [A] time = 1.38, size = 124, normalized size = 1.14

$$\frac{2x\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\left((2-ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+bn\tan\left(a+b\,\mathrm{lo}\right.\right.}{3b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x*Sqrt[Sec[a + b*Log[c*x^n]]]*(-2 + (2 - I*b*n)*(1 + E^((2*I)*a)*(c*x^n)
^((2*I)*b))*Hypergeometric2F1[1, 3/4 - (I/2)/(b*n), 5/4 - (I/2)/(b*n), -E^(
(2*I)*(a + b*Log[c*x^n]))] + b*n*Tan[a + b*Log[c*x^n]]))/(3*b^2*n^2)
```

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(sec(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \sec^{\frac{5}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(sec(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{5/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int((1/cos(a + b*log(c*x^n)))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.271 $\int \frac{\sec^{\frac{5}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=93

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{2}\left(a+b\log\left(cx\right.\right.\right.}{3bn}$$

```
[Out] 2/3*sec(a+b*ln(c*x^n))^(3/2)*sin(a+b*ln(c*x^n))/b/n+2/3*(cos(1/2*a+1/2*b*ln
(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticF(sin(1/2*a+1/2*b*ln(c
*x^n)),2^(1/2))*cos(a+b*ln(c*x^n))^(1/2)*sec(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 93, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3768, 3771, 2641}

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn}+\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{2}\left(a+b\log\left(cx\right.\right.\right.}{3bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticF[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec[
a + b*Log[c*x^n]]])/(3*b*n) + (2*Sec[a + b*Log[c*x^n]]^(3/2)*Sin[a + b*Log[
c*x^n]])/(3*b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3768

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Csc[c + d*x])^(n - 1))/(d*(n - 1)), x] + Dist[(b^2*(n - 2))/(n - 1), I
nt[(b*Csc[c + d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] &&
IntegerQ[2*n]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
```

```
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \sec^{\frac{5}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{2\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\text{Subst}\left(\int \sqrt{\sec(a+bx)}\,dx, x, \log\left(\right.\right.}{3n}$$
$$= \frac{2\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\sin\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\left(\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sec\left(a+\right.}\right.}{}$$
$$= \frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{3bn} + \frac{2\sec^{\frac{3}{2}}}{}$$

Mathematica [A] time = 0.16, size = 69, normalized size = 0.74

$$\frac{2\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\left(\sin\left(a+b\log\left(cx^n\right)\right)+\cos^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (2*Sec[a + b*Log[c*x^n]]^(3/2)*(Cos[a + b*Log[c*x^n]]^(3/2)*EllipticF[(a +
b*Log[c*x^n])/2, 2] + Sin[a + b*Log[c*x^n]]))/(3*b*n)
```

fricas [F] time = 1.33, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(5/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^(5/2)/x, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(5/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [B] time = 0.18, size = 291, normalized size = 3.13

$$-\frac{2\left(-2\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(c\,x^{n}))}{2}}\,\sqrt{2\left(\sin^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)-1}\ \mathrm{EllipticF}\left(\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right),\sqrt{2}\right)\left(\sin^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right.\cdots}{3n\sqrt{-2\left(\sin\cdots\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^(5/2)/x,x)
```

```
[Out] -2/3/n*(-2*(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n
))^2-1)^(1/2)*EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))*sin(1/2*a+1/2*b
*ln(c*x^n))^2+(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*
x^n))^2-1)^(1/2)*EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+
1/2*b*ln(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*x^n)))*((2*cos(1/2*a+1/2*b*ln(c*x^n
))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^
4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/(2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(3
/2)/sin(1/2*a+1/2*b*ln(c*x^n))/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sec\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^(5/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(5/2)/x, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(\frac{1}{\cos(a+b\ \ln(c\,x^{n}))}\right)^{5/2}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^(5/2)/x,x)
```

```
[Out] int((1/cos(a + b*log(c*x^n)))^(5/2)/x, x)
```

sympy [**F(-1)**] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**(5/2)/x,x)
```

```
[Out] Timed out
```

3.272 $\int \frac{1}{\sqrt{\sec\left(a+b\log(cx^n)\right)}}\,dx$

Optimal. Leaf size=110

$$\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{bn+2i}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-ibn)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*x*hypergeom([-1/2, 1/4*(-2*I-b*n)/b/n],[3/4-1/2*I/b/n],-exp(2*I*a)*(c*x^n
)^(2*I*b))/(2-I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)/sec(a+b*ln(c*x^n)
)^(1/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4503, 4507, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{bn+2i}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-ibn)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Hypergeometric2F1[-1/2, -(2*I + b*n)/(4*b*n), (3 - (2*I)/(b*n))/4, -(E
^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - I*b*n)*Sqrt[1 + E^((2*I)*a)*(c*x^n)^(
(2*I)*b)]*Sqrt[Sec[a + b*Log[c*x^n]]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sqrt{\sec \left(a+b\log \left(cx^n\right)\right)}}\,dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sqrt{\sec(a+b\log(x))}}\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x\left(cx^n\right)^{\frac{ib}{2}-\frac{1}{n}}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1}{n}}\sqrt{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec \left(a+b\log \left(cx^n\right)\right)}}$$

$$=\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{2i+bn}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-ibn)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec \left(a+b\log \left(cx^n\right)\right)}}$$

Mathematica [B] time = 4.31, size = 380, normalized size = 3.45

$$-\frac{2x\cos \left(a+b\log \left(cx^n\right)-bn\log(x)\right)}{\sqrt{\sec \left(a+b\log \left(cx^n\right)\right)}\left(bn\sin \left(a+b\log \left(cx^n\right)-bn\log(x)\right)-2\cos \left(a+b\log \left(cx^n\right)-bn\log(x)\right)\right)}+\frac{2e^{2ia}bnx\,(cx$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*b*E^((2*I)*a)*n*x*(c*x^n)^((2*I)*b)*((2*I + b*n)*x^((2*I)*b*n)*Hypergeom
etric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(b*n), -(E^((2*I)*a)*(c*x^n)^(
(2*I)*b))] + (-2*I + 3*b*n)*Hypergeometric2F1[1/2, -1/4*(2*I + b*n)/(b*n),
3/4 - (I/2)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]))/((2*I + b*n)*(-2*I +
 3*b*n)*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[(E^(I*a)*(c*x^n)^(I*b)
)/(2 + 2*E^((2*I)*a)*(c*x^n)^((2*I)*b))]*((-2 + I*b*n)*x^((2*I)*b*n) - I*E^
((2*I)*a)*(-2*I + b*n)*(c*x^n)^((2*I)*b))) - (2*x*Cos[a - b*n*Log[x] + b*Lo
g[c*x^n]])/(Sqrt[Sec[a + b*Log[c*x^n]]]*(-2*Cos[a - b*n*Log[x] + b*Log[c*x^
n]] + b*n*Sin[a - b*n*Log[x] + b*Log[c*x^n]]))
```

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/sec(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")

[Out] Exception raised: TypeError >> Error detected within library code: integrate: implementation incomplete (has polynomial part)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sec\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/sec(a+b*log(c*x^n))^(1/2),x, algorithm="giac")

[Out] integrate(1/sqrt(sec(b*log(c*x^n) + a)), x)

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sec\left(a+b\ln\left(c\,x^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/sec(a+b*ln(c*x^n))^(1/2),x)

[Out] int(1/sec(a+b*ln(c*x^n))^(1/2),x)

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sec\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/sec(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")

[Out] integrate(1/sqrt(sec(b*log(c*x^n) + a)), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sqrt{\frac{1}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(1/cos(a + b*log(c*x^n)))^(1/2),x)
```

```
[Out] int(1/(1/cos(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\sec\left(a + b\log\left(cx^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/sqrt(sec(a + b*log(c*x**n))), x)
```

3.273 $\int \frac{1}{x\sqrt{\sec(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=54

$$\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

```
[Out] 2*(cos(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticE
(sin(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))*cos(a+b*ln(c*x^n))^(1/2)*sec(a+b*ln(c*
x^n))^(1/2)/b/n
```

Rubi [A] time = 0.04, antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {3771, 2639}

$$\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Sec[a + b*Log[c*x^n]]]),x]
```

```
[Out] (2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticE[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec[
a + b*Log[c*x^n]]])/(b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{1}{x\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\sec(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= \frac{\left(\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int \sqrt{\cos(a+bx)}\,dx, x, \text{l}\right.}{n}$$
$$= \frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{bn}$$

Mathematica [A] time = 0.11, size = 54, normalized size = 1.00

$$\frac{2E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{bn\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Sec[a + b*Log[c*x^n]]]),x]
[Out] (2*EllipticE[(a + b*Log[c*x^n])/2, 2])/(b*n*Sqrt[Cos[a + b*Log[c*x^n]]]*Sqr
t[Sec[a + b*Log[c*x^n]]])
```

fricas [F] time = 1.60, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
[Out] integral(1/(x*sqrt(sec(b*log(c*x^n) + a))), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*sqrt(sec(b*log(c*x^n) + a))), x)
```

maple [B] time = 0.16, size = 181, normalized size = 3.35

$$\frac{2\sqrt{\left(2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)-1\right)\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)}\,\sqrt{\frac{1}{2}-\frac{\cos(a+b\ln(cx^n))}{2}}\,\sqrt{-2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)+1}\ \mathrm{Ellipt}}{n\sqrt{-2\left(\sin^4\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\right)+\sin^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)}\ \sin\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right)\sqrt{2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(cx^n)}{2}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/sec(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] 2/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)
*(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(-2*cos(1/2*a+1/2*b*ln(c*x^n))^2+1)^(
1/2)*EllipticE(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))/(-2*sin(1/2*a+1/2*b*ln(c
*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/2*b*ln(c*x^n))/(2*
cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*sqrt(sec(b*log(c*x^n) + a))), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x\,\sqrt{\frac{1}{\cos(a+b\,\ln(c\,x^n))}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(1/cos(a + b*log(c*x^n)))^(1/2)),x)
```

```
[Out] int(1/(x*(1/cos(a + b*log(c*x^n)))^(1/2)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(sec(a + b*log(c*x**n)))), x)
```

3.274 $\int \frac{1}{\sec^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=109

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*hypergeom([-3/2, -3/4-1/2*I/b/n],[1/4-1/2*I/b/n],-exp(2*I*a)*(c*x^n)^(2
*I*b))/(2-3*I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)/sec(a+b*ln(c*x^n))^
(3/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4503, 4507, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (2*x*Hypergeometric2F1[-3/2, (-3 - (2*I)/(b*n))/4, (1 - (2*I)/(b*n))/4, -(E
^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - (3*I)*b*n)*(1 + E^((2*I)*a)*(c*x^n)^(
(2*I)*b))^(3/2)*Sec[a + b*Log[c*x^n]]^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int\frac{x^{-1+\frac{1}{n}}}{\sec^{\frac{3}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x\left(cx^n\right)^{\frac{3ib}{2}-\frac{1}{n}}\right)\text{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1}{n}}\left(1+e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx^n\right)}{n\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$=\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 1.61, size = 168, normalized size = 1.54

$$\frac{2x\left(3b^2n^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}-\frac{i}{2bn};\frac{5}{4}-\frac{i}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sec^2\left(a+b\log\left(cx^n\right)\right)+(2+ibn)\left(3bn\tan\left(a\right.\right.\right.}{(2+3ibn)(bn-2i)(3bn+2i)\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (2*x*(3*b^2*n^2*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1, 3/
4 - (I/2)/(b*n), 5/4 - (I/2)/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))]*Sec[a +
b*Log[c*x^n]]^2 + (2 + I*b*n)*(2 + 3*b*n*Tan[a + b*Log[c*x^n]])))/((2 + (3*
I)*b*n)*(-2*I + b*n)*(2*I + 3*b*n)*Sec[a + b*Log[c*x^n]]^(3/2))
```

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/sec(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

[Out] Exception raised: TypeError >> Error detected within library code: integrate: implementation incomplete (has polynomial part)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(-3/2), x)
```

maple [F] time = 0.12, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sec(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(1/sec(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(-3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(1/cos(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int(1/(1/cos(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec^{\frac{3}{2}}\left(a + b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(sec(a + b*log(c*x**n))**(-3/2), x)
```

3.275 $\int \frac{1}{x \sec^{\frac{3}{2}}(a+b\log(cx^n))} \, dx$

Optimal. Leaf size=93

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}+\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn}$$

```
[Out] 2/3*sin(a+b*ln(c*x^n))/b/n/sec(a+b*ln(c*x^n))^(1/2)+2/3*(cos(1/2*a+1/2*b*ln
(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticF(sin(1/2*a+1/2*b*ln(c
*x^n)),2^(1/2))*cos(a+b*ln(c*x^n))^(1/2)*sec(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 93, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3769, 3771, 2641}

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}+\frac{2\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sec[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticF[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec[
a + b*Log[c*x^n]]])/(3*b*n) + (2*Sin[a + b*Log[c*x^n]])/(3*b*n*Sqrt[Sec[a +
 b*Log[c*x^n]]])
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3769

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Csc[c + d*x])^(n + 1))/(b*d*n), x] + Dist[(n + 1)/(b^2*n), Int[(b*Csc[c +
 d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] && IntegerQ[2*n
]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
```

```
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{1}{x\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sec^{\frac{3}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}} + \frac{\text{Subst}\left(\int \sqrt{\sec(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{3n}$$

$$= \frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}} + \frac{\left(\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\right)\text{Su}}{3n}$$

$$= \frac{2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{3bn} + \frac{2\text{s}}{3bn}$$

Mathematica [A] time = 0.13, size = 72, normalized size = 0.77

$$\frac{\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\left(\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+2\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sec[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (Sqrt[Sec[a + b*Log[c*x^n]]]*(2*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticF[(a + 
b*Log[c*x^n])/2, 2] + Sin[2*(a + b*Log[c*x^n])]))/(3*b*n)
```

fricas [F] time = 0.83, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

[Out] integral(1/(x*sec(b*log(c*x^n) + a)^(3/2)), x)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \sec\left(b \log\left(cx^{n}\right) + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/x/sec(a+b*log(c*x^n))^(3/2),x, algorithm="giac")

[Out] integrate(1/(x*sec(b*log(c*x^n) + a)^(3/2)), x)

maple [B] time = 0.19, size = 247, normalized size = 2.66

$$-\frac{2\sqrt{\left(2\left(\cos^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)-1\right)\left(\sin^{2}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)}\,\left(4\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\left(\sin^{4}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)+\sqrt{\frac{1}{2}-\frac{\cos(a+}{}}}{3n\sqrt{-2\left(\sin^{4}\left(\frac{a}{2}+\frac{b\ln(c\,x^{n})}{2}\right)\right)+\sin^{2}\left(\frac{a}{2}+\frac{b\ln(c}{2}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/x/sec(a+b*ln(c*x^n))^(3/2),x)

[Out] -2/3/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(4*cos(1/2*a+1/2*b*ln(c*x^n))*sin(1/2*a+1/2*b*ln(c*x^n))^4+(sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)*EllipticF(cos(1/2*a+1/2*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+1/2*b*ln(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*x^n)))/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/2*b*ln(c*x^n))/(2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \sec\left(b \log\left(cx^{n}\right) + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/x/sec(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")

[Out] integrate(1/(x*sec(b*log(c*x^n) + a)^(3/2)), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x\,{\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{3/2}} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(1/cos(a + b*log(c*x^n)))^(3/2)),x)
[Out] int(1/(x*(1/cos(a + b*log(c*x^n)))^(3/2)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sec^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*ln(c*x**n))**(3/2),x)
[Out] Integral(1/(x*sec(a + b*log(c*x**n))**(3/2)), x)
```

3.276 $\int \frac{1}{\sec^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=110

$$\frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*hypergeom([-5/2, -5/4-1/2*I/b/n],[1/4*(-2*I-b*n)/b/n],-exp(2*I*a)*(c*x^
n)^(2*I*b))/(2-5*I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)/sec(a+b*ln(c*x
^n))^(5/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4503, 4507, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (2*x*Hypergeometric2F1[-5/2, (-5 - (2*I)/(b*n))/4, -(2*I + b*n)/(4*b*n), -(
E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 - (5*I)*b*n)*(1 + E^((2*I)*a)*(c*x^n)^
((2*I)*b))^(5/2)*Sec[a + b*Log[c*x^n]]^(5/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sec^{\frac{5}{2}}(a+b\log(x))}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{\frac{5ib}{2}-\frac{1}{n}}\right)\text{Subst}\left(\int x^{-1-\frac{5ib}{2}+\frac{1}{n}}\left(1+e^{2ia}x^{2ib}\right)^{5/2}\,dx, x, cx^n\right)}{n\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{2i+bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [B] time = 8.68, size = 867, normalized size = 7.88

$$\frac{30b^3e^{2i\left(a+b\left(\log(cx^n)-n\log(x)\right)\right)}x\left((bn+2i)\,{}_2F_1\left(\frac{1}{2},\frac{3}{4}-\frac{i}{2bn};\frac{7}{4}-\frac{i}{2bn};-e^{2i\left(a+b\left(\log(cx^n)-n\log(x)\right)\right)}x^{2ibn}\right)x^{2ibn}+(3bn-2i)\,{}_2F_1 \cdots}{(2-5ibn)(bn+2i)(3bn-2i)(5bn-2i)\left(-bn+e^{2i\left(a+b\left(\log(cx^n)-n\log(x)\right)\right)}(bn-2i)-2i\right)\sqrt{e^{2i\left(a+b\left(\log(cx^n)-n\,\mathrm{l}\cdots\right.\right.}}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (30*b^3*E^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*n^3*x*((2*I + b*n)*x^(
(2*I)*b*n)*Hypergeometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(b*n), -(E
^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n))] + (-2*I + 3*b*n
)*Hypergeometric2F1[1/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), -(E^((2
*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n))]))/((2 - (5*I)*b*n)*
(2*I + b*n)*(-2*I + 3*b*n)*(-2*I + 5*b*n)*(-2*I - b*n + E^((2*I)*(a + b*(-(
n*Log[x]) + Log[c*x^n])))*(-2*I + b*n))*Sqrt[1 + E^((2*I)*(a + b*(-(n*Log[x
]) + Log[c*x^n])))*x^((2*I)*b*n)]*Sqrt[(E^(I*(a + b*(-(n*Log[x]) + Log[c*x^
n])))*x^(I*b*n))/(2 + 2*E^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*
I)*b*n))]) + Sqrt[Sec[a + b*n*Log[x] + b*(-(n*Log[x]) + Log[c*x^n])]]*(-1/4
*(x*Cos[b*n*Log[x]]*(12 + 55*b^2*n^2 + 12*Cos[2*(a + b*(-(n*Log[x]) + Log[c
```

```
*x^n]))] + 65*b^2*n^2*Cos[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))] + 4*b*n*Sin
[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/((-2*I + 5*b*n)*(2*I + 5*b*n)*(-2*
Cos[a + b*(-(n*Log[x]) + Log[c*x^n])] + b*n*Sin[a + b*(-(n*Log[x]) + Log[c*
x^n])])) + (x*Sin[b*n*Log[x]]*(-16*b*n - 4*b*n*Cos[2*(a + b*(-(n*Log[x]) +
Log[c*x^n]))] + 12*Sin[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))] + 65*b^2*n^2*S
in[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/(4*(-2*I + 5*b*n)*(2*I + 5*b*n)*
(-2*Cos[a + b*(-(n*Log[x]) + Log[c*x^n])] + b*n*Sin[a + b*(-(n*Log[x]) + Lo
g[c*x^n])])) + (x*Sin[3*b*n*Log[x]]*(5*b*n*Cos[3*(a + b*(-(n*Log[x]) + Log[
c*x^n]))] - 2*Sin[3*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/(2*(-2*I + 5*b*n)
*(2*I + 5*b*n)) + (x*Cos[3*b*n*Log[x]]*(2*Cos[3*(a + b*(-(n*Log[x]) + Log[c
*x^n]))] + 5*b*n*Sin[3*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/(2*(-2*I + 5*b
*n)*(2*I + 5*b*n)))
```

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/sec(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(-5/2), x)
```

maple [F] time = 0.13, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec\left(a+b\ln\left(c\,x^{n}\right)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sec(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(1/sec(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(sec(b*log(c*x^n) + a)^(-5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\left(\frac{1}{\cos(a+b\,\ln(c\,x^n))}\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(1/cos(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int(1/(1/cos(a + b*log(c*x^n)))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/sec(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.277 $\int \frac{1}{x\sec^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=93

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{5bn\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}+\frac{6\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{5bn}$$

```
[Out] 2/5*sin(a+b*ln(c*x^n))/b/n/sec(a+b*ln(c*x^n))^(3/2)+6/5*(cos(1/2*a+1/2*b*ln
(c*x^n))^2)^(1/2)/cos(1/2*a+1/2*b*ln(c*x^n))*EllipticE(sin(1/2*a+1/2*b*ln(c
*x^n)),2^(1/2))*cos(a+b*ln(c*x^n))^(1/2)*sec(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 93, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3769, 3771, 2639}

$$\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{5bn\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}+\frac{6\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)}{5bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sec[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (6*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticE[(a + b*Log[c*x^n])/2, 2]*Sqrt[Sec[
a + b*Log[c*x^n]]])/(5*b*n) + (2*Sin[a + b*Log[c*x^n]])/(5*b*n*Sec[a + b*Lo
g[c*x^n]]^(3/2))
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3769

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Csc[c + d*x])^(n + 1))/(b*d*n), x] + Dist[(n + 1)/(b^2*n), Int[(b*Csc[c +
 d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] && IntegerQ[2*n
]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
```

EqQ[n^2, 1/4]

Rubi steps

$$\int \frac{1}{x\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx=\frac{\text{Subst}\left(\int \frac{1}{\sec^{\frac{5}{2}}(a+bx)}\,dx,x,\log\left(cx^n\right)\right)}{n}$$

$$=\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{5bn\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}+\frac{3\,\text{Subst}\left(\int \frac{1}{\sqrt{\sec(a+bx)}}\,dx,x,\log\left(cx^n\right)\right)}{5n}$$

$$=\frac{2\sin\left(a+b\log\left(cx^n\right)\right)}{5bn\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}+\frac{\left(3\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\right)\text{S}}{5n}$$

$$=\frac{6\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}{5bn}+\frac{2\,\text{s}}{5bn}$$

Mathematica [A] time = 0.18, size = 83, normalized size = 0.89

$$\frac{\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\left(\sin\left(a+b\log\left(cx^n\right)\right)+\sin\left(3\left(a+b\log\left(cx^n\right)\right)\right)+12\sqrt{\cos\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a+b\log\right.\right.\right.}{10bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sec[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (Sqrt[Sec[a + b*Log[c*x^n]]]*(12*Sqrt[Cos[a + b*Log[c*x^n]]]*EllipticE[(a +
 b*Log[c*x^n])/2, 2] + Sin[a + b*Log[c*x^n]] + Sin[3*(a + b*Log[c*x^n])]))/
(10*b*n)
```

fricas [F] time = 1.00, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] integral(1/(x*sec(b*log(c*x^n) + a)^(5/2)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \sec\left(b \log\left(cx^n\right) + a\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*sec(b*log(c*x^n) + a)^(5/2)), x)
```

maple [B] time = 0.18, size = 280, normalized size = 3.01

$$-\frac{2\sqrt{\left(2\left(\cos^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)-1\right)\left(\sin^2\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)}\,\left(-8\cos\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\left(\sin^6\left(\frac{a}{2}+\frac{b\ln(c\,x^n)}{2}\right)\right)+8\cos\left(\frac{a}{2}+\right.\right.}{5n\sqrt{-2\left(\sin^4\left(\frac{a}{2}+\frac{b\ln(c}{2}\right.\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/sec(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] -2/5/n*((2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)*sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1
/2)*(-8*cos(1/2*a+1/2*b*ln(c*x^n))*sin(1/2*a+1/2*b*ln(c*x^n))^6+8*cos(1/2*a
+1/2*b*ln(c*x^n))*sin(1/2*a+1/2*b*ln(c*x^n))^4-3*(sin(1/2*a+1/2*b*ln(c*x^n)
)^2)^(1/2)*(2*sin(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)*EllipticE(cos(1/2*a+1/2
*b*ln(c*x^n)),2^(1/2))-2*sin(1/2*a+1/2*b*ln(c*x^n))^2*cos(1/2*a+1/2*b*ln(c*
x^n)))/(-2*sin(1/2*a+1/2*b*ln(c*x^n))^4+sin(1/2*a+1/2*b*ln(c*x^n))^2)^(1/2)
/sin(1/2*a+1/2*b*ln(c*x^n))/(2*cos(1/2*a+1/2*b*ln(c*x^n))^2-1)^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x \sec\left(b \log\left(cx^n\right) + a\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*sec(b*log(c*x^n) + a)^(5/2)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x\left(\frac{1}{\cos(a+b\ \ln(c\,x^n))}\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(1/cos(a + b*log(c*x^n)))^(5/2)),x)
[Out] int(1/(x*(1/cos(a + b*log(c*x^n)))^(5/2)), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/sec(a+b*ln(c*x**n))**(5/2),x)
[Out] Timed out
```

3.278 $\int x^m \sec^3\left(a+b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=102

$$\frac{8e^{3ia}x^{m+1}\left(cx^n\right)^{3ib}\ {}_2F_1\left(3,-\frac{i(m+1)-3bn}{2bn};-\frac{i(m+1)-5bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3ibn+m+1}$$

```
[Out] 8*exp(3*I*a)*x^(1+m)*(c*x^n)^(3*I*b)*hypergeom([3, 1/2*(-I*(1+m)+3*b*n)/b/n
],[1/2*(-I*(1+m)+5*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(1+m+3*I*b*n)
```

Rubi [A] time = 0.09, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$\frac{8e^{3ia}x^{m+1}\left(cx^n\right)^{3ib}\ {}_2F_1\left(3,-\frac{i(m+1)-3bn}{2bn};-\frac{i(m+1)-5bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{3ibn+m+1}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sec[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (8*E^((3*I)*a)*x^(1 + m)*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, -(I*(1 + m)
 - 3*b*n)/(2*b*n), -(I*(1 + m) - 5*b*n)/(2*b*n), -(E^((2*I)*a)*(c*x^n)^((2*
I)*b))])/(1 + m + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sec^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sec^3(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(8e^{3ia}x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+3ib+\frac{1+m}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^3}\,dx,x,cx^n\right)}{n}$$
$$= \frac{8e^{3ia}x^{1+m}\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,-\frac{i(1+m)-3bn}{2bn};-\frac{i(1+m)-5bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+m+3ibn}$$

Mathematica [A] time = 5.60, size = 134, normalized size = 1.31

$$\frac{x^{m+1}\left(-2\sec\left(a+b\log\left(cx^n\right)\right)\left(-bn\tan\left(a+b\log\left(cx^n\right)\right)+m+1\right)+4e^{ia}(-ibn+m+1)\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{i(m+1)}{2bn};\right.\right.}{4b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sec[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (x^(1 + m)*(4*E^(I*a)*(1 + m - I*b*n)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/
2 - ((I/2)*(1 + m))/(b*n), 3/2 - ((I/2)*(1 + m))/(b*n), -E^((2*I)*(a + b*Lo
g[c*x^n]))] - 2*Sec[a + b*Log[c*x^n]]*(1 + m - b*n*Tan[a + b*Log[c*x^n]])))
/(4*b^2*n^2)
```

fricas [F] time = 1.39, size = 0, normalized size = 0.00

$$\text{integral}\left(x^m\sec\left(b\log\left(cx^n\right)+a\right)^3,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] integral(x^m*sec(b*log(c*x^n) + a)^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m\sec\left(b\log\left(cx^n\right)+a\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^3,x, algorithm="giac")
[Out] integrate(x^m*sec(b*log(c*x^n) + a)^3, x)
```

maple [F] time = 1.75, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sec^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+b*ln(c*x^n))^3,x)
[Out] int(x^m*sec(a+b*ln(c*x^n))^3,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^3,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^{m}}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + b*log(c*x^n))^3,x)
[Out] int(x^m/cos(a + b*log(c*x^n))^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m}\sec^{3}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+b*ln(c*x**n))**3,x)
[Out] Integral(x**m*sec(a + b*log(c*x**n))**3, x)
```

3.279 $\int x^m \sec^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=102

$$\frac{4e^{2ia}x^{m+1}\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,-\frac{i(m+1)-2bn}{2bn};-\frac{i(m+1)-4bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2ibn+m+1}$$

```
[Out] 4*exp(2*I*a)*x^(1+m)*(c*x^n)^(2*I*b)*hypergeom([2, 1/2*(-I*(1+m)+2*b*n)/b/n
],[1/2*(-I*(1+m)+4*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(1+m+2*I*b*n)
```

Rubi [A] time = 0.08, antiderivative size = 102, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4509, 4505, 364}

$$\frac{4e^{2ia}x^{m+1}\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,-\frac{i(m+1)-2bn}{2bn};-\frac{i(m+1)-4bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2ibn+m+1}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (4*E^((2*I)*a)*x^(1 + m)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, -(I*(1 + m)
 - 2*b*n)/(2*b*n), -(I*(1 + m) - 4*b*n)/(2*b*n), -(E^((2*I)*a)*(c*x^n)^((2*
I)*b))])/(1 + m + (2*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sec^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sec^2(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(4e^{2ia}x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+2ib+\frac{1+m}{n}}}{\left(1+e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{n}$$
$$= \frac{4e^{2ia}x^{1+m}\left(cx^n\right)^{2ib}\ {}_2F_1\left(2,-\frac{i(1+m)-2bn}{2bn};-\frac{i(1+m)-4bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+m+2ibn}$$

Mathematica [B] time = 17.18, size = 482, normalized size = 4.73

$$\frac{x^{m+1}\sin(bn\log(x))\sec\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\sec\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)+bn\log(x)\right)}{bn}-\frac{(m+1)\sec\cdots}{\cdots}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sec[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x^(1 + m)*Sec[a + b*(-(n*Log[x]) + Log[c*x^n])]*Sec[a + b*n*Log[x] + b*(-(
n*Log[x]) + Log[c*x^n])]*Sin[b*n*Log[x]])/(b*n) - ((1 + m)*Sec[a + b*(-(n*L
og[x]) + Log[c*x^n])]*((x^(1 + m)*Sec[a + b*Log[c*x^n]]*Sin[b*n*Log[x]])/(1
 + m) - (I*Cos[a + b*(-(n*Log[x]) + Log[c*x^n])]*(-(E^((a + 2*a*m + b*(1 +
m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 + m + (2*I)
*b*n)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m))/(b*n), 1 - ((I/2)*(1 + m))/(b
*n), -E^((2*I)*(a + b*Log[c*x^n]))]) + E^((a*(1 + 2*m + (2*I)*b*n))/(b*n) +
 (1 + m + (2*I)*b*n)*Log[x] + ((1 + 2*m + (2*I)*b*n)*(-(n*Log[x]) + Log[c*x
^n]))/n)*(1 + m)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m + (2*I)*b*n))/(b*n),
 ((-1/2*I)*(1 + m + (4*I)*b*n))/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))] - I*E
^((a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))
/(b*n))*(1 + m + (2*I)*b*n)*Tan[a + b*Log[c*x^n]]))/(E^(((1 + 2*m)*(a + b*(
-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*(1 + m + (2*I)*b*n))))/(b*n)
```

fricas [F] time = 1.62, size = 0, normalized size = 0.00

$$\text{integral}\left(x^m\sec\left(b\log\left(cx^n\right)+a\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^2,x, algorithm="fricas")
[Out] integral(x^m*sec(b*log(c*x^n) + a)^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sec\left(b\log\left(cx^n\right) + a\right)^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^2,x, algorithm="giac")
[Out] integrate(x^m*sec(b*log(c*x^n) + a)^2, x)
```

maple [F] time = 1.53, size = 0, normalized size = 0.00

$$\int x^m \left(\sec^2\left(a + b\ln\left(c\,x^n\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+b*ln(c*x^n))^2,x)
[Out] int(x^m*sec(a+b*ln(c*x^n))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^2,x, algorithm="maxima")
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\cos\left(a + b\,\ln\left(c\,x^n\right)\right)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + b*log(c*x^n))^2,x)
[Out] int(x^m/cos(a + b*log(c*x^n))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m \sec^2\left(a + b\log\left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(x**m*sec(a + b*log(c*x**n))**2, x)
```

3.280 $\int x^m \sec\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=103

$$\frac{2e^{ia}x^{m+1}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,-\frac{im-bn+i}{2bn};-\frac{i(m+1)-3bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{ibn+m+1}$$

```
[Out] 2*exp(I*a)*x^(1+m)*(c*x^n)^(I*b)*hypergeom([1, 1/2*(-I-I*m+b*n)/b/n],[1/2*(
-I*(1+m)+3*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(1+m+I*b*n)
```

Rubi [**A**] time = 0.07, antiderivative size = 99, normalized size of antiderivative = 0.96, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4505, 364}

$$\frac{2e^{ia}x^{m+1}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i(m+1)}{bn}\right);-\frac{i(m+1)-3bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{ibn+m+1}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sec[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x^(1 + m)*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - (I*(1 + m))/(b
*n))/2, -(I*(1 + m) - 3*b*n)/(2*b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(1
 + m + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4505

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[2^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*
b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sec\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sec(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(2e^{ia}x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+ib+\frac{1+m}{n}}}{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n}$$
$$= \frac{2e^{ia}x^{1+m}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i(1+m)}{bn}\right);-\frac{i(1+m)-3bn}{2bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+m+ibn}$$

Mathematica [A] time = 0.21, size = 94, normalized size = 0.91

$$\frac{2e^{ia}x^{m+1}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{i(m+1)}{2bn};\frac{3}{2}-\frac{i(m+1)}{2bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{ibn+m+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Sec[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x^(1 + m)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - ((I/2)*(1 + m
))/(b*n), 3/2 - ((I/2)*(1 + m))/(b*n), -E^((2*I)*(a + b*Log[c*x^n]))])/(1 +
 m + I*b*n)
```

fricas [F] time = 0.99, size = 0, normalized size = 0.00

$$\text{integral}\left(x^m\sec\left(b\log\left(cx^n\right)+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(x^m*sec(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m\sec\left(b\log\left(cx^n\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(x^m*sec(b*log(c*x^n) + a), x)
```

maple [F] time = 0.42, size = 0, normalized size = 0.00

$$\int x^{m} \sec \left(a + b \ln \left(c\, x^{n}\right)\right) \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+b*ln(c*x^n)),x)
[Out] int(x^m*sec(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sec \left(b \log \left(c x^{n}\right) + a\right) \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(x^m*sec(b*log(c*x^n) + a), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\cos \left(a + b\, \ln \left(c\, x^n\right)\right)} \,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/cos(a + b*log(c*x^n)),x)
[Out] int(x^m/cos(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sec \left(a + b \log \left(c x^{n}\right)\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+b*ln(c*x**n)),x)
[Out] Integral(x**m*sec(a + b*log(c*x**n)), x)
```

3.281 $\int x^m \sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right) dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2} {}_2F_1\left(\frac{5}{2},-\frac{2im-5bn+2i}{4bn};-\frac{2im-9bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{5ibn+2m+2}$$

```
[Out] 2*x^(1+m)*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*hypergeom([5/2, 1/4*(-2*I-2*
I*m+5*b*n)/b/n],[1/4*(-2*I-2*I*m+9*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*s
ec(a+b*ln(c*x^n))^(5/2)/(2+2*m+5*I*b*n)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4509, 4507, 364}

$$\frac{2x^{m+1}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2} {}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(m+1)}{bn}\right);-\frac{2im-9bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{5ibn+2m+2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sec[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 + m)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Hypergeometric2F1[5/
2, (5 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - 9*b*n)/(4*b*n), -(E^((2
*I)*a)*(c*x^n)^((2*I)*b))]*Sec[a + b*Log[c*x^n]]^(5/2))/(2 + 2*m + (5*I)*b*
n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sec^{\frac{5}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1+m}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\sec^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}\cdots}}{\left(1+e^{2ia}\cdots\right.}\right.}{n}$$

$$= \frac{2x^{1+m}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-9bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\text{se}\cdots}{2+2m+5ibn}$$

Mathematica [A] time = 2.14, size = 182, normalized size = 1.40

$$\frac{2x^{m+1}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\left(\left(b^2n^2+4m^2+8m+4\right)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,-\frac{2im-3bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2i(a+b\cdots}\right.\right.}{3b^2n^2(ibn+2m+2)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sec[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 + m)*Sqrt[Sec[a + b*Log[c*x^n]]]*((4 + 8*m + 4*m^2 + b^2*n^2)*(1 +
E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2F1[1, -1/4*(2*I + (2*I)*m - 3
*b*n)/(b*n), -1/4*(2*I + (2*I)*m - 5*b*n)/(b*n), -E^((2*I)*(a + b*Log[c*x^n
]))] - (2 + 2*m + I*b*n)*(2 + 2*m - b*n*Tan[a + b*Log[c*x^n]])))/(3*b^2*n^2
*(2 + 2*m + I*b*n))
```

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^m*sec(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.12, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sec^{\frac{5}{2}} (a + b \ln (c x^{n}))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(x^m*sec(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sec \left(b \log (cx^{n}) + a\right)^{\frac{5}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*sec(b*log(c*x^n) + a)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^{m} \left(\frac{1}{\cos (a + b \, \ln (c x^{n}))}\right)^{5/2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(1/cos(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int(x^m*(1/cos(a + b*log(c*x^n)))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.282 $\int x^m \sec^{\frac{3}{2}}(a + b\log(cx^n))\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\left(1+e^{2ia}(cx^n)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},-\frac{2im-3bn+2i}{4bn};-\frac{2im-7bn+2i}{4bn};-e^{2ia}(cx^n)^{2ib}\right)\sec^{\frac{3}{2}}(a+b\log(cx^n))}{3ibn+2m+2}$$

```
[Out] 2*x^(1+m)*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*hypergeom([3/2, 1/4*(-2*I-2*
I*m+3*b*n)/b/n],[1/4*(-2*I-2*I*m+7*b*n)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*s
ec(a+b*ln(c*x^n))^(3/2)/(2+2*m+3*I*b*n)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4509, 4507, 364}

$$\frac{2x^{m+1}\left(1+e^{2ia}(cx^n)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(m+1)}{bn}\right);-\frac{2im-7bn+2i}{4bn};-e^{2ia}(cx^n)^{2ib}\right)\sec^{\frac{3}{2}}(a+b\log(cx^n))}{3ibn+2m+2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sec[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Hypergeometric2F1[3/
2, (3 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - 7*b*n)/(4*b*n), -(E^((2
*I)*a)*(c*x^n)^((2*I)*b))]*Sec[a + b*Log[c*x^n]]^(3/2))/(2 + 2*m + (3*I)*b*
n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sec^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1+m}{n}}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int \frac{x^{-1+}}{\left(1+e^{2}\right.}\right.}{n}$$

$$= \frac{2x^{1+m}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-7bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{2+2m+3ibn}$$

Mathematica [B] time = 9.49, size = 470, normalized size = 3.62

$$\frac{\sqrt{2}\,x^{-ibn+m+1}\left((3ibn+2m+2)\left((ibn+2m+2)\sqrt{\frac{e^{ia}\left(cx^n\right)^{ib}}{1+e^{2ia}\left(cx^n\right)^{2ib}}}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\;{}_2F_1\left(\frac{1}{2},-\frac{2im+bn+2i}{4bn};-\frac{2im-3bn+2i}{4bn};-\right.\right.\right.}{bn(3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sec[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (Sqrt[2]*x^(1 + m - I*b*n)*(-((4 + 8*m + 4*m^2 + b^2*n^2)*x^((2*I)*b*n)*Sqr
t[(E^(I*a)*(c*x^n)^(I*b))/(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sqrt[1 + E^(
(2*I)*a)*(c*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2, ((-1/2*I)*(1 + m + ((3*I
)/2)*b*n))/(b*n), -1/4*(2*I + (2*I)*m - 7*b*n)/(b*n), -(E^((2*I)*a)*(c*x^n)
^((2*I)*b))]) + (2 + 2*m + (3*I)*b*n)*((2 + 2*m + I*b*n)*Sqrt[(E^(I*a)*(c*x
^n)^(I*b))/(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sqrt[1 + E^((2*I)*a)*(c*x^n
)^((2*I)*b)]*Hypergeometric2F1[1/2, -1/4*(2*I + (2*I)*m + b*n)/(b*n), -1/4*
(2*I + (2*I)*m - 3*b*n)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))] - I*Sqrt[2
]*x^(I*b*n)*Sqrt[Sec[a + b*Log[c*x^n]]]*(b*n*Cos[b*n*Log[x]] - 2*(1 + m)*Si
n[b*n*Log[x]]))))/(b*n*(-2*I - (2*I)*m + 3*b*n)*(-2*(1 + m)*Cos[a - b*n*Log
[x] + b*Log[c*x^n]] + b*n*Sin[a - b*n*Log[x] + b*Log[c*x^n]]))
```

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^m*sec(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sec^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(x^m*sec(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sec\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*sec(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^{m} \left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)^{3/2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(1/cos(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int(x^m*(1/cos(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Timed out
```

3.283 $\int x^m \sqrt{\sec \left(a+b \log \left(c x^n\right)\right)} \, dx$

Optimal. Leaf size=130

$$\frac{2 x^{m+1} \sqrt{1+e^{2 i a} \left(c x^n\right)^{2 i b}} \, {}_2F_1\left(\frac{1}{2},-\frac{2 i m-b n+2 i}{4 b n};-\frac{2 i m-5 b n+2 i}{4 b n};-e^{2 i a} \left(c x^n\right)^{2 i b}\right) \sqrt{\sec \left(a+b \log \left(c x^n\right)\right)}}{i b n+2 m+2}$$

```
[Out] 2*x^(1+m)*hypergeom([1/2, 1/4*(-2*I-2*I*m+b*n)/b/n],[1/4*(-2*I-2*I*m+5*b*n)
/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)*sec
(a+b*ln(c*x^n))^(1/2)/(2+2*m+I*b*n)
```

Rubi [A] time = 0.09, antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4509, 4507, 364}

$$\frac{2 x^{m+1} \sqrt{1+e^{2 i a} \left(c x^n\right)^{2 i b}} \, {}_2F_1\left(\frac{1}{2},-\frac{2 i m-b n+2 i}{4 b n};-\frac{2 i m-5 b n+2 i}{4 b n};-e^{2 i a} \left(c x^n\right)^{2 i b}\right) \sqrt{\sec \left(a+b \log \left(c x^n\right)\right)}}{i b n+2 m+2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^(1 + m)*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Hypergeometric2F1[1/2,
 -(2*I + (2*I)*m - b*n)/(4*b*n), -(2*I + (2*I)*m - 5*b*n)/(4*b*n), -(E^((2*
I)*a)*(c*x^n)^((2*I)*b))]*Sqrt[Sec[a + b*Log[c*x^n]]])/(2 + 2*m + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,dx=\frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sqrt{\sec(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{ib}{2}-\frac{1+m}{n}}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int\frac{x^{-1+\frac{ib}{2}}}{\sqrt{1+e^{2i}}}\right.}{n}$$

$$=\frac{2x^{1+m}\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},-\frac{2i+2im-bn}{4bn};-\frac{2i+2im-5bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\sec\left(\right.}}{2+2m+ibn}$$

Mathematica [A] time = 0.78, size = 119, normalized size = 0.92

$$\frac{2x^{m+1}\left(1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,-\frac{2im-3bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{ibn+2m+2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*(1 + E^((2*I)*(a + b*Log[c*x^n])))*x^(1 + m)*Hypergeometric2F1[1, -1/4*(
2*I + (2*I)*m - 3*b*n)/(b*n), -1/4*(2*I + (2*I)*m - 5*b*n)/(b*n), -E^((2*I)
*(a + b*Log[c*x^n]))]*Sqrt[Sec[a + b*Log[c*x^n]]])/(2 + 2*m + I*b*n)
```

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^m*sec(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^m*sqrt(sec(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.12, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sqrt{\sec}\, (a + b\ln (c\, x^{n}))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*sec(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(x^m*sec(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sqrt{\sec\left(b \log\left(cx^{n}\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*sec(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*sqrt(sec(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^{m} \sqrt{\frac{1}{\cos\left(a + b\, \ln\left(c\, x^{n}\right)\right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(1/cos(a + b*log(c*x^n)))^(1/2),x)
```

```
[Out] int(x^m*(1/cos(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sqrt{\sec\left(a + b \log\left(cx^{n}\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*sec(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(x**m*sqrt(sec(a + b*log(c*x**n))), x)
```

3.284 $\int \frac{x^m}{\sqrt{\sec(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=129

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{1}{2},-\frac{2im+bn+2i}{4bn};-\frac{2im-3bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-ibn+2m+2)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*x^(1+m)*hypergeom([-1/2, 1/4*(-2*I-2*I*m-b*n)/b/n],[1/4*(-2*I-2*I*m+3*b*n
)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2+2*m-I*b*n)/(1+exp(2*I*a)*(c*x^n)^(2*
I*b))^(1/2)/sec(a+b*ln(c*x^n))^(1/2)
```

Rubi [A] time = 0.09, antiderivative size = 126, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4509, 4507, 364}

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bn}-1\right);-\frac{2im-3bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-ibn+2m+2)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^(1 + m)*Hypergeometric2F1[-1/2, (-1 - ((2*I)*(1 + m))/(b*n))/4, -(2*I
+ (2*I)*m - 3*b*n)/(4*b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 + 2*m -
I*b*n)*Sqrt[1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Sec[a + b*Log[c*x^n]]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\sqrt{\sec(a+b\log(x))}}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{\frac{ib}{2}-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1+m}{n}}\sqrt{1+e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}$$

$$= \frac{2x^{1+m}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-3bn}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+2m-ibn)\sqrt{1+e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [B] time = 6.93, size = 437, normalized size = 3.39

$$\frac{2x^{m+1}\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}{\sqrt{\sec\left(a+b\log\left(cx^n\right)\right)}\left(2(m+1)\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)-bn\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)}-\frac{2bnx^{m}\cdots}{\cdots}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Sqrt[Sec[a + b*Log[c*x^n]]],x]
```

```
[Out] (-2*b*E^((2*I)*(a - b*n*Log[x] + b*Log[c*x^n]))*n*x^(1 + m)*((2*I + (2*I)*m
 + b*n)*x^((2*I)*b*n)*Hypergeometric2F1[1/2, ((-1/2*I)*(1 + m + ((3*I)/2)*b
*n))/(b*n), -1/4*(2*I + (2*I)*m - 7*b*n)/(b*n), -(E^((2*I)*a)*(c*x^n)^((2*I
)*b))] + (-2*I - (2*I)*m + 3*b*n)*Hypergeometric2F1[1/2, -1/4*(2*I + (2*I)*
m + b*n)/(b*n), -1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), -(E^((2*I)*a)*(c*x^n)^(
(2*I)*b))]))/((2 + 2*m - I*b*n)*(2 + 2*m + (3*I)*b*n)*(2 + 2*m - I*b*n + E^
((2*I)*(a - b*n*Log[x] + b*Log[c*x^n]))*(2 + 2*m + I*b*n))*Sqrt[1 + E^((2*I
)*a)*(c*x^n)^((2*I)*b)]*Sqrt[(E^(I*a)*(c*x^n)^(I*b))/(2 + 2*E^((2*I)*a)*(c*
x^n)^((2*I)*b))]) + (2*x^(1 + m)*Cos[a - b*n*Log[x] + b*Log[c*x^n]])/(Sqrt[
```

```
Sec[a + b*Log[c*x^n]]]*(2*(1 + m)*Cos[a - b*n*Log[x] + b*Log[c*x^n]] - b*n*
Sin[a - b*n*Log[x] + b*Log[c*x^n]]))
```

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^m/sec(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/sec(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/sqrt(sec(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\sec\left(a+b\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/sec(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(x^m/sec(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\sec\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/sec(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/sqrt(sec(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\sqrt{\frac{1}{\cos(a+b\,\ln(c\,x^n))}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/(1/cos(a + b*log(c*x^n)))^(1/2),x)
[Out] int(x^m/(1/cos(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\sec\left(a + b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/sec(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(x**m/sqrt(sec(a + b*log(c*x**n))), x)
```

3.285 $\int \frac{x^m}{\sec^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{3}{2},-\frac{2im+3bn+2i}{4bn};-\frac{2im-bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-3ibn+2m+2)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x^(1+m)*hypergeom([-3/2, 1/4*(-2*I-2*I*m-3*b*n)/b/n],[1/4*(-2*I-2*I*m+b*n
)/b/n],-exp(2*I*a)*(c*x^n)^(2*I*b))/(2+2*m-3*I*b*n)/(1+exp(2*I*a)*(c*x^n)^(
2*I*b))^(3/2)/sec(a+b*ln(c*x^n))^(3/2)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4509, 4507, 364}

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bn}-3\right);-\frac{2im-bn+2i}{4bn};-e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-3ibn+2m+2)\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Sec[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*Hypergeometric2F1[-3/2, (-3 - ((2*I)*(1 + m))/(b*n))/4, -(2*I
+ (2*I)*m - b*n)/(4*b*n), -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/((2 + 2*m - (3
*I)*b*n)*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Sec[a + b*Log[c*x^n]]^(3
/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\sec^{\frac{3}{2}}(a+b\log(cx^n))}\,dx = \frac{\left(x^{1+m}(cx^n)^{-\frac{1+m}{n}}\right)\operatorname{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\sec^{\frac{3}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}(cx^n)^{\frac{3ib}{2}-\frac{1+m}{n}}\right)\operatorname{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1+m}{n}}\left(1+e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx^n\right)}{n\left(1+e^{2ia}(cx^n)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}(a+b\log(cx^n))}$$

$$= \frac{2x^{1+m}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-bn}{4bn};-e^{2ia}(cx^n)^{2ib}\right)}{(2+2m-3ibn)\left(1+e^{2ia}(cx^n)^{2ib}\right)^{3/2}\sec^{\frac{3}{2}}(a+b\log(cx^n))}$$

Mathematica [A] time = 2.50, size = 202, normalized size = 1.55

$$\frac{2x^{m+1}\left(3b^2n^2\left(1+e^{2ia}(cx^n)^{2ib}\right)\sec^2(a+b\log(cx^n))\,{}_2F_1\left(1,-\frac{2im-3bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};-e^{2i(a+b\log(cx^n))}\right)+(ibn+2\ldots\right.}{(ibn+2m+2)(-3ibn+2m+2)(3ibn+2m+2)\sec^{\frac{3}{2}}(a+b\log(cx^n)\ldots}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Sec[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*(3*b^2*n^2*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometric2
F1[1, -1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), -1/4*(2*I + (2*I)*m - 5*b*n)/(b*n
), -E^((2*I)*(a + b*Log[c*x^n]))]*Sec[a + b*Log[c*x^n]]^2 + (2 + 2*m + I*b*
n)*(2 + 2*m + 3*b*n*Tan[a + b*Log[c*x^n]])))/((2 + 2*m + I*b*n)*(2 + 2*m -
(3*I)*b*n)*(2 + 2*m + (3*I)*b*n)*Sec[a + b*Log[c*x^n]]^(3/2))
```

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^m/sec(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/sec(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/sec(b*log(c*x^n) + a)^(3/2), x)
```

maple [F] time = 0.11, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sec\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/sec(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(x^m/sec(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sec\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/sec(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/sec(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{{\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/(1/cos(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int(x^m/(1/cos(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sec^{\frac{3}{2}}\left(a + b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/sec(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(x**m/sec(a + b*log(c*x**n))**(3/2), x)
```

3.286 $\int (ex)^m \sec^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=139

$$\frac{(ex)^{m+1}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\ {}_2F_1\left(p,-\frac{im-bdnp+i}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);-e^{2iad}\left(cx^n\right)^{2ibd}\right)\sec^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(ibdnp+m+1)}$$

```
[Out] (e*x)^(1+m)*(1+exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p*hypergeom([p, 1/2*(-I-I*m+
b*d*n*p)/b/d/n],[1-1/2*I*(1+m)/b/d/n+1/2*p],-exp(2*I*a*d)*(c*x^n)^(2*I*b*d)
)*sec(d*(a+b*ln(c*x^n)))^p/e/(1+m+I*b*d*n*p)
```

Rubi [A] time = 0.12, antiderivative size = 133, normalized size of antiderivative = 0.96, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4509, 4507, 364}

$$\frac{(ex)^{m+1}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\ {}_2F_1\left(p,\frac{1}{2}\left(p-\frac{i(m+1)}{bdn}\right);\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);-e^{2iad}\left(cx^n\right)^{2ibd}\right)\sec^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(ibdnp+m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Sec[d*(a + b*Log[c*x^n])]^p,x]
```

```
[Out] ((e*x)^(1 + m)*(1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p*Hypergeometric2F1[
p, (((-I)*(1 + m))/(b*d*n) + p)/2, (2 - (I*(1 + m))/(b*d*n) + p)/2, -(E^((2
*I)*a*d)*(c*x^n)^((2*I)*b*d))]*Sec[d*(a + b*Log[c*x^n])]^p)/(e*(1 + m + I*b
*d*n*p))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \sec^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\mathrm{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sec^p(d(a+b\log(x)))\,dx, x, cx^n\right)}{en}$$

$$= \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}-ibdp}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p \sec^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\right)\mathrm{Su}}{en}$$

$$= \frac{(ex)^{1+m}\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p {}_2F_1\left(p,\frac{1}{2}\left(-\frac{i(1+m)}{bdn}+p\right);\frac{1}{2}\left(2-\frac{i(1+m)}{bdn}+p\right);-\right.}{e(1+m+ibdnp)}$$

Mathematica [A] time = 1.63, size = 169, normalized size = 1.22

$$\frac{2^p x(ex)^m\left(\frac{e^{iad}\left(cx^n\right)^{ibd}}{1+e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p\left(1+e^{2iad}\left(cx^n\right)^{2ibd}\right)^p {}_2F_1\left(p,-\frac{i(m+ibdnp+1)}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);-e^{2iad}\left(cx^n\right)^{2ibd}\right)}{ibdnp+m+1}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m*Sec[d*(a + b*Log[c*x^n])]^p,x]
```

```
[Out] (2^p*x*(e*x)^m*((E^(I*a*d)*(c*x^n)^(I*b*d))/(1 + E^((2*I)*a*d)*(c*x^n)^((2*
I)*b*d)))^p*(1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p*Hypergeometric2F1[p,
((-1/2*I)*(1 + m + I*b*d*n*p))/(b*d*n), (2 - (I*(1 + m))/(b*d*n) + p)/2, -(
E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))])/(1 + m + I*b*d*n*p)
```

fricas [F] time = 0.54, size = 0, normalized size = 0.00

$$\mathrm{integral}\left((ex)^m \sec\left(bd\log\left(cx^n\right)+ad\right)^p, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*sec(d*(a+b*log(c*x^n)))^p,x, algorithm="fricas")
```

```
[Out] integral((e*x)^m*sec(b*d*log(c*x^n) + a*d)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \sec\left(\left(b\log\left(cx^n\right)+a\right)d\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*sec(d*(a+b*log(c*x^n)))^p,x, algorithm="giac")
[Out] integrate((e*x)^m*sec((b*log(c*x^n) + a)*d)^p, x)
```

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int (ex)^{m} \left(\sec^{p}\left(d \left(a+b \ln \left(c \,x^{n}\right)\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*sec(d*(a+b*ln(c*x^n)))^p,x)
[Out] int((e*x)^m*sec(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^{m} \sec\left(\left(b \log\left(cx^{n}\right) + a\right)d\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*sec(d*(a+b*log(c*x^n)))^p,x, algorithm="maxima")
[Out] integrate((e*x)^m*sec((b*log(c*x^n) + a)*d)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(e\,x\right)}^m\,{\left(\frac{1}{\cos\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}\right)}^p \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*(1/cos(d*(a + b*log(c*x^n))))^p,x)
[Out] int((e*x)^m*(1/cos(d*(a + b*log(c*x^n))))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^{m} \sec^{p}\left(ad + bd \log\left(cx^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*sec(d*(a+b*ln(c*x**n)))**p,x)
[Out] Integral((e*x)**m*sec(a*d + b*d*log(c*x**n))**p, x)
```

3.287 $\int x \sec^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=106

$$\frac{x^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p\,{}_2F_1\left(p,\frac{1}{2}\left(p-\frac{2i}{bn}\right);\frac{1}{2}\left(p-\frac{2i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^p\left(a+b\log\left(cx^n\right)\right)}{2+ibnp}$$

```
[Out] x^2*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^p*hypergeom([p, -I/b/n+1/2*p],[1-I/b/n+1
/2*p],-exp(2*I*a)*(c*x^n)^(2*I*b))*sec(a+b*ln(c*x^n))^p/(2+I*b*n*p)
```

Rubi [A] time = 0.08, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4509, 4507, 364}

$$\frac{x^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p\,{}_2F_1\left(p,\frac{1}{2}\left(p-\frac{2i}{bn}\right);\frac{1}{2}\left(p-\frac{2i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^p\left(a+b\log\left(cx^n\right)\right)}{2+ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sec[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x^2*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*Hypergeometric2F1[p, ((-2*I)/(b*
n) + p)/2, (2 - (2*I)/(b*n) + p)/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sec[a
 + b*Log[c*x^n]]^p)/(2 + I*b*n*p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4509

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Sec[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\sec^p\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\sec^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x^2\left(cx^n\right)^{-\frac{2}{n}-ibp}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p\sec^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}+ibp}\left(1\right.\right.}{n}$$

$$=\frac{x^2\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p\,{}_2F_1\left(p,\frac{1}{2}\left(-\frac{2i}{bn}+p\right);\frac{1}{2}\left(2-\frac{2i}{bn}+p\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^p\left(a\right.}{2+ibnp}$$

Mathematica [A] time = 1.02, size = 142, normalized size = 1.34

$$-\frac{i2^px^2\left(\frac{e^{ia}\left(cx^n\right)^{ib}}{1+e^{2ia}\left(cx^n\right)^{2ib}}\right)^p\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p\,{}_2F_1\left(\frac{p}{2}-\frac{i}{bn},p;\frac{p}{2}-\frac{i}{bn}+1;-e^{2ia}\left(cx^n\right)^{2ib}\right)}{bnp-2i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sec[a + b*Log[c*x^n]]^p,x]
[Out] ((-I)*2^p*x^2*((E^(I*a)*(c*x^n)^(I*b))/(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)))
^p*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*Hypergeometric2F1[(-I)/(b*n) + p/2
, p, 1 - I/(b*n) + p/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(-2*I + b*n*p)
```

fricas [F] time = 0.56, size = 0, normalized size = 0.00

$$\text{integral}\left(x\sec\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^p,x, algorithm="fricas")
[Out] integral(x*sec(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate(x*sec(b*log(c*x^n) + a)^p, x)
```

maple [F] time = 0.12, size = 0, normalized size = 0.00

$$\int x\left(\sec^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*sec(a+b*ln(c*x^n))^p,x)
```

```
[Out] int(x*sec(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec\left(b\log\left(cx^{n}\right)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

```
[Out] integrate(x*sec(b*log(c*x^n) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)^{p}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(1/cos(a + b*log(c*x^n)))^p,x)
```

```
[Out] int(x*(1/cos(a + b*log(c*x^n)))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\sec^{p}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*sec(a+b*ln(c*x**n))**p,x)
```

```
[Out] Integral(x*sec(a + b*log(c*x**n))**p, x)
```

3.288 $\int \sec^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=107

$$\frac{x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p {}_2F_1\left(p,-\frac{i-bnp}{2bn};\frac{1}{2}\left(p-\frac{i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^p\left(a+b\log\left(cx^n\right)\right)}{1+ibnp}$$

```
[Out] x*(1+exp(2*I*a)*(c*x^n)^(2*I*b))^p*hypergeom([p, 1/2*(-I+b*n*p)/b/n],[1-1/2
*I/b/n+1/2*p],-exp(2*I*a)*(c*x^n)^(2*I*b))*sec(a+b*ln(c*x^n))^p/(1+I*b*n*p)
```

Rubi [A] time = 0.07, antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4503, 4507, 364}

$$\frac{x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p {}_2F_1\left(p,-\frac{i-bnp}{2bn};\frac{1}{2}\left(p-\frac{i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^p\left(a+b\log\left(cx^n\right)\right)}{1+ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[Sec[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*Hypergeometric2F1[p, -(I - b*n*p)/
(2*b*n), (2 - I/(b*n) + p)/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Sec[a + b*L
og[c*x^n]]^p)/(1 + I*b*n*p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4503

```
Int[Sec[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Sec[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4507

```
Int[((e_.)*(x_))^(m_.)*Sec[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.), x_Symbol]
:> Dist[(Sec[d*(a + b*Log[x])]^p*(1 + E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 + E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sec^p\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sec^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(x\left(cx^n\right)^{-\frac{1}{n}-ibp}\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p\sec^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}+ibp}\left(1+e^{2i}\right.\right.}{n}$$
$$= \frac{x\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p{}_2F_1\left(p,-\frac{i-bnp}{2bn};\frac{1}{2}\left(2-\frac{i}{bn}+p\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)\sec^p\left(a+b\log\left(c\right.\right.}{1+ibnp}$$

Mathematica [A] time = 0.81, size = 142, normalized size = 1.33

$$-\frac{i2^px\left(\frac{e^{ia}(cx^n)^{ib}}{1+e^{2ia}(cx^n)^{2ib}}\right)^p\left(1+e^{2ia}\left(cx^n\right)^{2ib}\right)^p{}_2F_1\left(p,\frac{bnp-i}{2bn};\frac{1}{2}\left(p-\frac{i}{bn}+2\right);-e^{2ia}\left(cx^n\right)^{2ib}\right)}{bnp-i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sec[a + b*Log[c*x^n]]^p,x]
```

```
[Out] ((-I)*2^p*x*((E^(I*a)*(c*x^n)^(I*b))/(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)))^p
*(1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*Hypergeometric2F1[p, (-I + b*n*p)/(2
*b*n), (2 - I/(b*n) + p)/2, -(E^((2*I)*a)*(c*x^n)^((2*I)*b))])/(-I + b*n*p)
```

fricas [F] time = 0.66, size = 0, normalized size = 0.00

$$\text{integral}\left(\sec\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral(sec(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^p,x, algorithm="giac")
[Out] integrate(sec(b*log(c*x^n) + a)^p, x)
```

maple [F] time = 0.08, size = 0, normalized size = 0.00

$$\int \sec^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(sec(a+b*ln(c*x^n))^p,x)
[Out] int(sec(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec\left(b\log\left(cx^{n}\right)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*log(c*x^n))^p,x, algorithm="maxima")
[Out] integrate(sec(b*log(c*x^n) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\cos\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/cos(a + b*log(c*x^n)))^p,x)
[Out] int((1/cos(a + b*log(c*x^n)))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sec^{p}{\left(a+b\log{\left(cx^{n}\right)}\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sec(a+b*ln(c*x**n))**p,x)
[Out] Integral(sec(a + b*log(c*x**n))**p, x)
```

3.289 $\int x^2 \csc \left(a+b \log \left(c x^n\right)\right) \, dx$

Optimal. Leaf size=86

$$\frac{2 e^{i a} x^3 \left(c x^n\right)^{i b} \, _2F_1\left(1,\frac{1}{2} \left(1-\frac{3 i}{b n}\right);\frac{3}{2} \left(1-\frac{i}{b n}\right);e^{2 i a} \left(c x^n\right)^{2 i b}\right)}{-b n+3 i}$$

```
[Out] 2*exp(I*a)*x^3*(c*x^n)^(I*b)*hypergeom([1, 1/2-3/2*I/b/n],[3/2-3/2*I/b/n],e
xp(2*I*a)*(c*x^n)^(2*I*b))/(3*I-b*n)
```

Rubi [**A**] time = 0.06, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4510, 4506, 364}

$$\frac{2 e^{i a} x^3 \left(c x^n\right)^{i b} \, _2F_1\left(1,\frac{1}{2} \left(1-\frac{3 i}{b n}\right);\frac{3}{2} \left(1-\frac{i}{b n}\right);e^{2 i a} \left(c x^n\right)^{2 i b}\right)}{-b n+3 i}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Csc[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x^3*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - (3*I)/(b*n))/2, (3*(
1 - I/(b*n)))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(3*I - b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^2 \csc\left(a + b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int x^{-1+\frac{3}{n}}\csc(a + b\log(x))\,dx, x, cx^n\right)}{n}$$
$$= -\frac{\left(2ie^{ia}x^3\left(cx^n\right)^{-3/n}\right)\text{Subst}\left(\int \frac{x^{-1+ib+\frac{3}{n}}}{1-e^{2ia}x^{2ib}}\,dx, x, cx^n\right)}{n}$$
$$= \frac{2e^{ia}x^3\left(cx^n\right)^{ib}\,{}_2F_1\left(1, \frac{1}{2}\left(1 - \frac{3i}{bn}\right); \frac{3}{2}\left(1 - \frac{i}{bn}\right); e^{2ia}\left(cx^n\right)^{2ib}\right)}{3i - bn}$$

Mathematica [A] time = 1.57, size = 82, normalized size = 0.95

$$-\frac{2e^{ia}x^3\left(cx^n\right)^{ib}\,{}_2F_1\left(1, \frac{1}{2} - \frac{3i}{2bn}; \frac{3}{2} - \frac{3i}{2bn}; e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{bn - 3i}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*Csc[a + b*Log[c*x^n]],x]
```

```
[Out] (-2*E^(I*a)*x^3*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - ((3*I)/2)/(b*n), 3
/2 - ((3*I)/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))])/(-3*I + b*n)
```

fricas [F] time = 0.74, size = 0, normalized size = 0.00

$$\text{integral}\left(x^2\csc\left(b\log\left(cx^n\right) + a\right), x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*csc(a+b*log(c*x^n)),x, algorithm="fricas")
```

```
[Out] integral(x^2*csc(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2\csc\left(b\log\left(cx^n\right) + a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*csc(a+b*log(c*x^n)),x, algorithm="giac")
```

```
[Out] integrate(x^2*csc(b*log(c*x^n) + a), x)
```

maple [F] time = 0.58, size = 0, normalized size = 0.00

$$\int x^2 \csc\left(a + b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*csc(a+b*ln(c*x^n)),x)
[Out] int(x^2*csc(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \csc\left(b\log\left(cx^n\right) + a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*csc(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(x^2*csc(b*log(c*x^n) + a), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^2}{\sin\left(a + b\,\ln\left(c\,x^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/sin(a + b*log(c*x^n)),x)
[Out] int(x^2/sin(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^2 \csc\left(a + b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*csc(a+b*ln(c*x**n)),x)
[Out] Integral(x**2*csc(a + b*log(c*x**n)), x)
```

3.290 $\int x \csc\left(a + b \log\left(cx^n\right)\right) dx$

Optimal. Leaf size=86

$$\frac{2e^{ia}x^2\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{2i}{bn}\right);\frac{1}{2}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{-bn+2i}$$

```
[Out] 2*exp(I*a)*x^2*(c*x^n)^(I*b)*hypergeom([1, 1/2-I/b/n],[3/2-I/b/n],exp(2*I*a
)*(c*x^n)^(2*I*b))/(2*I-b*n)
```

Rubi [A] time = 0.06, antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4510, 4506, 364}

$$\frac{2e^{ia}x^2\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{2i}{bn}\right);\frac{1}{2}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{-bn+2i}$$

Antiderivative was successfully verified.

```
[In] Int[x*Csc[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x^2*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - (2*I)/(b*n))/2, (3 -
 (2*I)/(b*n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(2*I - b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\csc\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\mathrm{Subst}\left(\int x^{-1+\frac{2}{n}}\csc(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=-\frac{\left(2ie^{ia}x^2\left(cx^n\right)^{-2/n}\right)\mathrm{Subst}\left(\int\frac{x^{-1+ib+\frac{2}{n}}}{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n}$$
$$=\frac{2e^{ia}x^2\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{2i}{bn}\right);\frac{1}{2}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{2i-bn}$$

Mathematica [A] time = 1.51, size = 78, normalized size = 0.91

$$-\frac{2e^{ia}x^2\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}-\frac{i}{bn};\frac{3}{2}-\frac{i}{bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{bn-2i}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Csc[a + b*Log[c*x^n]],x]
[Out] (-2*E^(I*a)*x^2*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - I/(b*n), 3/2 - I/(
b*n), E^((2*I)*(a + b*Log[c*x^n]))])/(-2*I + b*n)
```

fricas [F] time = 0.48, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(x\csc\left(b\log\left(cx^n\right)+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(x*csc(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\csc\left(b\log\left(cx^n\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(x*csc(b*log(c*x^n) + a), x)
```

maple [F] time = 0.47, size = 0, normalized size = 0.00

$$\int x \csc \left(a+b \ln \left(c\, x^{n}\right)\right) d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*csc(a+b*ln(c*x^n)),x)
[Out] int(x*csc(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \csc \left(b \log \left(c x^{n}\right)+a\right) d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(x*csc(b*log(c*x^n) + a), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x}{\sin \left(a+b\ \ln \left(c\, x^{n}\right)\right)} d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/sin(a + b*log(c*x^n)),x)
[Out] int(x/sin(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \csc \left(a+b \log \left(c x^{n}\right)\right) d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*ln(c*x**n)),x)
[Out] Integral(x*csc(a + b*log(c*x**n)), x)
```

3.291 $\int \csc\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=84

$$\frac{2e^{ia}x\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{-bn+i}$$

```
[Out] 2*exp(I*a)*x*(c*x^n)^(I*b)*hypergeom([1, 1/2-1/2*I/b/n],[3/2-1/2*I/b/n],exp
(2*I*a)*(c*x^n)^(2*I*b))/(I-b*n)
```

Rubi [A] time = 0.05, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.273, Rules used = {4504, 4506, 364}

$$\frac{2e^{ia}x\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{-bn+i}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]],x]
```

```
[Out] (2*E^(I*a)*x*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - I/(b*n))/2, (3 - I/(b*
n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(I - b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \csc\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\operatorname{Subst}\left(\int x^{-1+\frac{1}{n}}\csc(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=-\frac{\left(2ie^{ia}x\left(cx^n\right)^{-1/n}\right)\operatorname{Subst}\left(\int \frac{x^{-1+ib+\frac{1}{n}}}{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n}$$
$$=\frac{2e^{ia}x\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{i-bn}$$

Mathematica [A] time = 1.32, size = 80, normalized size = 0.95

$$-\frac{2e^{ia}x\left(cx^n\right)^{ib}\ {}_2F_1\left(1,\frac{1}{2}-\frac{i}{2bn};\frac{3}{2}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{bn-i}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]],x]
[Out] (-2*E^(I*a)*x*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - (I/2)/(b*n), 3/2 - (
I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))])/(-I + b*n)
```

fricas [F] time = 1.66, size = 0, normalized size = 0.00

$$\operatorname{integral}\left(\csc\left(b\log\left(cx^n\right)+a\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n)),x, algorithm="fricas")
[Out] integral(csc(b*log(c*x^n) + a), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^n\right)+a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n)),x, algorithm="giac")
[Out] integrate(csc(b*log(c*x^n) + a), x)
```

maple [F] time = 0.35, size = 0, normalized size = 0.00

$$\int \csc\left(a + b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n)),x)
[Out] int(csc(a+b*ln(c*x^n)),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^{n}\right) + a\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n)),x, algorithm="maxima")
[Out] integrate(csc(b*log(c*x^n) + a), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sin\left(a + b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n)),x)
[Out] int(1/sin(a + b*log(c*x^n)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(a + b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n)),x)
[Out] Integral(csc(a + b*log(c*x**n)), x)
```

3.292 $\int \frac{\csc\left(a+b\log\left(cx^n\right)\right)}{x}\,dx$

Optimal. Leaf size=20

$$-\frac{\tanh^{-1}\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

```
[Out] -arctanh(cos(a+b*ln(c*x^n)))/b/n
```

Rubi [A] time = 0.02, antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067, Rules used = {3770}

$$-\frac{\tanh^{-1}\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]/x,x]
```

```
[Out] -(ArcTanh[Cos[a + b*Log[c*x^n]]]/(b*n))
```

Rule 3770

```
Int[csc[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[ArcTanh[Cos[c + d*x]]/d, x]
 /; FreeQ[{c, d}, x]
```

Rubi steps

$$\begin{aligned} \int \frac{\csc\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \csc(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n} \\ &= -\frac{\tanh^{-1}\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{bn} \end{aligned}$$

Mathematica [B] time = 0.06, size = 54, normalized size = 2.70

$$\frac{\log\left(\sin\left(\frac{a}{2}+\frac{1}{2}b\log\left(cx^n\right)\right)\right)}{bn}-\frac{\log\left(\cos\left(\frac{a}{2}+\frac{1}{2}b\log\left(cx^n\right)\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]/x,x]
```

```
[Out] -(Log[Cos[a/2 + (b*Log[c*x^n])/2]]/(b*n)) + Log[Sin[a/2 + (b*Log[c*x^n])/2]
]/(b*n)
```

fricas [B] time = 0.43, size = 45, normalized size = 2.25

$$-\frac{\log\left(\frac{1}{2}\cos\left(bn\log(x)+b\log(c)+a\right)+\frac{1}{2}\right)-\log\left(-\frac{1}{2}\cos\left(bn\log(x)+b\log(c)+a\right)+\frac{1}{2}\right)}{2\,bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

```
[Out] -1/2*(log(1/2*cos(b*n*log(x) + b*log(c) + a) + 1/2) - log(-1/2*cos(b*n*log(
x) + b*log(c) + a) + 1/2))/(b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(b\log\left(cx^{n}\right)+a\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)/x, x)
```

maple [A] time = 0.03, size = 33, normalized size = 1.65

$$-\frac{\ln\left(\csc\left(a+b\ln\left(c\,x^{n}\right)\right)+\cot\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))/x,x)
```

```
[Out] -1/n/b*ln(csc(a+b*ln(c*x^n))+cot(a+b*ln(c*x^n)))
```

maxima [A] time = 0.31, size = 32, normalized size = 1.60

$$-\frac{\log\left(\cot\left(b\log\left(cx^{n}\right)+a\right)+\csc\left(b\log\left(cx^{n}\right)+a\right)\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

```
[Out] -log(cot(b*log(c*x^n) + a) + csc(b*log(c*x^n) + a))/(b*n)
```

mupad [B] time = 4.00, size = 68, normalized size = 3.40

$$\frac{\ln\left(\frac{e^{a\,1i}\,\left(c\,x^n\right)^{b\,1i}\,2i-2i}{x}\right)}{b\,n}-\frac{\ln\left(\frac{e^{a\,1i}\,\left(c\,x^n\right)^{b\,1i}\,2i+2i}{x}\right)}{b\,n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*sin(a + b*log(c*x^n))),x)
```

```
[Out] log((exp(a*1i)*(c*x^n)^(b*1i)*2i - 2i)/x)/(b*n) - log((exp(a*1i)*(c*x^n)^(b
*1i)*2i + 2i)/x)/(b*n)
```

sympy [A] time = 2.29, size = 49, normalized size = 2.45

$$-\begin{cases} -\log\left(x\right)\csc\left(a\right) & \text{for}\: b = 0 \\ -\log\left(x\right)\csc\left(a + b\log\left(c\right)\right) & \text{for}\: n = 0 \\ \frac{\log\left(\cot\left(a+b\log\left(cx^{n}\right)\right)+\csc\left(a+b\log\left(cx^{n}\right)\right)\right)}{bn} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))/x,x)
```

```
[Out] -Piecewise((-log(x)*csc(a), Eq(b, 0)), (-log(x)*csc(a + b*log(c)), Eq(n, 0)
), (log(cot(a + b*log(c*x**n)) + csc(a + b*log(c*x**n)))/(b*n), True))
```

3.293 $\int \frac{\csc\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx$

Optimal. Leaf size=85

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{i}{bn}\right);\frac{1}{2}\left(3+\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{x(bn+i)}$$

```
[Out] -2*exp(I*a)*(c*x^n)^(I*b)*hypergeom([1, 1/2+1/2*I/b/n],[3/2+1/2*I/b/n],exp(
2*I*a)*(c*x^n)^(2*I*b))/(I+b*n)/x
```

Rubi [A] time = 0.06, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4510, 4506, 364}

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{i}{bn}\right);\frac{1}{2}\left(3+\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{x(bn+i)}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]/x^2,x]
```

```
[Out] (-2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 + I/(b*n))/2, (3 + I/(b*n
))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((I + b*n)*x)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\csc\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{\left(cx^n\right)^{\frac{1}{n}}\operatorname{Subst}\left(\int x^{-1-\frac{1}{n}}\csc(a+b\log(x))\,dx,x,cx^n\right)}{nx}$$
$$= -\frac{\left(2ie^{ia}\left(cx^n\right)^{\frac{1}{n}}\right)\operatorname{Subst}\left(\int \frac{x^{-1+ib-\frac{1}{n}}}{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{nx}$$
$$= -\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{i}{bn}\right);\frac{1}{2}\left(3+\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(i+bn)x}$$

Mathematica [A] time = 1.17, size = 82, normalized size = 0.96

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}+\frac{i}{2bn};\frac{3}{2}+\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{x(bn+i)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]/x^2,x]
[Out] (-2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 + (I/2)/(b*n), 3/2 + (I/
2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))])/((I + b*n)*x)
```

fricas [F] time = 0.91, size = 0, normalized size = 0.00

$$\operatorname{integral}\left(\frac{\csc\left(b\log\left(cx^n\right)+a\right)}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
[Out] integral(csc(b*log(c*x^n) + a)/x^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(b\log\left(cx^n\right)+a\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)/x^2, x)
```

maple [F] time = 0.56, size = 0, normalized size = 0.00

$$\int \frac{\csc \left(a+b \ln \left(c \,x^{n}\right)\right)}{x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))/x^2,x)
```

```
[Out] int(csc(a+b*ln(c*x^n))/x^2,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc \left(b \log \left(cx^{n}\right) + a\right)}{x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)/x^2, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{2}\ \sin \left(a+b\ \ln \left(c\,x^{n}\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^2*sin(a + b*log(c*x^n))),x)
```

```
[Out] int(1/(x^2*sin(a + b*log(c*x^n))), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc \left(a + b \log \left(cx^{n}\right)\right)}{x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))/x**2,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))/x**2, x)
```

3.294 $\int \frac{\csc\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx$

Optimal. Leaf size=85

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{2i}{bn}\right);\frac{1}{2}\left(3+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{x^2(bn+2i)}$$

```
[Out] -2*exp(I*a)*(c*x^n)^(I*b)*hypergeom([1, 1/2+I/b/n],[3/2+I/b/n],exp(2*I*a)*(
c*x^n)^(2*I*b))/(2*I+b*n)/x^2
```

Rubi [A] time = 0.06, antiderivative size = 85, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4510, 4506, 364}

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{2i}{bn}\right);\frac{1}{2}\left(3+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{x^2(bn+2i)}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]/x^3,x]
```

```
[Out] (-2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 + (2*I)/(b*n))/2, (3 + (2
*I)/(b*n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((2*I + b*n)*x^2)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{\csc \left(a+b\log \left(cx^n\right)\right)}{x^3}\,dx = \frac{\left(cx^n\right)^{2/n} \operatorname{Subst}\left(\int x^{-1-\frac{2}{n}}\csc(a+b\log(x))\,dx,x,cx^n\right)}{nx^2}$$
$$= -\frac{\left(2ie^{ia}\left(cx^n\right)^{2/n}\right)\operatorname{Subst}\left(\int \frac{x^{-1+ib-\frac{2}{n}}}{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{nx^2}$$
$$= -\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1+\frac{2i}{bn}\right);\frac{1}{2}\left(3+\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2i+bn)x^2}$$

Mathematica [A] time = 1.13, size = 78, normalized size = 0.92

$$-\frac{2e^{ia}\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}+\frac{i}{bn};\frac{3}{2}+\frac{i}{bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{x^2(bn+2i)}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]/x^3,x]
```

```
[Out] (-2*E^(I*a)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 + I/(b*n), 3/2 + I/(b*n)
, E^((2*I)*(a + b*Log[c*x^n]))])/((2*I + b*n)*x^2)
```

fricas [F] time = 0.86, size = 0, normalized size = 0.00

$$\operatorname{integral}\left(\frac{\csc\left(b\log\left(cx^n\right)+a\right)}{x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)/x^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(b\log\left(cx^n\right)+a\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)/x^3, x)
```

maple [F] time = 0.66, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))/x^3,x)
```

```
[Out] int(csc(a+b*ln(c*x^n))/x^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(b\log\left(cx^{n}\right)+a\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)/x^3, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x^{3}\,\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x^3*sin(a + b*log(c*x^n))),x)
```

```
[Out] int(1/(x^3*sin(a + b*log(c*x^n))), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(a+b\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))/x**3,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))/x**3, x)
```

3.295 $\int \csc^2\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=84

$$-\frac{4e^{2ia}x\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2-\frac{i}{bn}\right);\frac{1}{2}\left(4-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

```
[Out] -4*exp(2*I*a)*x*(c*x^n)^(2*I*b)*hypergeom([2, 1-1/2*I/b/n],[2-1/2*I/b/n],ex
p(2*I*a)*(c*x^n)^(2*I*b))/(1+2*I*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4504, 4506, 364}

$$-\frac{4e^{2ia}x\left(cx^n\right)^{2ib}\,{}_2F_1\left(2,\frac{1}{2}\left(2-\frac{i}{bn}\right);\frac{1}{2}\left(4-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (-4*E^((2*I)*a)*x*(c*x^n)^((2*I)*b)*Hypergeometric2F1[2, (2 - I/(b*n))/2, (
4 - I/(b*n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(1 + (2*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \csc^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^2(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$=-\frac{\left(4e^{2ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+2ib+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^2}\,dx,x,cx^n\right)}{n}$$
$$=-\frac{4e^{2ia}x\left(cx^n\right)^{2ib}\ {}_2F_1\left(2,\frac{1}{2}\left(2-\frac{i}{bn}\right);\frac{1}{2}\left(4-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+2ibn}$$

Mathematica [A] time = 5.32, size = 146, normalized size = 1.74

$$\frac{x\left(-\frac{e^{2ia}\left(cx^n\right)^{2ib}\,{}_2F_1\left(1,1-\frac{i}{2bn};2-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)}{2bn-i}-i\,{}_2F_1\left(1,-\frac{i}{2bn};1-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)-\cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^2,x]
```

```
[Out] (x*(-Cot[a + b*Log[c*x^n]] - (E^((2*I)*a)*(c*x^n)^((2*I)*b)*Hypergeometric2
F1[1, 1 - (I/2)/(b*n), 2 - (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))])/(-I
+ 2*b*n) - I*Hypergeometric2F1[1, (-1/2*I)/(b*n), 1 - (I/2)/(b*n), E^((2*I)
*(a + b*Log[c*x^n]))]))/(b*n)
```

fricas [F] time = 0.96, size = 0, normalized size = 0.00

$$\text{integral}\left(\csc\left(b\log\left(cx^n\right)+a\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^n\right)+a\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^2,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^2, x)
```

maple [F] time = 1.39, size = 0, normalized size = 0.00

$$\int \csc^{2}\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^2,x)
```

```
[Out] int(csc(a+b*ln(c*x^n))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n))^2,x)
```

```
[Out] int(1/sin(a + b*log(c*x^n))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^{2}{\left(a+b\log{\left(cx^{n}\right)}\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**2,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**2, x)
```

3.296 $\int \frac{\csc^2(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=19

$$-\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] -cot(a+b*ln(c*x^n))/b/n
```

Rubi [A] time = 0.03, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3767, 8}

$$-\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^2/x,x]
```

```
[Out] -(Cot[a + b*Log[c*x^n]]/(b*n))
```

Rule 8

```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

Rule 3767

```
Int[csc[(c_.) + (d_.)*(x_)]^(n_), x_Symbol] :> -Dist[d^(-1), Subst[Int[Expa
ndIntegrand[(1 + x^2)^(n/2 - 1), x], x], x, Cot[c + d*x]], x] /; FreeQ[{c,
d}, x] && IGtQ[n/2, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{\csc^2\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \csc^2(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}\\
&= -\frac{\text{Subst}\left(\int 1\,dx, x, \cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}\\
&= -\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}
\end{aligned}$$

Mathematica [A] time = 0.09, size = 19, normalized size = 1.00

$$-\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^2/x,x]
[Out] -(Cot[a + b*Log[c*x^n]]/(b*n))
```

fricas [A] time = 1.31, size = 34, normalized size = 1.79

$$-\frac{\cos\left(bn\log(x)+b\log(c)+a\right)}{bn\sin\left(bn\log(x)+b\log(c)+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
[Out] -cos(b*n*log(x) + b*log(c) + a)/(b*n*sin(b*n*log(x) + b*log(c) + a))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\csc\left(b\log\left(cx^n\right)+a\right)^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^2/x,x, algorithm="giac")
[Out] integrate(csc(b*log(c*x^n) + a)^2/x, x)
```

maple [A] time = 0.04, size = 20, normalized size = 1.05

$$-\frac{\cot\left(a+b\ln\left(c\,x^n\right)\right)}{bn}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^2/x,x)
[Out] -cot(a+b*ln(c*x^n))/b/n
```

maxima [B] time = 1.63, size = 168, normalized size = 8.84

$$\frac{2\left(\cos\left(2b\log\left(x^n\right)+2a\right)\sin\left(2b\log(c\right.\right.}{2bn\cos\left(2b\log(c)\right)\cos\left(2b\log\left(x^n\right)+2a\right)-\left(b\cos\left(2b\log(c)\right)^2+b\sin\left(2b\log(c)\right)^2\right)n\cos\left(2b\log\left(x^n\right)+2a\right)^2\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

```
[Out] 2*(cos(2*b*log(x^n) + 2*a)*sin(2*b*log(c)) + cos(2*b*log(c))*sin(2*b*log(x^
n) + 2*a))/(2*b*n*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - (b*cos(2*b*log(
c))^2 + b*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2*a)^2 - 2*b*n*sin(2*b*lo
g(c))*sin(2*b*log(x^n) + 2*a) - (b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)
*n*sin(2*b*log(x^n) + 2*a)^2 - b*n)
```

mupad [B] time = 3.90, size = 29, normalized size = 1.53

$$-\frac{2\mathrm{i}}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*sin(a + b*log(c*x^n))^2),x)
```

```
[Out] -2i/(b*n*(exp(a*2i)*(c*x^n)^(b*2i) - 1))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc^2\left(a+b\log\left(cx^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**2/x,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**2/x, x)
```

3.297 $\int \csc^3\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=84

$$-\frac{8e^{3ia}x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{-3bn+i}$$

```
[Out] -8*exp(3*I*a)*x*(c*x^n)^(3*I*b)*hypergeom([3, 3/2-1/2*I/b/n],[5/2-1/2*I/b/n
],exp(2*I*a)*(c*x^n)^(2*I*b))/(I-3*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4504, 4506, 364}

$$-\frac{8e^{3ia}x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{-3bn+i}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^3,x]
```

```
[Out] (-8*E^((3*I)*a)*x*(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 - I/(b*n))/2, (
5 - I/(b*n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(I - 3*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \csc^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^3(a+b\log(x))\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(8ie^{3ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+3ib+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^3}\,dx,x,cx^n\right)}{n}$$
$$= -\frac{8e^{3ia}x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{i-3bn}$$

Mathematica [A] time = 5.64, size = 117, normalized size = 1.39

$$-\frac{x\left(\left(bn\cot\left(a+b\log\left(cx^n\right)\right)+1\right)\csc\left(a+b\log\left(cx^n\right)\right)+2e^{ia}(bn+i)\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}-\frac{i}{2bn};\frac{3}{2}-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\right)}{2b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^3,x]
```

```
[Out] -1/2*(x*((1 + b*n*Cot[a + b*Log[c*x^n]])*Csc[a + b*Log[c*x^n]] + 2*E^(I*a)*
(I + b*n)*(c*x^n)^(I*b)*Hypergeometric2F1[1, 1/2 - (I/2)/(b*n), 3/2 - (I/2)
/(b*n), E^((2*I)*(a + b*Log[c*x^n]))]))/(b^2*n^2)
```

fricas [F] time = 0.50, size = 0, normalized size = 0.00

$$\text{integral}\left(\csc\left(b\log\left(cx^n\right)+a\right)^3,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^3,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^n\right)+a\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^3,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^3, x)
```

maple [F] time = 1.89, size = 0, normalized size = 0.00

$$\int \csc^3\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^3,x)
```

```
[Out] int(csc(a+b*ln(c*x^n))^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^3,x, algorithm="maxima")
```

```
[Out] -((b*n*cos(b*log(c)) - sin(b*log(c)))*x*cos(b*log(x^n) + a) - (b*n*sin(b*lo
g(c)) + cos(b*log(c)))*x*sin(b*log(x^n) + a) + (((b*cos(4*b*log(c))*cos(3*b
*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)))*n - cos(3*b*log(c))*sin(4*b*l
og(c)) + cos(4*b*log(c))*sin(3*b*log(c)))*x*cos(3*b*log(x^n) + 3*a) + ((b*c
os(4*b*log(c))*cos(b*log(c)) + b*sin(4*b*log(c))*sin(b*log(c)))*n + cos(b*l
og(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(b*log(c)))*x*cos(b*log(x^n) +
a) + ((b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)
))*n + cos(4*b*log(c))*cos(3*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)))*x
*sin(3*b*log(x^n) + 3*a) + ((b*cos(b*log(c))*sin(4*b*log(c)) - b*cos(4*b*lo
g(c))*sin(b*log(c)))*n - cos(4*b*log(c))*cos(b*log(c)) - sin(4*b*log(c))*si
n(b*log(c)))*x*sin(b*log(x^n) + a))*cos(4*b*log(x^n) + 4*a) - (2*((b*cos(3*
b*log(c))*cos(2*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*
log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^
n) + 2*a) + 2*((b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(2
*b*log(c)))*n - cos(3*b*log(c))*cos(2*b*log(c)) - sin(3*b*log(c))*sin(2*b*l
og(c)))*x*sin(2*b*log(x^n) + 2*a) - (b*n*cos(3*b*log(c)) + sin(3*b*log(c)))
*x)*cos(3*b*log(x^n) + 3*a) - 2*(((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin(
2*b*log(c))*sin(b*log(c)))*n + cos(b*log(c))*sin(2*b*log(c)) - cos(2*b*log(
c))*sin(b*log(c)))*x*cos(b*log(x^n) + a) + ((b*cos(b*log(c))*sin(2*b*log(c)
) - b*cos(2*b*log(c))*sin(b*log(c)))*n - cos(2*b*log(c))*cos(b*log(c)) - si
n(2*b*log(c))*sin(b*log(c)))*x*sin(b*log(x^n) + a))*cos(2*b*log(x^n) + 2*a)
 + 2*(b^6*n^6 + b^4*n^4 + ((b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*
n^6 + (b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n^4)*cos(4*b*log(x^n)
 + 4*a)^2 + 4*((b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6 + (b^4*c
os(2*b*log(c))^2 + b^4*sin(2*b*log(c))^2)*n^4)*cos(2*b*log(x^n) + 2*a)^2 +
((b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6 + (b^4*cos(4*b*log(c))
^2 + b^4*sin(4*b*log(c))^2)*n^4)*sin(4*b*log(x^n) + 4*a)^2 + 4*((b^6*cos(2*
```

```
b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6 + (b^4*cos(2*b*log(c))^2 + b^4*sin
(2*b*log(c))^2)*n^4)*sin(2*b*log(x^n) + 2*a)^2 + 2*(b^6*n^6*cos(4*b*log(c))
 + b^4*n^4*cos(4*b*log(c)) - 2*((b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*
sin(4*b*log(c))*sin(2*b*log(c)))*n^6 + (b^4*cos(4*b*log(c))*cos(2*b*log(c))
 + b^4*sin(4*b*log(c))*sin(2*b*log(c)))*n^4)*cos(2*b*log(x^n) + 2*a) - 2*((
b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*
n^6 + (b^4*cos(2*b*log(c))*sin(4*b*log(c)) - b^4*cos(4*b*log(c))*sin(2*b*lo
g(c)))*n^4)*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 4*(b^6*n^6*c
os(2*b*log(c)) + b^4*n^4*cos(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 2*(b^6*
n^6*sin(4*b*log(c)) + b^4*n^4*sin(4*b*log(c)) - 2*((b^6*cos(2*b*log(c))*sin
(4*b*log(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n^6 + (b^4*cos(2*b*log(
c))*sin(4*b*log(c)) - b^4*cos(4*b*log(c))*sin(2*b*log(c)))*n^4)*cos(2*b*log
(x^n) + 2*a) + 2*((b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c)
)*sin(2*b*log(c)))*n^6 + (b^4*cos(4*b*log(c))*cos(2*b*log(c)) + b^4*sin(4*b
*log(c))*sin(2*b*log(c)))*n^4)*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) +
4*a) + 4*(b^6*n^6*sin(2*b*log(c)) + b^4*n^4*sin(2*b*log(c)))*sin(2*b*log(x^
n) + 2*a))*integrate(1/4*(cos(b*log(x^n) + a)*sin(b*log(c)) + cos(b*log(c))
*sin(b*log(x^n) + a))/(2*b^4*n^4*cos(b*log(c))*cos(b*log(x^n) + a) - 2*b^4*
n^4*sin(b*log(c))*sin(b*log(x^n) + a) + b^4*n^4 + (b^4*cos(b*log(c))^2 + b^
4*sin(b*log(c))^2)*n^4*cos(b*log(x^n) + a)^2 + (b^4*cos(b*log(c))^2 + b^4*s
in(b*log(c))^2)*n^4*sin(b*log(x^n) + a)^2), x) + 2*(b^6*n^6 + b^4*n^4 + ((b
^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6 + (b^4*cos(4*b*log(c))^2
+ b^4*sin(4*b*log(c))^2)*n^4)*cos(4*b*log(x^n) + 4*a)^2 + 4*((b^6*cos(2*b*l
og(c))^2 + b^6*sin(2*b*log(c))^2)*n^6 + (b^4*cos(2*b*log(c))^2 + b^4*sin(2*
b*log(c))^2)*n^4)*cos(2*b*log(x^n) + 2*a)^2 + ((b^6*cos(4*b*log(c))^2 + b^6
*sin(4*b*log(c))^2)*n^6 + (b^4*cos(4*b*log(c))^2 + b^4*sin(4*b*log(c))^2)*n
^4)*sin(4*b*log(x^n) + 4*a)^2 + 4*((b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log
(c))^2)*n^6 + (b^4*cos(2*b*log(c))^2 + b^4*sin(2*b*log(c))^2)*n^4)*sin(2*b*
log(x^n) + 2*a)^2 + 2*(b^6*n^6*cos(4*b*log(c)) + b^4*n^4*cos(4*b*log(c)) -
2*((b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c
)))*n^6 + (b^4*cos(4*b*log(c))*cos(2*b*log(c)) + b^4*sin(4*b*log(c))*sin(2*
b*log(c)))*n^4)*cos(2*b*log(x^n) + 2*a) - 2*((b^6*cos(2*b*log(c))*sin(4*b*l
og(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n^6 + (b^4*cos(2*b*log(c))*si
n(4*b*log(c)) - b^4*cos(4*b*log(c))*sin(2*b*log(c)))*n^4)*sin(2*b*log(x^n)
+ 2*a))*cos(4*b*log(x^n) + 4*a) - 4*(b^6*n^6*cos(2*b*log(c)) + b^4*n^4*cos(
2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 2*(b^6*n^6*sin(4*b*log(c)) + b^4*n^4
*sin(4*b*log(c)) - 2*((b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*lo
g(c))*sin(2*b*log(c)))*n^6 + (b^4*cos(2*b*log(c))*sin(4*b*log(c)) - b^4*cos
(4*b*log(c))*sin(2*b*log(c)))*n^4)*cos(2*b*log(x^n) + 2*a) + 2*((b^6*cos(4*
b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6 + (b^4
*cos(4*b*log(c))*cos(2*b*log(c)) + b^4*sin(4*b*log(c))*sin(2*b*log(c)))*n^4
)*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a) + 4*(b^6*n^6*sin(2*b*log
(c)) + b^4*n^4*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*integrate(-1/4*(co
s(b*log(x^n) + a)*sin(b*log(c)) + cos(b*log(c))*sin(b*log(x^n) + a))/(2*b^4
*n^4*cos(b*log(c))*cos(b*log(x^n) + a) - 2*b^4*n^4*sin(b*log(c))*sin(b*log(
```

```
x^n) + a) - b^4*n^4 - (b^4*cos(b*log(c))^2 + b^4*sin(b*log(c))^2)*n^4*cos(b
*log(x^n) + a)^2 - (b^4*cos(b*log(c))^2 + b^4*sin(b*log(c))^2)*n^4*sin(b*lo
g(x^n) + a)^2), x) - (((b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c
))*sin(3*b*log(c)))*n + cos(4*b*log(c))*cos(3*b*log(c)) + sin(4*b*log(c))*s
in(3*b*log(c)))*x*cos(3*b*log(x^n) + 3*a) + ((b*cos(b*log(c))*sin(4*b*log(c
)) - b*cos(4*b*log(c))*sin(b*log(c)))*n - cos(4*b*log(c))*cos(b*log(c)) - s
in(4*b*log(c))*sin(b*log(c)))*x*cos(b*log(x^n) + a) - ((b*cos(4*b*log(c))*c
os(3*b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)))*n - cos(3*b*log(c))*sin
(4*b*log(c)) + cos(4*b*log(c))*sin(3*b*log(c)))*x*sin(3*b*log(x^n) + 3*a) -
 ((b*cos(4*b*log(c))*cos(b*log(c)) + b*sin(4*b*log(c))*sin(b*log(c)))*n + c
os(b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(b*log(c)))*x*sin(b*log(x
^n) + a))*sin(4*b*log(x^n) + 4*a) + (2*((b*cos(2*b*log(c))*sin(3*b*log(c))
- b*cos(3*b*log(c))*sin(2*b*log(c)))*n - cos(3*b*log(c))*cos(2*b*log(c)) -
sin(3*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) - 2*((b*cos(3*b*
log(c))*cos(2*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*lo
g(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*x*sin(2*b*log(x^n)
 + 2*a) - (b*n*sin(3*b*log(c)) - cos(3*b*log(c)))*x)*sin(3*b*log(x^n) + 3*a
) + 2*(((b*cos(b*log(c))*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)))
*n - cos(2*b*log(c))*cos(b*log(c)) - sin(2*b*log(c))*sin(b*log(c)))*x*cos(b
*log(x^n) + a) - ((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(
b*log(c)))*n + cos(b*log(c))*sin(2*b*log(c)) - cos(2*b*log(c))*sin(b*log(c)
))*x*sin(b*log(x^n) + a))*sin(2*b*log(x^n) + 2*a))/(4*b^2*n^2*cos(2*b*log(c
))*cos(2*b*log(x^n) + 2*a) - 4*b^2*n^2*sin(2*b*log(c))*sin(2*b*log(x^n) + 2
*a) - (b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2*cos(4*b*log(x^n)
+ 4*a)^2 - 4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^2*cos(2*b*lo
g(x^n) + 2*a)^2 - (b^2*cos(4*b*log(c))^2 + b^2*sin(4*b*log(c))^2)*n^2*sin(4
*b*log(x^n) + 4*a)^2 - 4*(b^2*cos(2*b*log(c))^2 + b^2*sin(2*b*log(c))^2)*n^
2*sin(2*b*log(x^n) + 2*a)^2 - b^2*n^2 - 2*(b^2*n^2*cos(4*b*log(c)) - 2*(b^2
*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2
*cos(2*b*log(x^n) + 2*a) - 2*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos
(4*b*log(c))*sin(2*b*log(c)))*n^2*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n)
 + 4*a) + 2*(b^2*n^2*sin(4*b*log(c)) - 2*(b^2*cos(2*b*log(c))*sin(4*b*log(c
)) - b^2*cos(4*b*log(c))*sin(2*b*log(c)))*n^2*cos(2*b*log(x^n) + 2*a) + 2*(
b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*
n^2*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sin(a + b\ln(c x^n))^3} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n))^3,x)
```

```
[Out] int(1/sin(a + b*log(c*x^n))^3, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^3\left(a+b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**3,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**3, x)
```

3.298 $\int \frac{\csc^3(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=55

$$-\frac{\tanh^{-1}\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{2bn}-\frac{\cot\left(a+b\log\left(cx^n\right)\right)\csc\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

```
[Out] -1/2*arctanh(cos(a+b*ln(c*x^n)))/b/n-1/2*cot(a+b*ln(c*x^n))*csc(a+b*ln(c*x^
n))/b/n
```

Rubi [A] time = 0.04, antiderivative size = 55, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118, Rules used = {3768, 3770}

$$-\frac{\tanh^{-1}\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{2bn}-\frac{\cot\left(a+b\log\left(cx^n\right)\right)\csc\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] -ArcTanh[Cos[a + b*Log[c*x^n]]]/(2*b*n) - (Cot[a + b*Log[c*x^n]]*Csc[a + b*
Log[c*x^n]])/(2*b*n)
```

Rule 3768

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Csc[c + d*x])^(n - 1))/(d*(n - 1)), x] + Dist[(b^2*(n - 2))/(n - 1), I
nt[(b*Csc[c + d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] &&
IntegerQ[2*n]
```

Rule 3770

```
Int[csc[(c_.) + (d_.)*(x_)], x_Symbol] :> -Simp[ArcTanh[Cos[c + d*x]]/d, x]
 /; FreeQ[{c, d}, x]
```

Rubi steps

$$\int \frac{\csc^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \csc^3(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{\cot\left(a+b\log\left(cx^n\right)\right)\csc\left(a+b\log\left(cx^n\right)\right)}{2bn} + \frac{\text{Subst}\left(\int \csc(a+bx)\,dx, x, \log\left(cx^n\right.\right.}{2n}$$
$$= -\frac{\tanh^{-1}\left(\cos\left(a+b\log\left(cx^n\right)\right)\right)}{2bn} - \frac{\cot\left(a+b\log\left(cx^n\right)\right)\csc\left(a+b\log\left(cx^n\right)\right)}{2bn}$$

Mathematica [A] time = 0.08, size = 107, normalized size = 1.95

$$\frac{\log\left(\sin\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\right)\right)}{2bn} + \frac{\sec^2\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\right)}{8bn} - \frac{\log\left(\cos\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)\right)\right)\right)}{2bn} - \frac{\csc^2\left(\frac{1}{2}\left(a+b\log\left(\right.\right.\right.}{8bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^3/x,x]
```

```
[Out] -1/8*Csc[(a + b*Log[c*x^n])/2]^2/(b*n) - Log[Cos[(a + b*Log[c*x^n])/2]]/(2*
b*n) + Log[Sin[(a + b*Log[c*x^n])/2]]/(2*b*n) + Sec[(a + b*Log[c*x^n])/2]^2
/(8*b*n)
```

fricas [B] time = 0.89, size = 110, normalized size = 2.00

$$-\frac{\left(\cos\left(bn\log(x)+b\log(c)+a\right)^2-1\right)\log\left(\frac{1}{2}\cos\left(bn\log(x)+b\log(c)+a\right)+\frac{1}{2}\right)-\left(\cos\left(bn\log(x)+b\log(c)+\right.\right.}{4\left(bn\cos\left(bn\log(x)+b\log(c)+\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^3/x,x, algorithm="fricas")
```

```
[Out] -1/4*((cos(b*n*log(x) + b*log(c) + a)^2 - 1)*log(1/2*cos(b*n*log(x) + b*log
(c) + a) + 1/2) - (cos(b*n*log(x) + b*log(c) + a)^2 - 1)*log(-1/2*cos(b*n*l
og(x) + b*log(c) + a) + 1/2) - 2*cos(b*n*log(x) + b*log(c) + a))/(b*n*cos(b
*n*log(x) + b*log(c) + a)^2 - b*n)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(b\log\left(cx^n\right)+a\right)^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^3/x,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^3/x, x)
```

maple [A] time = 0.13, size = 66, normalized size = 1.20

$$-\frac{\cot \left(a+b \ln \left(c \,x^{n}\right)\right) \csc \left(a+b \ln \left(c \,x^{n}\right)\right)}{2 b n}+\frac{\ln \left(\csc \left(a+b \ln \left(c \,x^{n}\right)\right)-\cot \left(a+b \ln \left(c \,x^{n}\right)\right)\right)}{2 b n}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^3/x,x)
```

```
[Out] -1/2*cot(a+b*ln(c*x^n))*csc(a+b*ln(c*x^n))/b/n+1/2/b/n*ln(csc(a+b*ln(c*x^n)
)-cot(a+b*ln(c*x^n)))
```

maxima [B] time = 0.66, size = 2168, normalized size = 39.42

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^3/x,x, algorithm="maxima")
```

```
[Out] 1/4*(4*((cos(4*b*log(c))*cos(3*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)))
*cos(3*b*log(x^n) + 3*a) + (cos(4*b*log(c))*cos(b*log(c)) + sin(4*b*log(c))
*sin(b*log(c)))*cos(b*log(x^n) + a) + (cos(3*b*log(c))*sin(4*b*log(c)) - co
s(4*b*log(c))*sin(3*b*log(c)))*sin(3*b*log(x^n) + 3*a) + (cos(b*log(c))*sin
(4*b*log(c)) - cos(4*b*log(c))*sin(b*log(c)))*sin(b*log(x^n) + a))*cos(4*b*
log(x^n) + 4*a) - 4*(2*(cos(3*b*log(c))*cos(2*b*log(c)) + sin(3*b*log(c))*s
in(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(3*b*log(c)
) - cos(3*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos(3*b*log(
c)))*cos(3*b*log(x^n) + 3*a) - 8*((cos(2*b*log(c))*cos(b*log(c)) + sin(2*b*
log(c))*sin(b*log(c)))*cos(b*log(x^n) + a) + (cos(b*log(c))*sin(2*b*log(c))
 - cos(2*b*log(c))*sin(b*log(c)))*sin(b*log(x^n) + a))*cos(2*b*log(x^n) + 2
*a) + 4*cos(b*log(c))*cos(b*log(x^n) + a) - ((cos(4*b*log(c))^2 + sin(4*b*l
og(c))^2)*cos(4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c)
)^2)*cos(2*b*log(x^n) + 2*a)^2 + (cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*si
n(4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b
*log(x^n) + 2*a)^2 - 2*(2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c)
)*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log
(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos(4*b*l
og(c)))*cos(4*b*log(x^n) + 4*a) - 4*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a)
 + 2*(2*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))
*cos(2*b*log(x^n) + 2*a) - 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log
(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(4*b*log(c)))*sin(4*b*lo
g(x^n) + 4*a) + 4*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)*log((cos(a)^
```

```
2 + sin(a)^2)*cos(b*log(c))^2 + (cos(a)^2 + sin(a)^2)*sin(b*log(c))^2 + 2*(
cos(b*log(c))*cos(a) - sin(b*log(c))*sin(a))*cos(b*log(x^n)) + cos(b*log(x^
n))^2 - 2*(cos(a)*sin(b*log(c)) + cos(b*log(c))*sin(a))*sin(b*log(x^n)) + s
in(b*log(x^n))^2) + ((cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*cos(4*b*log(x^
n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2*b*log(x^n) +
2*a)^2 + (cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(x^n) + 4*a)^2
+ 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n) + 2*a)^2 - 2*(
2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2
*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*s
in(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos(4*b*log(c)))*cos(4*b*log(x^n)
 + 4*a) - 4*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + 2*(2*(cos(2*b*log(c))
*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a)
 - 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*si
n(2*b*log(x^n) + 2*a) - sin(4*b*log(c)))*sin(4*b*log(x^n) + 4*a) + 4*sin(2*
b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)*log((cos(a)^2 + sin(a)^2)*cos(b*log(
c))^2 + (cos(a)^2 + sin(a)^2)*sin(b*log(c))^2 - 2*(cos(b*log(c))*cos(a) - s
in(b*log(c))*sin(a))*cos(b*log(x^n)) + cos(b*log(x^n))^2 + 2*(cos(a)*sin(b*
log(c)) + cos(b*log(c))*sin(a))*sin(b*log(x^n)) + sin(b*log(x^n))^2) - 4*((
cos(3*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(3*b*log(c)))*cos(3*b*
log(x^n) + 3*a) + (cos(b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(b*lo
g(c)))*cos(b*log(x^n) + a) - (cos(4*b*log(c))*cos(3*b*log(c)) + sin(4*b*log
(c))*sin(3*b*log(c)))*sin(3*b*log(x^n) + 3*a) - (cos(4*b*log(c))*cos(b*log(
c)) + sin(4*b*log(c))*sin(b*log(c)))*sin(b*log(x^n) + a))*sin(4*b*log(x^n)
+ 4*a) + 4*(2*(cos(2*b*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*lo
g(c)))*cos(2*b*log(x^n) + 2*a) - 2*(cos(3*b*log(c))*cos(2*b*log(c)) + sin(3
*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(3*b*log(c)))*sin(
3*b*log(x^n) + 3*a) + 8*((cos(b*log(c))*sin(2*b*log(c)) - cos(2*b*log(c))*s
in(b*log(c)))*cos(b*log(x^n) + a) - (cos(2*b*log(c))*cos(b*log(c)) + sin(2*
b*log(c))*sin(b*log(c)))*sin(b*log(x^n) + a))*sin(2*b*log(x^n) + 2*a) - 4*s
in(b*log(c))*sin(b*log(x^n) + a))/((b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))
^2)*n*cos(4*b*log(x^n) + 4*a)^2 - 4*b*n*cos(2*b*log(c))*cos(2*b*log(x^n) +
2*a) + 4*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*cos(2*b*log(x^n) + 2
*a)^2 + (b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*sin(4*b*log(x^n) + 4*
a)^2 + 4*b*n*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 4*(b*cos(2*b*log(c))
^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) + 2*a)^2 + b*n + 2*(b*n*cos(4*
b*log(c)) - 2*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*
b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - 2*(b*cos(2*b*log(c))*sin(4*b*log(c))
 - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(4*b*lo
g(x^n) + 4*a) + 2*(2*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))
*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - b*n*sin(4*b*log(c)) - 2*(b*co
s(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*
b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a))
```

mupad [B] time = 6.43, size = 177, normalized size = 3.22

$$-\frac{\ln\left(-\frac{1\mathrm{i}}{x}-\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}\,1\mathrm{i}}{x}\right)}{2\,b\,n}+\frac{\ln\left(\frac{1\mathrm{i}}{x}-\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}\,1\mathrm{i}}{x}\right)}{2\,b\,n}+\frac{2\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{b\,n\,\left(1+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,4\mathrm{i}}-2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}\right)}+\frac{\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}}{b\,n\,\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*sin(a + b*log(c*x^n))^3),x)
```

```
[Out] log(1i/x - (exp(a*1i)*(c*x^n)^(b*1i)*1i)/x)/(2*b*n) - log(- 1i/x - (exp(a*1
i)*(c*x^n)^(b*1i)*1i)/x)/(2*b*n) + (2*exp(a*1i)*(c*x^n)^(b*1i))/(b*n*(exp(a
*4i)*(c*x^n)^(b*4i) - 2*exp(a*2i)*(c*x^n)^(b*2i) + 1)) + (exp(a*1i)*(c*x^n)
^(b*1i))/(b*n*(exp(a*2i)*(c*x^n)^(b*2i) - 1))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc^3\left(a+b\log\left(cx^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**3/x,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**3/x, x)
```

3.299 $\int \csc^4\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=84

$$\frac{16e^{4ia}x\left(cx^n\right)^{4ib}\;{}_2F_1\left(4,\frac{1}{2}\left(4-\frac{i}{bn}\right);\frac{1}{2}\left(6-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+4ibn}$$

```
[Out] 16*exp(4*I*a)*x*(c*x^n)^(4*I*b)*hypergeom([4, 2-1/2*I/b/n],[3-1/2*I/b/n],ex
p(2*I*a)*(c*x^n)^(2*I*b))/(1+4*I*b*n)
```

Rubi [A] time = 0.06, antiderivative size = 84, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4504, 4506, 364}

$$\frac{16e^{4ia}x\left(cx^n\right)^{4ib}\;{}_2F_1\left(4,\frac{1}{2}\left(4-\frac{i}{bn}\right);\frac{1}{2}\left(6-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+4ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (16*E^((4*I)*a)*x*(c*x^n)^((4*I)*b)*Hypergeometric2F1[4, (4 - I/(b*n))/2, (
6 - I/(b*n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(1 + (4*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \csc^4\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^4(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(16e^{4ia}x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+4ib+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^4}\,dx,x,cx^n\right)}{n}$$

$$= \frac{16e^{4ia}x\left(cx^n\right)^{4ib}\ {}_2F_1\left(4,\frac{1}{2}\left(4-\frac{i}{bn}\right);\frac{1}{2}\left(6-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{1+4ibn}$$

Mathematica [B] time = 13.24, size = 221, normalized size = 2.63

$$\frac{x\left(-4i\left(4b^2n^2+1\right)\ {}_2F_1\left(1,-\frac{i}{2bn};1-\frac{i}{2bn};e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)+\csc^3\left(a+b\log\left(cx^n\right)\right)\left(-\left(\left(12b^2n^2+1\right)\cos\left(a+b\log\left(c\right.\right.\right.\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^4,x]
```

```
[Out] (x*(-4*E^((2*I)*a)*(I + 2*b*n)*(c*x^n)^((2*I)*b)*Hypergeometric2F1[1, 1 - (
I/2)/(b*n), 2 - (I/2)/(b*n), E^((2*I)*(a + b*Log[c*x^n]))] - (4*I)*(1 + 4*b
^2*n^2)*Hypergeometric2F1[1, (-1/2*I)/(b*n), 1 - (I/2)/(b*n), E^((2*I)*(a +
 b*Log[c*x^n]))] + Csc[a + b*Log[c*x^n]]^3*(-((1 + 12*b^2*n^2)*Cos[a + b*Lo
g[c*x^n]]) + (1 + 4*b^2*n^2)*Cos[3*(a + b*Log[c*x^n])] - 4*b*n*Sin[a + b*Lo
g[c*x^n]])))/(24*b^3*n^3)
```

fricas [F] time = 0.60, size = 0, normalized size = 0.00

$$\text{integral}\left(\csc\left(b\log\left(cx^n\right)+a\right)^4,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^4,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)^4, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^n\right)+a\right)^4\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^4,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^4, x)
```

maple [F] time = 0.34, size = 0, normalized size = 0.00

$$\int \csc^{4}\left(a + b\ln\left(c\,x^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^4,x)
```

```
[Out] int(csc(a+b*ln(c*x^n))^4,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^4,x, algorithm="maxima")
```

```
[Out] 1/3*(6*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*x*cos(4*b*log(x^n) + 4
*a)^2 + 6*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*x*cos(2*b*log(x^n)
+ 2*a)^2 + 6*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*x*sin(4*b*log(x^
n) + 4*a)^2 + 6*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*x*sin(2*b*log
(x^n) + 2*a)^2 - (2*b*n*cos(2*b*log(c)) - sin(2*b*log(c)))*x*cos(2*b*log(x^
n) + 2*a) + (2*b*n*sin(2*b*log(c)) + cos(2*b*log(c)))*x*sin(2*b*log(x^n) +
2*a) - ((2*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*l
og(c)))*n - cos(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*b*log(c
)))*x*cos(4*b*log(x^n) + 4*a) + 2*(6*(b^2*cos(2*b*log(c))*sin(6*b*log(c)) -
 b^2*cos(6*b*log(c))*sin(2*b*log(c)))*n^2 - (b*cos(6*b*log(c))*cos(2*b*log(
c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(6*b*log(c)
) - cos(6*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) + (2*(b*cos(
4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n + cos(6*
b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*log(c)))*x*sin(4*b*log(
x^n) + 4*a) - 2*(6*(b^2*cos(6*b*log(c))*cos(2*b*log(c)) + b^2*sin(6*b*log(c
))*sin(2*b*log(c)))*n^2 + (b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*lo
g(c))*sin(2*b*log(c)))*n + cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log(c)
)*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) - (4*b^2*n^2*sin(6*b*log(c)) +
 sin(6*b*log(c)))*x)*cos(6*b*log(x^n) + 6*a) + (3*(12*(b^2*cos(2*b*log(c))*
sin(4*b*log(c)) - b^2*cos(4*b*log(c))*sin(2*b*log(c)))*n^2 - 4*(b*cos(4*b*l
og(c))*cos(2*b*log(c)) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*log
(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n)
+ 2*a) - 3*(12*(b^2*cos(4*b*log(c))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*s
in(2*b*log(c)))*n^2 + 4*(b*cos(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(
```

c))*sin(2*b*log(c)))*n + cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*
sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) - 2*(6*b^2*n^2*sin(4*b*log(c)) -
 b*n*cos(4*b*log(c)) + sin(4*b*log(c)))*x)*cos(4*b*log(x^n) + 4*a) + 18*(4*
b^8*n^8 + b^6*n^6 + (4*(b^8*cos(6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8
+ (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*cos(6*b*log(x^n) + 6
a)^2 + 9(4*(b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos
(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*cos(4*b*log(x^n) + 4*a)^2 + 9*
(4*(b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c
))^2 + b^6*sin(2*b*log(c))^2)*n^6)*cos(2*b*log(x^n) + 2*a)^2 + (4*(b^8*cos(
6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6*s
in(6*b*log(c))^2)*n^6)*sin(6*b*log(x^n) + 6*a)^2 + 9*(4*(b^8*cos(4*b*log(c)
)^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log
(c))^2)*n^6)*sin(4*b*log(x^n) + 4*a)^2 + 9*(4*(b^8*cos(2*b*log(c))^2 + b^8*
sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^
6)*sin(2*b*log(x^n) + 2*a)^2 - 2*(4*b^8*n^8*cos(6*b*log(c)) + b^6*n^6*cos(6
*b*log(c)) + 3*(4*(b^8*cos(6*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c)
)*sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b
*log(c))*sin(4*b*log(c)))*n^6)*cos(4*b*log(x^n) + 4*a) - 3*(4*(b^8*cos(6*b*
log(c))*cos(2*b*log(c)) + b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*c
os(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*
cos(2*b*log(x^n) + 2*a) + 3*(4*(b^8*cos(4*b*log(c))*sin(6*b*log(c)) - b^8*c
os(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*log(c))
- b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*sin(4*b*log(x^n) + 4*a) - 3*(4*
(b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(2*b*log(c)))
*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(2*b*l
og(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*cos(6*b*log(x^n) + 6*a) + 6*(4*b^8*n^
8*cos(4*b*log(c)) + b^6*n^6*cos(4*b*log(c)) - 3*(4*(b^8*cos(4*b*log(c))*cos
(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*log(
c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log
(x^n) + 2*a) - 3*(4*(b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(
c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4
*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n)
+ 4*a) - 6*(4*b^8*n^8*cos(2*b*log(c)) + b^6*n^6*cos(2*b*log(c)))*cos(2*b*lo
g(x^n) + 2*a) + 2*(4*b^8*n^8*sin(6*b*log(c)) + b^6*n^6*sin(6*b*log(c)) + 3*
(4*(b^8*cos(4*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c
)))*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*
b*log(c)))*n^6)*cos(4*b*log(x^n) + 4*a) - 3*(4*(b^8*cos(2*b*log(c))*sin(6*b
*log(c)) - b^8*cos(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*
sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n
) + 2*a) - 3*(4*(b^8*cos(6*b*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*
sin(4*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b*l
og(c))*sin(4*b*log(c)))*n^6)*sin(4*b*log(x^n) + 4*a) + 3*(4*(b^8*cos(6*b*lo
g(c))*cos(2*b*log(c)) + b^8*sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos
(6*b*log(c))*cos(2*b*log(c)) + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*si
n(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) - 6*(4*b^8*n^8*sin(4*b*log(c

```
)) + b^6*n^6*sin(4*b*log(c)) - 3*(4*(b^8*cos(2*b*log(c))*sin(4*b*log(c)) -
b^8*cos(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log
(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) +
3*(4*(b^8*cos(4*b*log(c))*cos(2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log
(c)))*n^8 + (b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(
2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4*a) + 6*(4*b
^8*n^8*sin(2*b*log(c)) + b^6*n^6*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*
integrate(1/36*(cos(b*log(x^n) + a)*sin(b*log(c)) + cos(b*log(c))*sin(b*log
(x^n) + a))/(2*b^6*n^6*cos(b*log(c))*cos(b*log(x^n) + a) - 2*b^6*n^6*sin(b*
log(c))*sin(b*log(x^n) + a) + b^6*n^6 + (b^6*cos(b*log(c))^2 + b^6*sin(b*lo
g(c))^2)*n^6*cos(b*log(x^n) + a)^2 + (b^6*cos(b*log(c))^2 + b^6*sin(b*log(c
))^2)*n^6*sin(b*log(x^n) + a)^2), x) - 18*(4*b^8*n^8 + b^6*n^6 + (4*(b^8*co
s(6*b*log(c))^2 + b^8*sin(6*b*log(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6
*sin(6*b*log(c))^2)*n^6)*cos(6*b*log(x^n) + 6*a)^2 + 9*(4*(b^8*cos(4*b*log(
c))^2 + b^8*sin(4*b*log(c))^2)*n^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*l
og(c))^2)*n^6)*cos(4*b*log(x^n) + 4*a)^2 + 9*(4*(b^8*cos(2*b*log(c))^2 + b^
8*sin(2*b*log(c))^2)*n^8 + (b^6*cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*
n^6)*cos(2*b*log(x^n) + 2*a)^2 + (4*(b^8*cos(6*b*log(c))^2 + b^8*sin(6*b*lo
g(c))^2)*n^8 + (b^6*cos(6*b*log(c))^2 + b^6*sin(6*b*log(c))^2)*n^6)*sin(6*b
*log(x^n) + 6*a)^2 + 9*(4*(b^8*cos(4*b*log(c))^2 + b^8*sin(4*b*log(c))^2)*n
^8 + (b^6*cos(4*b*log(c))^2 + b^6*sin(4*b*log(c))^2)*n^6)*sin(4*b*log(x^n)
+ 4*a)^2 + 9*(4*(b^8*cos(2*b*log(c))^2 + b^8*sin(2*b*log(c))^2)*n^8 + (b^6*
cos(2*b*log(c))^2 + b^6*sin(2*b*log(c))^2)*n^6)*sin(2*b*log(x^n) + 2*a)^2 -
 2*(4*b^8*n^8*cos(6*b*log(c)) + b^6*n^6*cos(6*b*log(c)) + 3*(4*(b^8*cos(6*b
*log(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*
cos(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(c)))*n^6)
*cos(4*b*log(x^n) + 4*a) - 3*(4*(b^8*cos(6*b*log(c))*cos(2*b*log(c)) + b^8*
sin(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*log(c))
 + b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) + 3*(4
*(b^8*cos(4*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c))
)*n^8 + (b^6*cos(4*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*b*
log(c)))*n^6)*sin(4*b*log(x^n) + 4*a) - 3*(4*(b^8*cos(2*b*log(c))*sin(6*b*l
og(c)) - b^8*cos(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*si
n(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*log(x^n)
+ 2*a))*cos(6*b*log(x^n) + 6*a) + 6*(4*b^8*n^8*cos(4*b*log(c)) + b^6*n^6*co
s(4*b*log(c)) - 3*(4*(b^8*cos(4*b*log(c))*cos(2*b*log(c)) + b^8*sin(4*b*log
(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))*cos(2*b*log(c)) + b^6*sin(
4*b*log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) - 3*(4*(b^8*cos(2
*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^
6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c))*sin(2*b*log(c)))*n^
6)*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) - 6*(4*b^8*n^8*cos(2*b*
log(c)) + b^6*n^6*cos(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 2*(4*b^8*n^8*s
in(6*b*log(c)) + b^6*n^6*sin(6*b*log(c)) + 3*(4*(b^8*cos(4*b*log(c))*sin(6*
b*log(c)) - b^8*cos(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*cos(4*b*log(c))
*sin(6*b*log(c)) - b^6*cos(6*b*log(c))*sin(4*b*log(c)))*n^6)*cos(4*b*log(x^
```

n) + 4*a) - 3*(4*(b^8*cos(2*b*log(c))*sin(6*b*log(c)) - b^8*cos(6*b*log(c))
*sin(2*b*log(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(6*b*log(c)) - b^6*cos(6*b*
log(c))*sin(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) - 3*(4*(b^8*cos(6*b*l
og(c))*cos(4*b*log(c)) + b^8*sin(6*b*log(c))*sin(4*b*log(c)))*n^8 + (b^6*co
s(6*b*log(c))*cos(4*b*log(c)) + b^6*sin(6*b*log(c))*sin(4*b*log(c)))*n^6)*s
in(4*b*log(x^n) + 4*a) + 3*(4*(b^8*cos(6*b*log(c))*cos(2*b*log(c)) + b^8*si
n(6*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(6*b*log(c))*cos(2*b*log(c)) +
 b^6*sin(6*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*log(x^n) + 2*a))*sin(6*b
*log(x^n) + 6*a) - 6*(4*b^8*n^8*sin(4*b*log(c)) + b^6*n^6*sin(4*b*log(c)) -
 3*(4*(b^8*cos(2*b*log(c))*sin(4*b*log(c)) - b^8*cos(4*b*log(c))*sin(2*b*lo
g(c)))*n^8 + (b^6*cos(2*b*log(c))*sin(4*b*log(c)) - b^6*cos(4*b*log(c))*sin
(2*b*log(c)))*n^6)*cos(2*b*log(x^n) + 2*a) + 3*(4*(b^8*cos(4*b*log(c))*cos(
2*b*log(c)) + b^8*sin(4*b*log(c))*sin(2*b*log(c)))*n^8 + (b^6*cos(4*b*log(c
))*cos(2*b*log(c)) + b^6*sin(4*b*log(c))*sin(2*b*log(c)))*n^6)*sin(2*b*log(
x^n) + 2*a))*sin(4*b*log(x^n) + 4*a) + 6*(4*b^8*n^8*sin(2*b*log(c)) + b^6*n
^6*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a))*integrate(-1/36*(cos(b*log(x^n
) + a)*sin(b*log(c)) + cos(b*log(c))*sin(b*log(x^n) + a))/(2*b^6*n^6*cos(b*
log(c))*cos(b*log(x^n) + a) - 2*b^6*n^6*sin(b*log(c))*sin(b*log(x^n) + a) -
 b^6*n^6 - (b^6*cos(b*log(c))^2 + b^6*sin(b*log(c))^2)*n^6*cos(b*log(x^n) +
 a)^2 - (b^6*cos(b*log(c))^2 + b^6*sin(b*log(c))^2)*n^6*sin(b*log(x^n) + a)
^2), x) + ((2*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*
b*log(c)))*n + cos(6*b*log(c))*cos(4*b*log(c)) + sin(6*b*log(c))*sin(4*b*lo
g(c)))*x*cos(4*b*log(x^n) + 4*a) - 2*(6*(b^2*cos(6*b*log(c))*cos(2*b*log(c)
) + b^2*sin(6*b*log(c))*sin(2*b*log(c)))*n^2 + (b*cos(2*b*log(c))*sin(6*b*l
og(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n + cos(6*b*log(c))*cos(2*b*log
(c)) + sin(6*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) - (2*(b*c
os(6*b*log(c))*cos(4*b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n - cos
(4*b*log(c))*sin(6*b*log(c)) + cos(6*b*log(c))*sin(4*b*log(c)))*x*sin(4*b*l
og(x^n) + 4*a) - 2*(6*(b^2*cos(2*b*log(c))*sin(6*b*log(c)) - b^2*cos(6*b*lo
g(c))*sin(2*b*log(c)))*n^2 - (b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b
*log(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log
(c))*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) + (4*b^2*n^2*cos(6*b*log(c)
) + cos(6*b*log(c)))*x)*sin(6*b*log(x^n) + 6*a) + (3*(12*(b^2*cos(4*b*log(c
))*cos(2*b*log(c)) + b^2*sin(4*b*log(c))*sin(2*b*log(c)))*n^2 + 4*(b*cos(2*
b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n + cos(4*b*
log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x^
n) + 2*a) + 3*(12*(b^2*cos(2*b*log(c))*sin(4*b*log(c)) - b^2*cos(4*b*log(c)
)*sin(2*b*log(c)))*n^2 - 4*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4*b*l
og(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c
))*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) - 2*(6*b^2*n^2*cos(4*b*log(c)
) + b*n*sin(4*b*log(c)) + cos(4*b*log(c)))*x)*sin(4*b*log(x^n) + 4*a))/(6*b
^3*n^3*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) - 6*b^3*n^3*sin(2*b*log(c))*
sin(2*b*log(x^n) + 2*a) - b^3*n^3 - (b^3*cos(6*b*log(c))^2 + b^3*sin(6*b*lo
g(c))^2)*n^3*cos(6*b*log(x^n) + 6*a)^2 - 9*(b^3*cos(4*b*log(c))^2 + b^3*sin
(4*b*log(c))^2)*n^3*cos(4*b*log(x^n) + 4*a)^2 - 9*(b^3*cos(2*b*log(c))^2 +

```
b^3*sin(2*b*log(c))^2)*n^3*cos(2*b*log(x^n) + 2*a)^2 - (b^3*cos(6*b*log(c))
^2 + b^3*sin(6*b*log(c))^2)*n^3*sin(6*b*log(x^n) + 6*a)^2 - 9*(b^3*cos(4*b*
log(c))^2 + b^3*sin(4*b*log(c))^2)*n^3*sin(4*b*log(x^n) + 4*a)^2 - 9*(b^3*c
os(2*b*log(c))^2 + b^3*sin(2*b*log(c))^2)*n^3*sin(2*b*log(x^n) + 2*a)^2 + 2
*(b^3*n^3*cos(6*b*log(c)) + 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*si
n(6*b*log(c))*sin(4*b*log(c)))*n^3*cos(4*b*log(x^n) + 4*a) - 3*(b^3*cos(6*b
*log(c))*cos(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*cos(2*b
*log(x^n) + 2*a) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log
(c))*sin(4*b*log(c)))*n^3*sin(4*b*log(x^n) + 4*a) - 3*(b^3*cos(2*b*log(c))*
sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n)
 + 2*a))*cos(6*b*log(x^n) + 6*a) - 6*(b^3*n^3*cos(4*b*log(c)) - 3*(b^3*cos(
4*b*log(c))*cos(2*b*log(c)) + b^3*sin(4*b*log(c))*sin(2*b*log(c)))*n^3*cos(
2*b*log(x^n) + 2*a) - 3*(b^3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*
log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*
a) - 2*(b^3*n^3*sin(6*b*log(c)) + 3*(b^3*cos(4*b*log(c))*sin(6*b*log(c)) -
b^3*cos(6*b*log(c))*sin(4*b*log(c)))*n^3*cos(4*b*log(x^n) + 4*a) - 3*(b^3*c
os(2*b*log(c))*sin(6*b*log(c)) - b^3*cos(6*b*log(c))*sin(2*b*log(c)))*n^3*c
os(2*b*log(x^n) + 2*a) - 3*(b^3*cos(6*b*log(c))*cos(4*b*log(c)) + b^3*sin(6
*b*log(c))*sin(4*b*log(c)))*n^3*sin(4*b*log(x^n) + 4*a) + 3*(b^3*cos(6*b*lo
g(c))*cos(2*b*log(c)) + b^3*sin(6*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*lo
g(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) + 6*(b^3*n^3*sin(4*b*log(c)) - 3*(b^
3*cos(2*b*log(c))*sin(4*b*log(c)) - b^3*cos(4*b*log(c))*sin(2*b*log(c)))*n^
3*cos(2*b*log(x^n) + 2*a) + 3*(b^3*cos(4*b*log(c))*cos(2*b*log(c)) + b^3*si
n(4*b*log(c))*sin(2*b*log(c)))*n^3*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n
) + 4*a))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + b*log(c*x^n))^4,x)
```

```
[Out] int(1/sin(a + b*log(c*x^n))^4, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^4\left(a+b\log\left(cx^n\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**4,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**4, x)
```

3.300 $\int \frac{\csc^4(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=43

$$-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}$$

```
[Out] -cot(a+b*ln(c*x^n))/b/n-1/3*cot(a+b*ln(c*x^n))^3/b/n
```

Rubi [A] time = 0.03, antiderivative size = 43, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 1, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {3767}

$$-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] -(Cot[a + b*Log[c*x^n]]/(b*n)) - Cot[a + b*Log[c*x^n]]^3/(3*b*n)
```

Rule 3767

```
Int[csc[(c_.) + (d_.)*(x_)]^(n_), x_Symbol] :> -Dist[d^(-1), Subst[Int[Expa
ndIntegrand[(1 + x^2)^(n/2 - 1), x], x], x, Cot[c + d*x]], x] /; FreeQ[{c,
d}, x] && IGtQ[n/2, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\csc^4\left(a+b\log\left(cx^n\right)\right)}{x}\,dx &= \frac{\text{Subst}\left(\int \csc^4(a+bx)\,dx,x,\log\left(cx^n\right)\right)}{n}\\ &= -\frac{\text{Subst}\left(\int \left(1+x^2\right)\,dx,x,\cot\left(a+b\log\left(cx^n\right)\right)\right)}{bn}\\ &= -\frac{\cot\left(a+b\log\left(cx^n\right)\right)}{bn}-\frac{\cot^3\left(a+b\log\left(cx^n\right)\right)}{3bn}\end{aligned}$$

Mathematica [A] time = 0.08, size = 56, normalized size = 1.30

$$-\frac{2\cot\left(a+b\log\left(cx^n\right)\right)}{3bn}-\frac{\cot\left(a+b\log\left(cx^n\right)\right)\csc^2\left(a+b\log\left(cx^n\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^4/x,x]
```

```
[Out] (-2*Cot[a + b*Log[c*x^n]])/(3*b*n) - (Cot[a + b*Log[c*x^n]]*Csc[a + b*Log[c
*x^n]]^2)/(3*b*n)
```

fricas [A] time = 0.67, size = 71, normalized size = 1.65

$$-\frac{2\cos\left(bn\log(x)+b\log(c)+a\right)^{3}-3\cos\left(bn\log(x)+b\log(c)+a\right)}{3\left(bn\cos\left(bn\log(x)+b\log(c)+a\right)^{2}-bn\right)\sin\left(bn\log(x)+b\log(c)+a\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^4/x,x, algorithm="fricas")
```

```
[Out] -1/3*(2*cos(b*n*log(x) + b*log(c) + a)^3 - 3*cos(b*n*log(x) + b*log(c) + a)
)/((b*n*cos(b*n*log(x) + b*log(c) + a)^2 - b*n)*sin(b*n*log(x) + b*log(c) +
 a))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int\frac{\csc\left(b\log\left(cx^{n}\right)+a\right)^{4}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^4/x,x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^4/x, x)
```

maple [A] time = 0.12, size = 36, normalized size = 0.84

$$\frac{\left(-\frac{2}{3}-\frac{\left(\csc^{2}\left(a+b\ln\left(c\,x^{n}\right)\right)\right)}{3}\right)\cot\left(a+b\ln\left(c\,x^{n}\right)\right)}{nb}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^4/x,x)
```

```
[Out] 1/n/b*(-2/3-1/3*csc(a+b*ln(c*x^n))^2)*cot(a+b*ln(c*x^n))
```

maxima [B] time = 0.75, size = 1332, normalized size = 30.98

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^4/x,x, algorithm="maxima")
```

```
[Out] 4/3*((3*(cos(2*b*log(c))*sin(6*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))
*cos(2*b*log(x^n) + 2*a) - 3*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*log
(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(6*b*log(c)))*cos(6*b*lo
g(x^n) + 6*a) - 3*(3*(cos(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin
(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) - 3*(cos(4*b*log(c))*cos(2*b*log(c))
+ sin(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(4*b*log(c)
))*cos(4*b*log(x^n) + 4*a) + (3*(cos(6*b*log(c))*cos(2*b*log(c)) + sin(6*b*
log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 3*(cos(2*b*log(c))*sin(6
*b*log(c)) - cos(6*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos
(6*b*log(c)))*sin(6*b*log(x^n) + 6*a) - 3*(3*(cos(4*b*log(c))*cos(2*b*log(c
)) + sin(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*log(x^n) + 2*a) + 3*(cos(2*b*
log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n)
 + 2*a) - cos(4*b*log(c)))*sin(4*b*log(x^n) + 4*a))/((b*cos(6*b*log(c))^2 +
 b*sin(6*b*log(c))^2)*n*cos(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*log(c))^2
+ b*sin(4*b*log(c))^2)*n*cos(4*b*log(x^n) + 4*a)^2 - 6*b*n*cos(2*b*log(c))*
cos(2*b*log(x^n) + 2*a) + 9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*c
os(2*b*log(x^n) + 2*a)^2 + (b*cos(6*b*log(c))^2 + b*sin(6*b*log(c))^2)*n*si
n(6*b*log(x^n) + 6*a)^2 + 9*(b*cos(4*b*log(c))^2 + b*sin(4*b*log(c))^2)*n*s
in(4*b*log(x^n) + 4*a)^2 + 6*b*n*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) +
9*(b*cos(2*b*log(c))^2 + b*sin(2*b*log(c))^2)*n*sin(2*b*log(x^n) + 2*a)^2 +
 b*n - 2*(b*n*cos(6*b*log(c)) + 3*(b*cos(6*b*log(c))*cos(4*b*log(c)) + b*si
n(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) - 3*(b*cos(6*b*log
(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n
) + 2*a) + 3*(b*cos(4*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(4*b
*log(c)))*n*sin(4*b*log(x^n) + 4*a) - 3*(b*cos(2*b*log(c))*sin(6*b*log(c))
- b*cos(6*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*cos(6*b*log
(x^n) + 6*a) + 6*(b*n*cos(4*b*log(c)) - 3*(b*cos(4*b*log(c))*cos(2*b*log(c)
) + b*sin(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) + 2*a) - 3*(b*cos
(2*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*sin(2*b
*log(x^n) + 2*a))*cos(4*b*log(x^n) + 4*a) + 2*(3*(b*cos(4*b*log(c))*sin(6*b
*log(c)) - b*cos(6*b*log(c))*sin(4*b*log(c)))*n*cos(4*b*log(x^n) + 4*a) - 3
*(b*cos(2*b*log(c))*sin(6*b*log(c)) - b*cos(6*b*log(c))*sin(2*b*log(c)))*n*
cos(2*b*log(x^n) + 2*a) + b*n*sin(6*b*log(c)) - 3*(b*cos(6*b*log(c))*cos(4*
b*log(c)) + b*sin(6*b*log(c))*sin(4*b*log(c)))*n*sin(4*b*log(x^n) + 4*a) +
3*(b*cos(6*b*log(c))*cos(2*b*log(c)) + b*sin(6*b*log(c))*sin(2*b*log(c)))*n
*sin(2*b*log(x^n) + 2*a))*sin(6*b*log(x^n) + 6*a) + 6*(3*(b*cos(2*b*log(c))
*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(2*b*log(c)))*n*cos(2*b*log(x^n) +
2*a) - b*n*sin(4*b*log(c)) - 3*(b*cos(4*b*log(c))*cos(2*b*log(c)) + b*sin(4
*b*log(c))*sin(2*b*log(c)))*n*sin(2*b*log(x^n) + 2*a))*sin(4*b*log(x^n) + 4
*a))
```

mupad [B] time = 9.23, size = 49, normalized size = 1.14

$$\frac{4\,\left({\mathrm{e}}^{a\,2{}\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2{}\mathrm{i}}\,3{}\mathrm{i}-\mathrm{i}\right)}{3\,b\,n\,{\left({\mathrm{e}}^{a\,2{}\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2{}\mathrm{i}}-1\right)}^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*sin(a + b*log(c*x^n))^4),x)
```

```
[Out] (4*(exp(a*2i)*(c*x^n)^(b*2i)*3i - 1i))/(3*b*n*(exp(a*2i)*(c*x^n)^(b*2i) - 1
)^3)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc^{4}{\left(a + b \log{\left(cx^{n} \right)} \right)}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**4/x,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**4/x, x)
```

3.301 $\int \left(-\left(\left(1+b^2n^2\right)\csc\left(a+b\log\left(cx^n\right)\right)\right)+2b^2n^2\csc^3\left(a\right.\right.$

Optimal. Leaf size=42

$$-x\csc\left(a+b\log\left(cx^n\right)\right)-bnx\cot\left(a+b\log\left(cx^n\right)\right)\csc\left(a+b\log\left(cx^n\right)\right)$$

```
[Out] -x*csc(a+b*ln(c*x^n))-b*n*x*cot(a+b*ln(c*x^n))*csc(a+b*ln(c*x^n))
```

Rubi [C] time = 0.13, antiderivative size = 172, normalized size of antiderivative = 4.10, number of steps used = 7, number of rules used = 3, integrand size = 44, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.068, Rules used = {4504, 4506, 364}

$$2e^{ia}x(bn+i)\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right);\frac{1}{2}\left(3-\frac{i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)-\frac{16e^{3ia}b^2n^2x\left(cx^n\right)^{3ib}\,{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i}{bn}\right);\frac{1}{2}\left(5-\frac{i}{bn}\right.\right.}{-3bn+i}$$

Warning: Unable to verify antiderivative.

```
[In] Int[-((1 + b^2*n^2)*Csc[a + b*Log[c*x^n]]) + 2*b^2*n^2*Csc[a + b*Log[c*x^n]
]^3,x]
```

```
[Out] 2*E^(I*a)*(I + b*n)*x*(c*x^n)^(I*b)*Hypergeometric2F1[1, (1 - I/(b*n))/2, (
3 - I/(b*n))/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)] - (16*b^2*E^((3*I)*a)*n^2*x*
(c*x^n)^((3*I)*b)*Hypergeometric2F1[3, (3 - I/(b*n))/2, (5 - I/(b*n))/2, E^
((2*I)*a)*(c*x^n)^((2*I)*b)])/(I - 3*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \left(-\left(1+b^2n^2\right)\csc\left(a+b\log\left(cx^n\right)\right)+2b^2n^2\csc^3\left(a+b\log\left(cx^n\right)\right)\right)dx=\left(2b^2n^2\right)\int \csc^3\left(a+b\log\left(cx^n\right)\right)dx -$$

$$=\left(2b^2nx\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\text{csc}\right.$$

$$=\left(16ib^2e^{3ia}nx\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x}{\left(1-\right.}\right.$$

$$=2e^{ia}(i+bn)x\left(cx^n\right)^{ib}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i}{bn}\right.\right.$$

Mathematica [A] time = 0.44, size = 30, normalized size = 0.71

$$-x\left(bn\cot\left(a+b\log\left(cx^n\right)\right)+1\right)\csc\left(a+b\log\left(cx^n\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[-((1 + b^2*n^2)*Csc[a + b*Log[c*x^n]]) + 2*b^2*n^2*Csc[a + b*Log[
c*x^n]]^3,x]
```

```
[Out] -(x*(1 + b*n*Cot[a + b*Log[c*x^n]])*Csc[a + b*Log[c*x^n]])
```

fricas [A] time = 3.56, size = 50, normalized size = 1.19

$$\frac{bnx\cos\left(bn\log(x)+b\log(c)+a\right)+x\sin\left(bn\log(x)+b\log(c)+a\right)}{\cos\left(bn\log(x)+b\log(c)+a\right)^2-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b^2*n^2+1)*csc(a+b*log(c*x^n))+2*b^2*n^2*csc(a+b*log(c*x^n))^3,
x, algorithm="fricas")
```

```
[Out] (b*n*x*cos(b*n*log(x) + b*log(c) + a) + x*sin(b*n*log(x) + b*log(c) + a))/(
cos(b*n*log(x) + b*log(c) + a)^2 - 1)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int 2\,b^2n^2\csc\left(b\log\left(cx^n\right)+a\right)^3-\left(b^2n^2+1\right)\csc\left(b\log\left(cx^n\right)+a\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b^2*n^2+1)*csc(a+b*log(c*x^n))+2*b^2*n^2*csc(a+b*log(c*x^n))^3,
x, algorithm="giac")
```

```
[Out] integrate(2*b^2*n^2*csc(b*log(c*x^n) + a)^3 - (b^2*n^2 + 1)*csc(b*log(c*x^n
) + a), x)
```

maple [C] time = 0.65, size = 523, normalized size = 12.45

$$\frac{2c^{ib}\left(x^{n}\right)^{ib} x \left(nb\, c^{2ib} \left(x^{n}\right)^{2ib} \mathrm{e}^{\frac{3b\pi \mathrm{csgn}\left(ic\, x^{n}\right)^{3}}{2}} \mathrm{e}^{-\frac{3b\pi \mathrm{csgn}\left(ic\, x^{n}\right)^{2} \mathrm{csgn}(ic)}{2}} \mathrm{e}^{-\frac{3b\pi \mathrm{csgn}\left(ic\, x^{n}\right)^{2} \mathrm{csgn}\left(ix^{n}\right)}{2}} \mathrm{e}^{\frac{3b\pi\, \mathrm{csgn}\left(ic\, x^{n}\right) \mathrm{csgn}(ic) \mathrm{csgn}\left(ix^{n}\right)}{2}} \mathrm{e}^{3ia} + bn\, \mathrm{e}^{\frac{b\pi \mathrm{cs}}{}}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(b^2*n^2+1)*csc(a+b*ln(c*x^n))+2*b^2*n^2*csc(a+b*ln(c*x^n))^3,x)
```

```
[Out] 2*c^(I*b)*(x^n)^(I*b)*x/(((x^n)^(I*b))^2*(c^(I*b))^2*exp(b*Pi*csgn(I*c*x^n)
^3)*exp(-b*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-b*Pi*csgn(I*c*x^n)^2*csgn(I*x
^n))*exp(b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(2*I*a)-1)^2*(n*b*(c^
(I*b))^2*((x^n)^(I*b))^2*exp(3/2*b*Pi*csgn(I*c*x^n)^3)*exp(-3/2*b*Pi*csgn(I
*c*x^n)^2*csgn(I*c))*exp(-3/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*x^n))*exp(3/2*b*P
i*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(3*I*a)+b*n*exp(1/2*b*Pi*csgn(I*c
*x^n)^3)*exp(-1/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-1/2*b*Pi*csgn(I*c*x^
n)^2*csgn(I*x^n))*exp(1/2*b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(I*a
)-I*(c^(I*b))^2*((x^n)^(I*b))^2*exp(3/2*b*Pi*csgn(I*c*x^n)^3)*exp(-3/2*b*Pi
*csgn(I*c*x^n)^2*csgn(I*c))*exp(-3/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*x^n))*exp(
3/2*b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*exp(3*I*a)+I*exp(1/2*b*Pi*csg
n(I*c*x^n)^3)*exp(-1/2*b*Pi*csgn(I*c*x^n)^2*csgn(I*c))*exp(-1/2*b*Pi*csgn(I
*c*x^n)^2*csgn(I*x^n))*exp(1/2*b*Pi*csgn(I*c*x^n)*csgn(I*c)*csgn(I*x^n))*ex
p(I*a))
```

maxima [B] time = 0.66, size = 1701, normalized size = 40.50

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b^2*n^2+1)*csc(a+b*log(c*x^n))+2*b^2*n^2*csc(a+b*log(c*x^n))^3,
x, algorithm="maxima")
```

```
[Out] 2*((b*n*cos(b*log(c)) - sin(b*log(c)))*x*cos(b*log(x^n) + a) - (b*n*sin(b*l
og(c)) + cos(b*log(c)))*x*sin(b*log(x^n) + a) + (((b*cos(4*b*log(c))*cos(3*
b*log(c)) + b*sin(4*b*log(c))*sin(3*b*log(c)))*n - cos(3*b*log(c))*sin(4*b*
```

```
log(c)) + cos(4*b*log(c))*sin(3*b*log(c)))*x*cos(3*b*log(x^n) + 3*a) + ((b*
cos(4*b*log(c))*cos(b*log(c)) + b*sin(4*b*log(c))*sin(b*log(c)))*n + cos(b*
log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(b*log(c)))*x*cos(b*log(x^n) +
 a) + ((b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c
)))*n + cos(4*b*log(c))*cos(3*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)))*
x*sin(3*b*log(x^n) + 3*a) + ((b*cos(b*log(c))*sin(4*b*log(c)) - b*cos(4*b*l
og(c))*sin(b*log(c)))*n - cos(4*b*log(c))*cos(b*log(c)) - sin(4*b*log(c))*s
in(b*log(c)))*x*sin(b*log(x^n) + a))*cos(4*b*log(x^n) + 4*a) - (2*((b*cos(3
*b*log(c))*cos(2*b*log(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n + cos(2*b
*log(c))*sin(3*b*log(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*x*cos(2*b*log(x
^n) + 2*a) + 2*((b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c))*sin(
2*b*log(c)))*n - cos(3*b*log(c))*cos(2*b*log(c)) - sin(3*b*log(c))*sin(2*b*
log(c)))*x*sin(2*b*log(x^n) + 2*a) - (b*n*cos(3*b*log(c)) + sin(3*b*log(c))
)*x)*cos(3*b*log(x^n) + 3*a) - 2*(((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin
(2*b*log(c))*sin(b*log(c)))*n + cos(b*log(c))*sin(2*b*log(c)) - cos(2*b*log
(c))*sin(b*log(c)))*x*cos(b*log(x^n) + a) + ((b*cos(b*log(c))*sin(2*b*log(c
)) - b*cos(2*b*log(c))*sin(b*log(c)))*n - cos(2*b*log(c))*cos(b*log(c)) - s
in(2*b*log(c))*sin(b*log(c)))*x*sin(b*log(x^n) + a))*cos(2*b*log(x^n) + 2*a
) - (((b*cos(3*b*log(c))*sin(4*b*log(c)) - b*cos(4*b*log(c))*sin(3*b*log(c)
))*n + cos(4*b*log(c))*cos(3*b*log(c)) + sin(4*b*log(c))*sin(3*b*log(c)))*x
*cos(3*b*log(x^n) + 3*a) + ((b*cos(b*log(c))*sin(4*b*log(c)) - b*cos(4*b*lo
g(c))*sin(b*log(c)))*n - cos(4*b*log(c))*cos(b*log(c)) - sin(4*b*log(c))*si
n(b*log(c)))*x*cos(b*log(x^n) + a) - ((b*cos(4*b*log(c))*cos(3*b*log(c)) +
b*sin(4*b*log(c))*sin(3*b*log(c)))*n - cos(3*b*log(c))*sin(4*b*log(c)) + co
s(4*b*log(c))*sin(3*b*log(c)))*x*sin(3*b*log(x^n) + 3*a) - ((b*cos(4*b*log(
c))*cos(b*log(c)) + b*sin(4*b*log(c))*sin(b*log(c)))*n + cos(b*log(c))*sin(
4*b*log(c)) - cos(4*b*log(c))*sin(b*log(c)))*x*sin(b*log(x^n) + a))*sin(4*b
*log(x^n) + 4*a) + (2*((b*cos(2*b*log(c))*sin(3*b*log(c)) - b*cos(3*b*log(c
))*sin(2*b*log(c)))*n - cos(3*b*log(c))*cos(2*b*log(c)) - sin(3*b*log(c))*s
in(2*b*log(c)))*x*cos(2*b*log(x^n) + 2*a) - 2*((b*cos(3*b*log(c))*cos(2*b*l
og(c)) + b*sin(3*b*log(c))*sin(2*b*log(c)))*n + cos(2*b*log(c))*sin(3*b*log
(c)) - cos(3*b*log(c))*sin(2*b*log(c)))*x*sin(2*b*log(x^n) + 2*a) - (b*n*si
n(3*b*log(c)) - cos(3*b*log(c)))*x)*sin(3*b*log(x^n) + 3*a) + 2*(((b*cos(b*
log(c))*sin(2*b*log(c)) - b*cos(2*b*log(c))*sin(b*log(c)))*n - cos(2*b*log(
c))*cos(b*log(c)) - sin(2*b*log(c))*sin(b*log(c)))*x*cos(b*log(x^n) + a) -
((b*cos(2*b*log(c))*cos(b*log(c)) + b*sin(2*b*log(c))*sin(b*log(c)))*n + co
s(b*log(c))*sin(2*b*log(c)) - cos(2*b*log(c))*sin(b*log(c)))*x*sin(b*log(x^
n) + a))*sin(2*b*log(x^n) + 2*a))/((cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*
cos(4*b*log(x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*cos(2
*b*log(x^n) + 2*a)^2 + (cos(4*b*log(c))^2 + sin(4*b*log(c))^2)*sin(4*b*log(
x^n) + 4*a)^2 + 4*(cos(2*b*log(c))^2 + sin(2*b*log(c))^2)*sin(2*b*log(x^n)
+ 2*a)^2 - 2*(2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2*b*
log(c)))*cos(2*b*log(x^n) + 2*a) + 2*(cos(2*b*log(c))*sin(4*b*log(c)) - cos
(4*b*log(c))*sin(2*b*log(c)))*sin(2*b*log(x^n) + 2*a) - cos(4*b*log(c)))*co
s(4*b*log(x^n) + 4*a) - 4*cos(2*b*log(c))*cos(2*b*log(x^n) + 2*a) + 2*(2*(c
```

```
os(2*b*log(c))*sin(4*b*log(c)) - cos(4*b*log(c))*sin(2*b*log(c)))*cos(2*b*l
og(x^n) + 2*a) - 2*(cos(4*b*log(c))*cos(2*b*log(c)) + sin(4*b*log(c))*sin(2
*b*log(c)))*sin(2*b*log(x^n) + 2*a) - sin(4*b*log(c)))*sin(4*b*log(x^n) + 4
*a) + 4*sin(2*b*log(c))*sin(2*b*log(x^n) + 2*a) + 1)
```

mupad [B] time = 3.26, size = 85, normalized size = 2.02

$$\frac{2\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}\,\left(b\,n+1\mathrm{i}\right)+2\,x\,\mathrm{e}^{a\,1\mathrm{i}}\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,1\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}\,\left(b\,n-\mathrm{i}\right)}{{\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^n\right)}^{b\,2\mathrm{i}}-1\right)}^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((2*b^2*n^2)/sin(a + b*log(c*x^n))^3 - (b^2*n^2 + 1)/sin(a + b*log(c*x^n
)),x)
```

```
[Out] (2*x*exp(a*1i)*(c*x^n)^(b*1i)*(b*n + 1i) + 2*x*exp(a*1i)*exp(a*2i)*(c*x^n)^
(b*1i)*(c*x^n)^(b*2i)*(b*n - 1i))/(exp(a*2i)*(c*x^n)^(b*2i) - 1)^2
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \left(2b^{2}n^{2}\csc^{2}\left(a+b\log\left(cx^{n}\right)\right)-b^{2}n^{2}-1\right)\csc\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(b**2*n**2+1)*csc(a+b*ln(c*x**n))+2*b**2*n**2*csc(a+b*ln(c*x**n)
)**3,x)
```

```
[Out] Integral((2*b**2*n**2*csc(a + b*log(c*x**n))**2 - b**2*n**2 - 1)*csc(a + b*
log(c*x**n)), x)
```

3.302 $\int x^m \csc^3\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)\right)\,dx$

Optimal. Leaf size=110

$$\frac{x^{m+1}\csc\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)}{2(m+1)}-\frac{x^{m+1}\cot\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)\csc\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)}{2\sqrt{-(m+1)^2}}$$

```
[Out] 1/2*x^(1+m)*csc(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))/(1+m)-1/2*x^(1+m)*cot(a
+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))*csc(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))/
(-(1+m)^2)^(1/2)
```

Rubi [C] time = 0.18, antiderivative size = 142, normalized size of antiderivative = 1.29, number of steps used = 3, number of rules used = 3, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.097, Rules used = {4510, 4506, 364}

$$-\frac{8e^{3ia}x^{m+1}\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)^{6i}{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i(m+1)}{\sqrt{-(m+1)^2}}\right);\frac{1}{2}\left(5-\frac{i(m+1)}{\sqrt{-(m+1)^2}}\right);e^{2ia}\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)^{4i}\right)}{im-3\sqrt{-(m+1)^2}+i}$$

Warning: Unable to verify antiderivative.

```
[In] Int[x^m*Csc[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]]^3,x]
```

```
[Out] (-8*E^((3*I)*a)*x^(1 + m)*(c*x^(Sqrt[-(1 + m)^2]/2))^(6*I)*Hypergeometric2F
1[3, (3 - (I*(1 + m))/Sqrt[-(1 + m)^2])/2, (5 - (I*(1 + m))/Sqrt[-(1 + m)^2
])/2, E^((2*I)*a)*(c*x^(Sqrt[-(1 + m)^2]/2))^(4*I)])/(I + I*m - 3*Sqrt[-(1
+ m)^2])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \csc^3\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)\right)dx = \frac{\left(2x^{1+m}\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{-\frac{2(1+m)}{\sqrt{-(1+m)^2}}}\right)\text{Subst}\left(\int x^{-1+\frac{2(1+m)}{\sqrt{-(1+m)^2}}}\csc^3(a+2\log(\right.}{\sqrt{-(1+m)^2}}$$

$$= \frac{\left(16ie^{3ia}x^{1+m}\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{-\frac{2(1+m)}{\sqrt{-(1+m)^2}}}\right)\text{Subst}\left(\int \frac{x^{(-1+6i)+\frac{2(1+m)}{\sqrt{-(1+m)^2}}}}{\left(1-e^{2ia}x^{4i}\right)^3}dx, x, c\right.}{\sqrt{-(1+m)^2}}$$

$$= -\frac{8e^{3ia}x^{1+m}\left(cx^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{6i}{}_2F_1\left(3,\frac{1}{2}\left(3-\frac{i(1+m)}{\sqrt{-(1+m)^2}}\right);\frac{1}{2}\left(5-\frac{i(1+m)}{\sqrt{-(1+m)^2}}\right.\right.}{i+im-3\sqrt{-(1+m)^2}}$$

Mathematica [A] time = 2.05, size = 79, normalized size = 0.72

$$\frac{x^{m+1}\left(\sqrt{-(m+1)^2}\cot\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)+m+1\right)\csc\left(a+2\log\left(cx^{\frac{1}{2}\sqrt{-(m+1)^2}}\right)\right)}{2(m+1)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^m*Csc[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]]^3,x]
```

```
[Out] (x^(1 + m)*(1 + m + Sqrt[-(1 + m)^2]*Cot[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)
]])*Csc[a + 2*Log[c*x^(Sqrt[-(1 + m)^2]/2)]])/(2*(1 + m)^2)
```

fricas [C] time = 0.71, size = 82, normalized size = 0.75

$$\frac{-4i\,x^2x^{2\,m}e^{\left(3i\,a+6i\,\log(c)\right)}+2i\,e^{\left(5i\,a+10i\,\log(c)\right)}}{(m+1)x^4x^{4\,m}-2\,(m+1)x^2x^{2\,m}e^{\left(2i\,a+4i\,\log(c)\right)}+(m+1)e^{\left(4i\,a+8i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+2*log(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x, algorithm="fric
as")
```

```
[Out] (-4*I*x^2*x^(2*m)*e^(3*I*a + 6*I*log(c)) + 2*I*e^(5*I*a + 10*I*log(c)))/((m
 + 1)*x^4*x^(4*m) - 2*(m + 1)*x^2*x^(2*m)*e^(2*I*a + 4*I*log(c)) + (m + 1)*
e^(4*I*a + 8*I*log(c)))
```

giac [C] time = 19.51, size = 839, normalized size = 7.63

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+2*log(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x, algorithm="giac
")
```

```
[Out] I*c^(6*I)*m*x*x^m*x^abs(m + 1)*e^(3*I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^(8*I)
*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) - 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2*I*a)
 - 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) - 2*c^(4*I)*x^(2*abs(m + 1))*e^(2
*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1))) - I
*c^(6*I)*x*x^m*x^abs(m + 1)*abs(m + 1)*e^(3*I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2
*c^(8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) - 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e
^(2*I*a) - 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) - 2*c^(4*I)*x^(2*abs(m +
1))*e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m +
1))) + I*c^(6*I)*x*x^m*x^abs(m + 1)*e^(3*I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c^
(8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) - 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(2
*I*a) - 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) - 2*c^(4*I)*x^(2*abs(m + 1))
*e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1))
) - I*c^(2*I)*m*x*x^m*x^(3*abs(m + 1))*e^(I*a)/(c^(8*I)*m^2*e^(4*I*a) + 2*c
^(8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) - 2*c^(4*I)*m^2*x^(2*abs(m + 1))*e^(
2*I*a) - 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) - 2*c^(4*I)*x^(2*abs(m + 1)
)*e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*abs(m + 1)
)) - I*c^(2*I)*x*x^m*x^(3*abs(m + 1))*abs(m + 1)*e^(I*a)/(c^(8*I)*m^2*e^(4*
I*a) + 2*c^(8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) - 2*c^(4*I)*m^2*x^(2*abs(m
 + 1))*e^(2*I*a) - 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) - 2*c^(4*I)*x^(2*
abs(m + 1))*e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*
abs(m + 1))) - I*c^(2*I)*x*x^m*x^(3*abs(m + 1))*e^(I*a)/(c^(8*I)*m^2*e^(4*I
*a) + 2*c^(8*I)*m*e^(4*I*a) + c^(8*I)*e^(4*I*a) - 2*c^(4*I)*m^2*x^(2*abs(m
+ 1))*e^(2*I*a) - 4*c^(4*I)*m*x^(2*abs(m + 1))*e^(2*I*a) - 2*c^(4*I)*x^(2*a
bs(m + 1))*e^(2*I*a) + m^2*x^(4*abs(m + 1)) + 2*m*x^(4*abs(m + 1)) + x^(4*a
bs(m + 1)))
```

maple [F] time = 0.21, size = 0, normalized size = 0.00

$$\int x^{m} \left(\csc^{3}\left(a + 2\ln\left(c\,x^{\frac{\sqrt{-(1+m)^{2}}}{2}}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*csc(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x)
```

```
[Out] int(x^m*csc(a+2*ln(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x)
```

maxima [B] time = 1.46, size = 974, normalized size = 8.85

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+2*log(c*x^(1/2*(-(1+m)^2)^(1/2))))^3,x, algorithm="maxi
ma")
```

```
[Out] 2*((cos(2*log(c))*sin(a) + cos(a)*sin(2*log(c)))*x*e^(m*log(x) + 14*arctan2
(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 14*arctan2(sin(1/2*log(x)), cos(1/
2*log(x)))) + 2*(((cos(a)*sin(2*a) - cos(2*a)*sin(a))*cos(2*log(c)) - (cos(
2*a)*cos(a) + sin(2*a)*sin(a))*sin(2*log(c)))*cos(4*log(c)) + ((cos(2*a)*co
s(a) + sin(2*a)*sin(a))*cos(2*log(c)) + (cos(a)*sin(2*a) - cos(2*a)*sin(a))
*sin(2*log(c)))*sin(4*log(c)))*x*e^(m*log(x) + 10*arctan2(sin(1/2*m*log(x))
, cos(1/2*m*log(x))) + 10*arctan2(sin(1/2*log(x)), cos(1/2*log(x)))) - (((c
os(a)*sin(4*a) - cos(4*a)*sin(a))*cos(2*log(c)) - (cos(4*a)*cos(a) + sin(4*
a)*sin(a))*sin(2*log(c)))*cos(8*log(c)) + ((cos(4*a)*cos(a) + sin(4*a)*sin(
a))*cos(2*log(c)) + (cos(a)*sin(4*a) - cos(4*a)*sin(a))*sin(2*log(c)))*sin(
8*log(c)))*x*e^(m*log(x) + 6*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x)))
+ 6*arctan2(sin(1/2*log(x)), cos(1/2*log(x)))))/((cos(4*a)^2 + sin(4*a)^2)*
cos(8*log(c))^2 + (cos(4*a)^2 + sin(4*a)^2)*sin(8*log(c))^2 + ((cos(4*a)^2
+ sin(4*a)^2)*cos(8*log(c))^2 + (cos(4*a)^2 + sin(4*a)^2)*sin(8*log(c))^2)*
m + (m + 1)*e^(16*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 16*arctan
2(sin(1/2*log(x)), cos(1/2*log(x)))) - 4*((cos(2*a)*cos(4*log(c)) - sin(2*a
)*sin(4*log(c)))*m + cos(2*a)*cos(4*log(c)) - sin(2*a)*sin(4*log(c)))*e^(12
*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 12*arctan2(sin(1/2*log(x))
, cos(1/2*log(x)))) + 2*(2*(cos(2*a)^2 + sin(2*a)^2)*cos(4*log(c))^2 + 2*(c
os(2*a)^2 + sin(2*a)^2)*sin(4*log(c))^2 + (2*(cos(2*a)^2 + sin(2*a)^2)*cos(
4*log(c))^2 + 2*(cos(2*a)^2 + sin(2*a)^2)*sin(4*log(c))^2 + cos(4*a)*cos(8*
log(c)) - sin(4*a)*sin(8*log(c)))*m + cos(4*a)*cos(8*log(c)) - sin(4*a)*sin
(8*log(c)))*e^(8*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log(x))) + 8*arctan2(
sin(1/2*log(x)), cos(1/2*log(x)))) - 4*((((cos(4*a)*cos(2*a) + sin(4*a)*sin
(2*a))*cos(4*log(c)) + (cos(2*a)*sin(4*a) - cos(4*a)*sin(2*a))*sin(4*log(c)
))*cos(8*log(c)) - ((cos(2*a)*sin(4*a) - cos(4*a)*sin(2*a))*cos(4*log(c)) -
 (cos(4*a)*cos(2*a) + sin(4*a)*sin(2*a))*sin(4*log(c)))*sin(8*log(c)))*m +
((cos(4*a)*cos(2*a) + sin(4*a)*sin(2*a))*cos(4*log(c)) + (cos(2*a)*sin(4*a)
 - cos(4*a)*sin(2*a))*sin(4*log(c)))*cos(8*log(c)) - ((cos(2*a)*sin(4*a) -
cos(4*a)*sin(2*a))*cos(4*log(c)) - (cos(4*a)*cos(2*a) + sin(4*a)*sin(2*a))*
sin(4*log(c)))*sin(8*log(c)))*e^(4*arctan2(sin(1/2*m*log(x)), cos(1/2*m*log
(x))) + 4*arctan2(sin(1/2*log(x)), cos(1/2*log(x)))))
```

mupad [B] time = 6.96, size = 171, normalized size = 1.55

$$\frac{\frac{x^{m+1}\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(c\,x^{\frac{\sqrt{-m^2-2\,m-1}}{2}}\right)^{6\mathrm{i}}\,\left(\mathrm{e}^{a\,2\mathrm{i}}+\mathrm{e}^{a\,2\mathrm{i}}\,\sqrt{-{\left(m+1\right)}^2}\,1\mathrm{i}+m\,\mathrm{e}^{a\,2\mathrm{i}}\right)}{\sqrt{-{\left(m+1\right)}^2}}+\frac{x^{m+1}\,\mathrm{e}^{a\,1\mathrm{i}}\,\left(c\,x^{\frac{\sqrt{-m^2-2\,m-1}}{2}}\right)^{2\mathrm{i}}\,\left(m+1-\sqrt{-{\left(m+1\right)}^2}\,1\mathrm{i}\right)}{\sqrt{-{\left(m+1\right)}^2}}}{\left(m+1\right)\,{\left(\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^{\frac{\sqrt{-m^2-2\,m-1}}{2}}\right)}^{4\mathrm{i}}-1\right)}^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/sin(a + 2*log(c*x^((-(m + 1)^2)^(1/2)/2)))^3,x)
```

```
[Out] ((x^(m + 1)*exp(a*1i)*(c*x^((- 2*m - m^2 - 1)^(1/2)/2))^6i*(exp(a*2i) + exp
(a*2i)*(-(m + 1)^2)^(1/2)*1i + m*exp(a*2i)))/(-(m + 1)^2)^(1/2) + (x^(m + 1
)*exp(a*1i)*(c*x^((- 2*m - m^2 - 1)^(1/2)/2))^2i*(m - (-(m + 1)^2)^(1/2)*1i
 + 1))/(-(m + 1)^2)^(1/2))/((m + 1)*(exp(a*2i)*(c*x^((- 2*m - m^2 - 1)^(1/2
)/2))^4i - 1)^2)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*csc(a+2*ln(c*x**(1/2*(-(1+m)**2)**(1/2))))**3,x)
```

```
[Out] Timed out
```

3.303 $\int x \csc^3\left(a+2\log\left(cx^i\right)\right)\,dx$

Optimal. Leaf size=49

$$-\frac{ie^{ia}x^2\left(cx^i\right)^{2i}}{\left(1-e^{2ia}\left(cx^i\right)^{4i}\right)^2}$$

```
[Out] -I*exp(I*a)*(c*x^I)^(2*I)*x^2/(1-exp(2*I*a)*(c*x^I)^(4*I))^2
```

Rubi [A] time = 0.04, antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4510, 4506, 261}

$$-\frac{ie^{ia}x^2\left(cx^i\right)^{2i}}{\left(1-e^{2ia}\left(cx^i\right)^{4i}\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*Csc[a + 2*Log[c*x^I]]^3,x]
```

```
[Out] ((-I)*E^(I*a)*(c*x^I)^(2*I)*x^2)/(1 - E^((2*I)*a)*(c*x^I)^(4*I))^2
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\csc^3\left(a+2\log\left(cx^i\right)\right)\,dx = -\left(\left(i\left(cx^i\right)^{2i}x^2\right)\text{Subst}\left(\int x^{-1-2i}\csc^3(a+2\log(x))\,dx,x,cx^i\right)\right)$$

$$= \left(8e^{3ia}\left(cx^i\right)^{2i}x^2\right)\text{Subst}\left(\int\frac{x^{-1+4i}}{\left(1-e^{2ia}x^{4i}\right)^3}\,dx,x,cx^i\right)$$

$$= -\frac{ie^{ia}\left(cx^i\right)^{2i}x^2}{\left(1-e^{2ia}\left(cx^i\right)^{4i}\right)^2}$$

Mathematica [B] time = 0.21, size = 127, normalized size = 2.59

$$\frac{\csc^2\left(a+2\log\left(cx^i\right)\right)\left(\left(2x^4+1\right)\sin\left(a+2\log\left(cx^i\right)-2i\log(x)\right)+i\left(2x^4-1\right)\cos\left(a+2\log\left(cx^i\right)-2i\log(x)\right)\right)\left(\right.}{4x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*Csc[a + 2*Log[c*x^I]]^3,x]
```

```
[Out] (Csc[a + 2*Log[c*x^I]]^2*(I*(-1 + 2*x^4)*Cos[a + 2*Log[c*x^I] - (2*I)*Log[x
]] + (1 + 2*x^4)*Sin[a + 2*Log[c*x^I] - (2*I)*Log[x]])*(Cos[2*(a + 2*Log[c*
x^I] - (2*I)*Log[x])] + I*Sin[2*(a + 2*Log[c*x^I] - (2*I)*Log[x])]))/(4*x^4
)
```

fricas [A] time = 0.88, size = 56, normalized size = 1.14

$$\frac{-2i\,x^4e^{\left(3i\,a+6i\,\log(c)\right)}+i\,e^{\left(5i\,a+10i\,\log(c)\right)}}{x^8-2\,x^4e^{\left(2i\,a+4i\,\log(c)\right)}+e^{\left(4i\,a+8i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+2*log(c*x^I))^3,x, algorithm="fricas")
```

```
[Out] (-2*I*x^4*e^(3*I*a + 6*I*log(c)) + I*e^(5*I*a + 10*I*log(c)))/(x^8 - 2*x^4*
e^(2*I*a + 4*I*log(c)) + e^(4*I*a + 8*I*log(c)))
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\csc\left(a+2\,\log\left(cx^i\right)\right)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+2*log(c*x^I))^3,x, algorithm="giac")
```

```
[Out] integrate(x*csc(a + 2*log(c*x^I))^3, x)
```

maple [C] time = 0.18, size = 211, normalized size = 4.31

$$-\frac{i x^{2} c^{2 i} \left(x^{i}\right)^{2 i} {\mathrm e}^{\pi \mathrm{csgn}\left(i c\,x^{i}\right)^{3}-\pi \mathrm{csgn}\left(i c\,x^{i}\right)^{2} \mathrm{csgn}\left(i c\right)-\pi \mathrm{csgn}\left(i c\,x^{i}\right)^{2} \mathrm{csgn}\left(i x^{i}\right)+\pi \,\mathrm{csgn}\left(i c\,x^{i}\right) \mathrm{csgn}\left(i c\right) \mathrm{csgn}\left(i x^{i}\right)+i a}}{\left(\left(x^{i}\right)^{4 i} c^{4 i} {\mathrm e}^{2 \pi \mathrm{csgn}\left(i c\,x^{i}\right)^{3}} {\mathrm e}^{-2 \pi \mathrm{csgn}\left(i c\,x^{i}\right)^{2} \mathrm{csgn}\left(i c\right)} {\mathrm e}^{-2 \pi \mathrm{csgn}\left(i c\,x^{i}\right)^{2} \mathrm{csgn}\left(i x^{i}\right)} {\mathrm e}^{2 \pi \,\mathrm{csgn}\left(i c\,x^{i}\right) \mathrm{csgn}\left(i c\right) \mathrm{csgn}\left(i x^{i}\right)} {\mathrm e}^{2 i a}-1\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*csc(a+2*ln(c*x^I))^3,x)
```

```
[Out] -I*x^2*c^(2*I)*(x^I)^(2*I)*exp(Pi*csgn(I*c*x^I)^3-Pi*csgn(I*c*x^I)^2*csgn(I
*c)-Pi*csgn(I*c*x^I)^2*csgn(I*x^I)+Pi*csgn(I*c*x^I)*csgn(I*c)*csgn(I*x^I)+I
*a)/(((x^I)^(2*I))^2*(c^(2*I))^2*exp(2*Pi*csgn(I*c*x^I)^3)*exp(-2*Pi*csgn(I
*c*x^I)^2*csgn(I*c))*exp(-2*Pi*csgn(I*c*x^I)^2*csgn(I*x^I))*exp(2*Pi*csgn(I
*c*x^I)*csgn(I*c)*csgn(I*x^I))*exp(2*I*a)-1)^2
```

maxima [B] time = 0.39, size = 142, normalized size = 2.90

$$\frac{\left(\left(-i \cos\left(a\right) + \sin\left(a\right)\right) \cos\left(2 \log\left(c\right)\right) + \left(\cos\left(a\right) + i \sin}{\left(\cos\left(4 a\right) + i \sin\left(4 a\right)\right) \cos\left(8 \log\left(c\right)\right) - \left(\left(2 \cos\left(2 a\right) + 2i \sin\left(2 a\right)\right) \cos\left(4 \log\left(c\right)\right) + 2 \left(i \cos\left(2 a\right) - \sin\left(2 a\right)\right) \sin}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+2*log(c*x^I))^3,x, algorithm="maxima")
```

```
[Out] ((-I*cos(a) + sin(a))*cos(2*log(c)) + (cos(a) + I*sin(a))*sin(2*log(c)))*x^
2*e^(6*arctan2(sin(log(x)), cos(log(x))))/((cos(4*a) + I*sin(4*a))*cos(8*lo
g(c)) - ((2*cos(2*a) + 2*I*sin(2*a))*cos(4*log(c)) + 2*(I*cos(2*a) - sin(2*
a))*sin(4*log(c)))*e^(4*arctan2(sin(log(x)), cos(log(x)))) + (I*cos(4*a) -
sin(4*a))*sin(8*log(c)) + e^(8*arctan2(sin(log(x)), cos(log(x)))))
```

mupad [B] time = 4.41, size = 45, normalized size = 0.92

$$-\frac{x^2\,{\mathrm{e}}^{a\,1{}\mathrm{i}}\,{\left(c\,x^{1{}\mathrm{i}}\right)}^{2{}\mathrm{i}}\,1{}\mathrm{i}}{1+{\mathrm{e}}^{a\,4{}\mathrm{i}}\,{\left(c\,x^{1{}\mathrm{i}}\right)}^{8{}\mathrm{i}}-2\,{\mathrm{e}}^{a\,2{}\mathrm{i}}\,{\left(c\,x^{1{}\mathrm{i}}\right)}^{4{}\mathrm{i}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/sin(a + 2*log(c*x^1i))^3,x)
```

```
[Out] -(x^2*exp(a*1i)*(c*x^1i)^2i*1i)/(exp(a*4i)*(c*x^1i)^8i - 2*exp(a*2i)*(c*x^1
i)^4i + 1)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\csc^3\left(a+2\log\left(cx^i\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+2*ln(c*x**I))**3,x)
```

```
[Out] Integral(x*csc(a + 2*log(c*x**I))**3, x)
```

3.304 $\int \csc^3\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\,dx$

Optimal. Leaf size=58

$$\frac{1}{2}x\csc\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)+\frac{1}{2}ix\cot\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\csc\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)$$

```
[Out] 1/2*x*csc(a+2*ln(c*x^(1/2*I)))+1/2*I*x*cot(a+2*ln(c*x^(1/2*I)))*csc(a+2*ln(
c*x^(1/2*I)))
```

Rubi [A] time = 0.04, antiderivative size = 51, normalized size of antiderivative = 0.88, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4504, 4506, 261}

$$-\frac{2ie^{ia}x\left(cx^{\frac{i}{2}}\right)^{2i}}{\left(1-e^{2ia}\left(cx^{\frac{i}{2}}\right)^{4i}\right)^2}$$

Warning: Unable to verify antiderivative.

```
[In] Int[Csc[a + 2*Log[c*x^(I/2)]]^3,x]
```

```
[Out] ((-2*I)*E^(I*a)*(c*x^(I/2))^(2*I)*x)/(1 - E^((2*I)*a)*(c*x^(I/2))^(4*I))^2
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \csc^3\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\,dx = -\left(\left(2i\left(cx^{\frac{i}{2}}\right)^{2i}x\right)\text{Subst}\left(\int x^{-1-2i}\csc^3(a+2\log(x))\,dx,x,cx^{\frac{i}{2}}\right)\right)$$
$$= \left(16e^{3ia}\left(cx^{\frac{i}{2}}\right)^{2i}x\right)\text{Subst}\left(\int \frac{x^{-1+4i}}{\left(1-e^{2ia}x^{4i}\right)^3}\,dx,x,cx^{\frac{i}{2}}\right)$$
$$= -\frac{2ie^{ia}\left(cx^{\frac{i}{2}}\right)^{2i}x}{\left(1-e^{2ia}\left(cx^{\frac{i}{2}}\right)^{4i}\right)^2}$$

Mathematica [B] time = 0.17, size = 137, normalized size = 2.36

$$\frac{\csc^2\left(a+2\log\left(cx^{\frac{i}{2}}\right)\right)\left(\left(2x^2+1\right)\sin\left(a+2\log\left(cx^{\frac{i}{2}}\right)-i\log(x)\right)+i\left(2x^2-1\right)\cos\left(a+2\log\left(cx^{\frac{i}{2}}\right)-i\log(x)\right)\right)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + 2*Log[c*x^(I/2)]]^3,x]
```

```
[Out] (Csc[a + 2*Log[c*x^(I/2)]]^2*(I*(-1 + 2*x^2)*Cos[a + 2*Log[c*x^(I/2)] - I*L
og[x]] + (1 + 2*x^2)*Sin[a + 2*Log[c*x^(I/2)] - I*Log[x]])*(Cos[2*(a + 2*Lo
g[c*x^(I/2)] - I*Log[x])] + I*Sin[2*(a + 2*Log[c*x^(I/2)] - I*Log[x])]))/(2
*x^2)
```

fricas [A] time = 1.12, size = 56, normalized size = 0.97

$$\frac{-4i\,x^2e^{\left(3i\,a+6i\,\log(c)\right)}+2i\,e^{\left(5i\,a+10i\,\log(c)\right)}}{x^4-2\,x^2e^{\left(2i\,a+4i\,\log(c)\right)}+e^{\left(4i\,a+8i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*log(c*x^(1/2*I)))^3,x, algorithm="fricas")
```

```
[Out] (-4*I*x^2*e^(3*I*a + 6*I*log(c)) + 2*I*e^(5*I*a + 10*I*log(c)))/(x^4 - 2*x^
2*e^(2*I*a + 4*I*log(c)) + e^(4*I*a + 8*I*log(c)))
```

giac [A] time = 2.66, size = 74, normalized size = 1.28

$$\frac{2i\,c^{10i}e^{(5i\,a)}}{c^{8i}e^{(4i\,a)}-2\,c^{4i}x^2e^{(2i\,a)}+x^4}-\frac{4i\,c^{6i}x^2e^{(3i\,a)}}{c^{8i}e^{(4i\,a)}-2\,c^{4i}x^2e^{(2i\,a)}+x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*log(c*x^(1/2*I)))^3,x, algorithm="giac")
```

```
[Out] 2*I*c^(10*I)*e^(5*I*a)/(c^(8*I)*e^(4*I*a) - 2*c^(4*I)*x^2*e^(2*I*a) + x^4)
- 4*I*c^(6*I)*x^2*e^(3*I*a)/(c^(8*I)*e^(4*I*a) - 2*c^(4*I)*x^2*e^(2*I*a) +
x^4)
```

maple [C] time = 0.17, size = 209, normalized size = 3.60

$$-\frac{2 i x c^{2i} \left(x^{\frac{i}{2}}\right)^{2i} \mathrm{e}^{\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right)^{3}-\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right)^{2} \operatorname{csgn}(i c)-\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right)^{2} \operatorname{csgn}\left(i x^{\frac{i}{2}}\right)+\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right) \operatorname{csgn}(i c) \operatorname{csgn}\left(i x^{\frac{i}{2}}\right)+i a}}{\left(\left(x^{\frac{i}{2}}\right)^{4i} c^{4i} \mathrm{e}^{2\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right)^{3}} \mathrm{e}^{-2\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right)^{2} \operatorname{csgn}(i c)} \mathrm{e}^{-2\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right)^{2} \operatorname{csgn}\left(i x^{\frac{i}{2}}\right)} \mathrm{e}^{2\pi \operatorname{csgn}\left(i c x^{\frac{i}{2}}\right) \operatorname{csgn}(i c) \operatorname{csgn}\left(i x^{\frac{i}{2}}\right)} \mathrm{e}^{2 i a}-1\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+2*ln(c*x^(1/2*I)))^3,x)
```

```
[Out] -2*I*x*c^(2*I)*(x^(1/2*I))^(2*I)*exp(Pi*csgn(I*c*x^(1/2*I))^3-Pi*csgn(I*c*x
^(1/2*I))^2*csgn(I*c)-Pi*csgn(I*c*x^(1/2*I))^2*csgn(I*x^(1/2*I))+Pi*csgn(I*
c*x^(1/2*I))*csgn(I*c)*csgn(I*x^(1/2*I))+I*a)/(((x^(1/2*I))^(2*I))^2*(c^(2*
I))^2*exp(2*Pi*csgn(I*c*x^(1/2*I))^3)*exp(-2*Pi*csgn(I*c*x^(1/2*I))^2*csgn(
I*c))*exp(-2*Pi*csgn(I*c*x^(1/2*I))^2*csgn(I*x^(1/2*I)))*exp(2*Pi*csgn(I*c*
x^(1/2*I))*csgn(I*c)*csgn(I*x^(1/2*I)))*exp(2*I*a)-1)^2
```

maxima [B] time = 0.40, size = 159, normalized size = 2.74

$$-\frac{\left(2\left(i \cos(a) - \sin(a)\right) \cos\left(2 \log(c)\right) - (2 \cos(a) + \cdots}{(\cos(4a) + i \sin(4a)) \cos\left(8 \log(c)\right) - \left((2 \cos(2a) + 2i \sin(2a)) \cos\left(4 \log(c)\right) + 2(i \cos(2a) - \sin(2a)) \sin\cdots\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*log(c*x^(1/2*I)))^3,x, algorithm="maxima")
```

```
[Out] -(2*(I*cos(a) - sin(a))*cos(2*log(c)) - (2*cos(a) + 2*I*sin(a))*sin(2*log(c
)))*x*e^(6*arctan2(sin(1/2*log(x)), cos(1/2*log(x))))/((cos(4*a) + I*sin(4*
a))*cos(8*log(c)) - ((2*cos(2*a) + 2*I*sin(2*a))*cos(4*log(c)) + 2*(I*cos(2
*a) - sin(2*a))*sin(4*log(c)))*e^(4*arctan2(sin(1/2*log(x)), cos(1/2*log(x)
))) + (I*cos(4*a) - sin(4*a))*sin(8*log(c)) + e^(8*arctan2(sin(1/2*log(x)),
 cos(1/2*log(x)))))
```

mupad [B] time = 4.54, size = 55, normalized size = 0.95

$$-\frac{x\,\mathrm{e}^{a\,1\mathrm{i}}\,{\left(c\,x^{\frac{1}{2}\mathrm{i}}\right)}^{2\mathrm{i}}\,2\mathrm{i}}{1+\mathrm{e}^{a\,4\mathrm{i}}\,{\left(c\,x^{\frac{1}{2}\mathrm{i}}\right)}^{8\mathrm{i}}-2\,\mathrm{e}^{a\,2\mathrm{i}}\,{\left(c\,x^{\frac{1}{2}\mathrm{i}}\right)}^{4\mathrm{i}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + 2*log(c*x^(1i/2)))^3,x)
```

```
[Out] -(x*exp(a*1i)*(c*x^(1i/2))^2i*2i)/(exp(a*4i)*(c*x^(1i/2))^8i - 2*exp(a*2i)*
(c*x^(1i/2))^4i + 1)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^{3}\left(a + 2\log\left(cx^{\frac{i}{2}}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*ln(c*x**(1/2*I)))**3,x)
```

```
[Out] Integral(csc(a + 2*log(c*x**(I/2)))**3, x)
```

3.305 $\int \csc^3\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)\,dx$

Optimal. Leaf size=51

$$\frac{2ie^{3ia}x\left(cx^{-\frac{i}{2}}\right)^{6i}}{\left(1-e^{2ia}\left(cx^{-\frac{i}{2}}\right)^{4i}\right)^2}$$

```
[Out] 2*I*exp(3*I*a)*(c/(x^(1/2*I)))^(6*I)*x/(1-exp(2*I*a)*(c/(x^(1/2*I)))^(4*I))
^2
```

Rubi [A] time = 0.04, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176, Rules used = {4504, 4506, 264}

$$\frac{2ie^{3ia}x\left(cx^{-\frac{i}{2}}\right)^{6i}}{\left(1-e^{2ia}\left(cx^{-\frac{i}{2}}\right)^{4i}\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + 2*Log[c/x^(I/2)]]^3,x]
```

```
[Out] ((2*I)*E^((3*I)*a)*(c/x^(I/2))^(6*I)*x)/(1 - E^((2*I)*a)*(c/x^(I/2))^(4*I))
^2
```

Rule 264

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[((c
*x)^(m + 1)*(a + b*x^n)^(p + 1))/(a*c*(m + 1)), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
```

```
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rubi steps

$$\int \csc^3\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)dx = \left(2i\left(cx^{-\frac{i}{2}}\right)^{-2i}x\right)\text{Subst}\left(\int x^{-1+2i}\csc^3(a+2\log(x))\,dx,x,cx^{-\frac{i}{2}}\right)$$
$$= -\left(\left(16e^{3ia}\left(cx^{-\frac{i}{2}}\right)^{-2i}x\right)\text{Subst}\left(\int \frac{x^{-1+8i}}{\left(1-e^{2ia}x^{4i}\right)^3}\,dx,x,cx^{-\frac{i}{2}}\right)\right)$$
$$= \frac{2ie^{3ia}\left(cx^{-\frac{i}{2}}\right)^{6i}x}{\left(1-e^{2ia}\left(cx^{-\frac{i}{2}}\right)^{4i}\right)^2}$$

Mathematica [B] time = 0.17, size = 137, normalized size = 2.69

$$-\frac{\csc^2\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)\left(i\left(2x^2+1\right)\sin\left(a+2\log\left(cx^{-\frac{i}{2}}\right)+i\log(x)\right)+\left(2x^2-1\right)\cos\left(a+2\log\left(cx^{-\frac{i}{2}}\right)+i\log(\right.\right.}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + 2*Log[c/x^(I/2)]]^3,x]
```

```
[Out] -1/2*(Csc[a + 2*Log[c/x^(I/2)]]^2*((-1 + 2*x^2)*Cos[a + 2*Log[c/x^(I/2)] +
I*Log[x]] + I*(1 + 2*x^2)*Sin[a + 2*Log[c/x^(I/2)] + I*Log[x]])*(I*Cos[2*(a
 + 2*Log[c/x^(I/2)] + I*Log[x])] + Sin[2*(a + 2*Log[c/x^(I/2)] + I*Log[x])]
))/x^2
```

fricas [B] time = 1.46, size = 56, normalized size = 1.10

$$\frac{4i\,x^2e^{\left(2i\,a+4i\,\log(c)\right)}-2i}{x^4e^{\left(5i\,a+10i\,\log(c)\right)}-2\,x^2e^{\left(3i\,a+6i\,\log(c)\right)}+e^{\left(i\,a+2i\,\log(c)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*log(c/(x^(1/2*I))))^3,x, algorithm="fricas")
```

```
[Out] (4*I*x^2*e^(2*I*a + 4*I*log(c)) - 2*I)/(x^4*e^(5*I*a + 10*I*log(c)) - 2*x^2
*e^(3*I*a + 6*I*log(c)) + e^(I*a + 2*I*log(c)))
```

giac [B] time = 2.61, size = 83, normalized size = 1.63

$$\frac{4i\,c^{4i}x^{2}e^{(2i\,a)}}{c^{10i}x^{4}e^{(5i\,a)}-2\,c^{6i}x^{2}e^{(3i\,a)}+c^{2i}e^{(i\,a)}}-\frac{2i}{c^{10i}x^{4}e^{(5i\,a)}-2\,c^{6i}x^{2}e^{(3i\,a)}+c^{2i}e^{(i\,a)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*log(c/(x^(1/2*I))))^3,x, algorithm="giac")
```

```
[Out] 4*I*c^(4*I)*x^2*e^(2*I*a)/(c^(10*I)*x^4*e^(5*I*a) - 2*c^(6*I)*x^2*e^(3*I*a)
 + c^(2*I)*e^(I*a)) - 2*I/(c^(10*I)*x^4*e^(5*I*a) - 2*c^(6*I)*x^2*e^(3*I*a)
 + c^(2*I)*e^(I*a))
```

maple [C] time = 0.18, size = 239, normalized size = 4.69

$$\frac{2ix\left(x^{\frac{i}{2}}\right)^{-6i}c^{6i}\mathrm{e}^{3\pi\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)^{3}-3\pi\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}(ic)-3\pi\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)+3\pi\,\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)\mathrm{csgn}(ic)\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)+3ia}}{\left(\left(x^{\frac{i}{2}}\right)^{-4i}c^{4i}\mathrm{e}^{2\pi\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)^{3}}\mathrm{e}^{-2\pi\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}(ic)}\mathrm{e}^{-2\pi\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)^{2}\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)}\mathrm{e}^{2\pi\,\mathrm{csgn}\left(ic\,x^{-\frac{i}{2}}\right)\mathrm{csgn}(ic)\mathrm{csgn}\left(ix^{-\frac{i}{2}}\right)}\mathrm{e}^{2ia}-1\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+2*ln(c/(x^(1/2*I))))^3,x)
```

```
[Out] 2*I*x*((x^(1/2*I))^(-2*I))^3*(c^(2*I))^3*exp(3*Pi*csgn(I*c/(x^(1/2*I)))^3-3
*Pi*csgn(I*c/(x^(1/2*I)))^2*csgn(I*c)-3*Pi*csgn(I*c/(x^(1/2*I)))^2*csgn(I/(
x^(1/2*I)))+3*Pi*csgn(I*c/(x^(1/2*I)))*csgn(I*c)*csgn(I/(x^(1/2*I)))+3*I*a)
/(((x^(1/2*I))^(-2*I))^2*(c^(2*I))^2*exp(2*Pi*csgn(I*c/(x^(1/2*I)))^3)*exp(
-2*Pi*csgn(I*c/(x^(1/2*I)))^2*csgn(I*c))*exp(-2*Pi*csgn(I*c/(x^(1/2*I)))^2*
csgn(I/(x^(1/2*I))))*exp(2*Pi*csgn(I*c/(x^(1/2*I)))*csgn(I*c)*csgn(I/(x^(1/
2*I))))*exp(2*I*a)-1)^2
```

maxima [B] time = 0.40, size = 166, normalized size = 3.25

$$\frac{\left(2\left(i\,\cos\left(3\,a\right)-\sin\left(3\,a\right)\right)\cos\left(6\,\log(c)\right)-\left(2\,\cos\left(3\,a\right.\right.}{\left(\left(\cos\left(4\,a\right)+i\,\sin\left(4\,a\right)\right)\cos\left(8\,\log(c)\right)-\left(-i\,\cos\left(4\,a\right)+\sin\left(4\,a\right)\right)\sin\left(8\,\log(c)\right)\right)e^{\left(8\,\arctan\left(\sin\left(\frac{1}{2}\,\log(x)\right),\cos\left(\frac{1}{2}\,\log(x)\right)\right)\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*log(c/(x^(1/2*I))))^3,x, algorithm="maxima")
```

```
[Out] (2*(I*cos(3*a) - sin(3*a))*cos(6*log(c)) - (2*cos(3*a) + 2*I*sin(3*a))*sin(
6*log(c)))*x*e^(6*arctan2(sin(1/2*log(x)), cos(1/2*log(x))))/(((cos(4*a) +
```

```
I*sin(4*a))*cos(8*log(c)) - (-I*cos(4*a) + sin(4*a))*sin(8*log(c)))*e^(8*ar
ctan2(sin(1/2*log(x)), cos(1/2*log(x)))) - ((2*cos(2*a) + 2*I*sin(2*a))*cos
(4*log(c)) - 2*(-I*cos(2*a) + sin(2*a))*sin(4*log(c)))*e^(4*arctan2(sin(1/2
*log(x)), cos(1/2*log(x)))) + 1)
```

mupad [B] time = 6.32, size = 38, normalized size = 0.75

$$\frac{x\,\mathrm{e}^{a\,3\mathrm{i}}\left(\frac{c}{x^{\frac{1}{2}\mathrm{i}}}\right)^{6\mathrm{i}}\,2\mathrm{i}}{\left(\mathrm{e}^{a\,2\mathrm{i}}\left(\frac{c}{x^{\frac{1}{2}\mathrm{i}}}\right)^{4\mathrm{i}}-1\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/sin(a + 2*log(c/x^(1i/2)))^3,x)
```

```
[Out] (x*exp(a*3i)*(c/x^(1i/2))^6i*2i)/(exp(a*2i)*(c/x^(1i/2))^4i - 1)^2
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^3\left(a+2\log\left(cx^{-\frac{i}{2}}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+2*ln(c/(x**(1/2*I))))**3,x)
```

```
[Out] Integral(csc(a + 2*log(c*x**(-I/2)))**3, x)
```

3.306 $\int \csc^p\left(a+\frac{i\log(cx^n)}{n(-2+p)}\right)\,dx$

Optimal. Leaf size=96

$$-\frac{e^{-2ia}(2-p)x\left(cx^n\right)^{-\frac{2}{n(2-p)}}\left(1-e^{2ia}\left(cx^n\right)^{\frac{2}{n(2-p)}}\right)\csc^p\left(a-\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

```
[Out] -1/2*(2-p)*x*(1-exp(2*I*a)*(c*x^n)^(2/n/(2-p)))*csc(a-I*ln(c*x^n)/n/(2-p))^
p/exp(2*I*a)/(1-p)/((c*x^n)^(2/n/(2-p)))
```

Rubi [A] time = 0.09, antiderivative size = 96, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4504, 4508, 261}

$$-\frac{e^{-2ia}(2-p)x\left(cx^n\right)^{-\frac{2}{n(2-p)}}\left(1-e^{2ia}\left(cx^n\right)^{\frac{2}{n(2-p)}}\right)\csc^p\left(a-\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] -((2 - p)*x*(1 - E^((2*I)*a)*(c*x^n)^(2/(n*(2 - p))))*Csc[a - (I*Log[c*x^n]
)/(n*(2 - p))]^p)/(2*E^((2*I)*a)*(1 - p)*(c*x^n)^(2/(n*(2 - p))))
```

Rule 261

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a + b*x^n)
^(p + 1)/(b*n*(p + 1)), x] /; FreeQ[{a, b, m, n, p}, x] && EqQ[m, n - 1] &&
 NeQ[p, -1]
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \csc^p\left(a+\frac{i\log(cx^n)}{n(-2+p)}\right)dx = \frac{\left(x(cx^n)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^p\left(a+\frac{i\log(x)}{n(-2+p)}\right)dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x(cx^n)^{-\frac{1}{n}+\frac{p}{n(-2+p)}}\left(1-e^{2ia}(cx^n)^{-\frac{2}{n(-2+p)}}\right)^p\csc^p\left(a+\frac{i\log(cx^n)}{n(-2+p)}\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}-\frac{p}{n(-2}}\right.}{n}$$

$$= -\frac{e^{-2ia}(2-p)x(cx^n)^{-\frac{2}{n(2-p)}}\left(1-e^{2ia}(cx^n)^{\frac{2}{n(2-p)}}\right)\csc^p\left(a-\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Mathematica [A] time = 2.11, size = 155, normalized size = 1.61

$$\frac{2^{p-1}(p-2)xe^{-\frac{2iap}{p-2}}\left(e^{\frac{2iap}{p-2}}-e^{\frac{4ia}{p-2}}(cx^n)^{\frac{2}{n(p-2)}}\right)\left(-\frac{ie^{\frac{ia(p+2)}{p-2}}(cx^n)^{\frac{1}{n(p-2)}}}{e^{\frac{4ia}{p-2}}(cx^n)^{\frac{2}{n(p-2)}}-e^{\frac{2iap}{p-2}}}\right)^p}{p-1}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] (2^(-1 + p)*(-2 + p)*x*(E^(((2*I)*a*p)/(-2 + p)) - E^(((4*I)*a)/(-2 + p))*(
c*x^n)^(2/(n*(-2 + p))))*(((-I)*E^((I*a*(2 + p))/(-2 + p))*(c*x^n)^(1/(n*(-
2 + p))))/(-E^(((2*I)*a*p)/(-2 + p)) + E^(((4*I)*a)/(-2 + p))*(c*x^n)^(2/(n
*(-2 + p)))))^p)/(E^(((2*I)*a*p)/(-2 + p))*(-1 + p))
```

fricas [A] time = 0.95, size = 150, normalized size = 1.56

$$\frac{\left((p-2)xe^{\left(\frac{2\left(ianp-2ian-n\log(x)-\log(c)\right)}{np-2n}\right)}-(p-2)x\right)\left(\frac{2ie^{\left(\frac{ianp-2ian-n\log(x)-\log(c)}{np-2n}\right)}}{e^{\left(\frac{2\left(ianp-2ian-n\log(x)-\log(c)\right)}{np-2n}\right)}-1}\right)^p e^{\left(-\frac{2\left(ianp-2ian-n\log(x)-\log(c)\right)}{np-2n}\right)}}{2(p-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+I*log(c*x^n)/n/(-2+p))^p,x, algorithm="fricas")
```

```
[Out] 1/2*((p - 2)*x*e^(2*(I*a*n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) -
(p - 2)*x)*(2*I*e^((I*a*n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(e^
```

```
(2*(I*a*n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) - 1))^p*e^(-2*(I*a*
n*p - 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(p - 1)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(a + \frac{i \log\left(cx^n\right)}{n(p-2)}\right)^p dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+I*log(c*x^n)/n/(-2+p))^p,x, algorithm="giac")
[Out] integrate(csc(a + I*log(c*x^n)/(n*(p - 2)))^p, x)
```

maple [F] time = 0.25, size = 0, normalized size = 0.00

$$\int \csc^p\left(a + \frac{i \ln\left(c\, x^n\right)}{n\left(-2+p\right)}\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+I*ln(c*x^n)/n/(-2+p))^p,x)
[Out] int(csc(a+I*ln(c*x^n)/n/(-2+p))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(a + \frac{i \log\left(cx^n\right)}{n(p-2)}\right)^p dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+I*log(c*x^n)/n/(-2+p))^p,x, algorithm="maxima")
[Out] integrate(csc(a + I*log(c*x^n)/(n*(p - 2)))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \left(\frac{1}{\sin\left(a + \frac{\ln\left(c\, x^n\right) 1i}{n\left(p-2\right)}\right)}\right)^p dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + (log(c*x^n)*1i)/(n*(p - 2))))^p,x)
[Out] int((1/sin(a + (log(c*x^n)*1i)/(n*(p - 2))))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^{p}\left(a+\frac{i\log\left(cx^{n}\right)}{n\left(p-2\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+I*ln(c*x**n)/n/(-2+p))**p,x)
[Out] Integral(csc(a + I*log(c*x**n)/(n*(p - 2)))**p, x)
```

3.307 $\int \csc^p\left(a-\frac{i\log(cx^n)}{n(-2+p)}\right)\,dx$

Optimal. Leaf size=71

$$\frac{(2-p)x\left(1-e^{2ia}\left(cx^n\right)^{-\frac{2}{n(2-p)}}\right)\csc^p\left(a+\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

```
[Out] 1/2*(2-p)*x*(1-exp(2*I*a)/((c*x^n)^(2/n/(2-p))))*csc(a+I*ln(c*x^n)/n/(2-p))
^p/(1-p)
```

Rubi [A] time = 0.08, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {4504, 4508, 264}

$$\frac{(2-p)x\left(1-e^{2ia}\left(cx^n\right)^{-\frac{2}{n(2-p)}}\right)\csc^p\left(a+\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a - (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] ((2 - p)*x*(1 - E^((2*I)*a)/(c*x^n)^(2/(n*(2 - p))))*Csc[a + (I*Log[c*x^n])
/(n*(2 - p))]^p)/(2*(1 - p))
```

Rule 264

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[((c
*x)^(m + 1)*(a + b*x^n)^(p + 1))/(a*c*(m + 1)), x] /; FreeQ[{a, b, c, m, n,
 p}, x] && EqQ[(m + 1)/n + p + 1, 0] && NeQ[m, -1]
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \csc^p\left(a-\frac{i\log\left(cx^n\right)}{n(-2+p)}\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^p\left(a-\frac{i\log(x)}{n(-2+p)}\right)dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{1}{n}-\frac{p}{n(-2+p)}}\left(1-e^{2ia}\left(cx^n\right)^{\frac{2}{n(-2+p)}}\right)^p\csc^p\left(a-\frac{i\log(cx^n)}{n(-2+p)}\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}+\frac{p}{n(-2+p)}}\right.}{n}$$

$$= \frac{(2-p)x\left(1-e^{2ia}\left(cx^n\right)^{-\frac{2}{n(2-p)}}\right)\csc^p\left(a+\frac{i\log(cx^n)}{n(2-p)}\right)}{2(1-p)}$$

Mathematica [A] time = 3.10, size = 128, normalized size = 1.80

$$\frac{2^{p-1}(p-2)x\left(\frac{ie^{ia}\left(cx^n\right)^{\frac{1}{n(p-2)}}}{-1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(p-2)}}}\right)^p\left(1+e^{2ia}\left(cx^n\right)^{\frac{2}{n(p-2)}}\left(-1+\left(1-e^{-2ia}\left(cx^n\right)^{-\frac{2}{n(p-2)}}\right)^p\right)\right)}{p-1}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a - (I*Log[c*x^n])/(n*(-2 + p))]^p,x]
```

```
[Out] (2^(-1 + p)*(-2 + p)*x*((I*E^(I*a)*(c*x^n)^(1/(n*(-2 + p))))/(-1 + E^((2*I)
*a)*(c*x^n)^(2/(n*(-2 + p)))))^p*(1 + E^((2*I)*a)*(c*x^n)^(2/(n*(-2 + p)))*
(-1 + (1 - 1/(E^((2*I)*a)*(c*x^n)^(2/(n*(-2 + p)))))^p)))/(-1 + p)
```

fricas [B] time = 0.83, size = 150, normalized size = 2.11

$$\frac{\left(\left(p-2\right)xe^{\left(\frac{2\left(-i\,anp+2i\,an-n\log(x)-\log(c)\right)}{np-2\,n}\right)}-\left(p-2\right)x\right)\left(-\frac{2i\,e^{\left(\frac{-i\,anp+2i\,an-n\log(x)-\log(c)}{np-2\,n}\right)}}{e^{\left(\frac{2\left(-i\,anp+2i\,an-n\log(x)-\log(c)\right)}{np-2\,n}\right)}-1}\right)^p e^{\left(-\frac{2\left(-i\,anp+2i\,an-n\log(x)-\log(c)\right)}{np-2\,n}\right)}}{2\left(p-1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a-I*log(c*x^n)/n/(-2+p))^p,x, algorithm="fricas")
```

```
[Out] 1/2*((p - 2)*x*e^(2*(-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) -
 (p - 2)*x)*(-2*I*e^((-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/
(e^(2*(-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n)) - 1))^p*e^(-2*(
-I*a*n*p + 2*I*a*n - n*log(x) - log(c))/(n*p - 2*n))/(p - 1)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(a - \frac{i\log\left(cx^{n}\right)}{n\left(p-2\right)}\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a-I*log(c*x^n)/n/(-2+p))^p,x, algorithm="giac")
[Out] integrate(csc(a - I*log(c*x^n)/(n*(p - 2)))^p, x)
```

maple [F] time = 0.24, size = 0, normalized size = 0.00

$$\int \csc^{p}\left(a - \frac{i\ln\left(c\,x^{n}\right)}{n\left(-2+p\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a-I*ln(c*x^n)/n/(-2+p))^p,x)
[Out] int(csc(a-I*ln(c*x^n)/n/(-2+p))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \left(-\csc\left(-a + \frac{i\log\left(cx^{n}\right)}{n\left(p-2\right)}\right)\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a-I*log(c*x^n)/n/(-2+p))^p,x, algorithm="maxima")
[Out] integrate((-csc(-a + I*log(c*x^n)/(n*(p - 2))))^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \left(\frac{1}{\sin\left(a - \frac{\ln\left(c\,x^{n}\right)\,1{}\mathrm{i}}{n\,\left(p-2\right)}\right)}\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a - (log(c*x^n)*1i)/(n*(p - 2))))^p,x)
[Out] int((1/sin(a - (log(c*x^n)*1i)/(n*(p - 2))))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^{p}\left(a - \frac{i \log\left(cx^{n}\right)}{n\left(p - 2\right)}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a-I*ln(c*x**n)/n/(-2+p))**p,x)
```

```
[Out] Integral(csc(a - I*log(c*x**n)/(n*(p - 2)))**p, x)
```

3.308 $\int \sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,dx$

Optimal. Leaf size=109

$$\frac{2x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{2+ibn}$$

```
[Out] 2*x*hypergeom([1/2, 1/4-1/2*I/b/n],[5/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I*
b))*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)*csc(a+b*ln(c*x^n))^(1/2)/(2+I*b*n)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4504, 4508, 364}

$$\frac{2x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{2+ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Sqrt[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Csc[a + b*Log[c*x^n]]]*Hy
pergeometric2F1[1/2, (1 - (2*I)/(b*n))/4, (5 - (2*I)/(b*n))/4, E^((2*I)*a)*
(c*x^n)^((2*I)*b)])/(2 + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \sqrt{\csc \left(a+b\log \left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\sqrt{\csc(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$
$$= \frac{\left(x\left(cx^n\right)^{-\frac{ib}{2}-\frac{1}{n}}\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc \left(a+b\log \left(cx^n\right)\right)}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{ib}{2}+\frac{1}{n}}}{\sqrt{1-e^{2ia}x^{2ib}}}\,dx,x\right.}{n}$$
$$= \frac{2x\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc \left(a+b\log \left(cx^n\right)\right)}\,{}_2F_1\left(\frac{1}{2},\frac{1}{4}\left(1-\frac{2i}{bn}\right);\frac{1}{4}\left(5-\frac{2i}{bn}\right);e^{2ia}\left(c\right.\right.}{2+ibn}$$

Mathematica [A] time = 0.63, size = 115, normalized size = 1.06

$$\frac{2ie^{-2ia}x\left(cx^n\right)^{-2ib}\left(-1+e^{2i\left(a+b\log\left(cx^n\right)\right)}\right)\,{}_2F_1\left(1,\frac{3}{4}+\frac{i}{2bn};\frac{5}{4}+\frac{i}{2bn};e^{-2i\left(a+b\log\left(cx^n\right)\right)}\right)\sqrt{\csc \left(a+b\log \left(cx^n\right)\right)}}{bn+2i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] ((2*I)*(-1 + E^((2*I)*(a + b*Log[c*x^n])))*x*Sqrt[Csc[a + b*Log[c*x^n]]]*Hy
pergeometric2F1[1, 3/4 + (I/2)/(b*n), 5/4 + (I/2)/(b*n), E^((-2*I)*(a + b*L
og[c*x^n]))])/(E^((2*I)*a)*(2*I + b*n)*(c*x^n)^((2*I)*b))
```

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(csc(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)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\csc \left(b\log \left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(csc(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.22, size = 0, normalized size = 0.00

$$\int \sqrt{\csc}\, (a + b \ln (c\, x^n))\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^(1/2),x)
[Out] int(csc(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\csc \left(b \log \left(cx^n\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
[Out] integrate(sqrt(csc(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \sqrt{\frac{1}{\sin (a + b\, \ln (c\, x^n))}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + b*log(c*x^n)))^(1/2),x)
[Out] int((1/sin(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{\csc \left(a + b \log \left(cx^n\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(sqrt(csc(a + b*log(c*x**n))), x)
```

3.309 $\int \frac{\sqrt{\csc(a+b\log(cx^n))}}{x}\,dx$

Optimal. Leaf size=59

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

```
[Out] -2*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*
x^n))*EllipticF(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))*csc(a+b*ln(c*x^n
))^(1/2)*sin(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.04, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {3771, 2641}

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[Csc[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (2*Sqrt[Csc[a + b*Log[c*x^n]]]*EllipticF[(a - Pi/2 + b*Log[c*x^n])/2, 2]*Sq
rt[Sin[a + b*Log[c*x^n]]])/(b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{x}\,dx = \frac{\text{Subst}\left(\int \sqrt{\csc(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{\left(\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int \frac{1}{\sqrt{\sin(a+bx)}}\,dx, x, \log\left(cx\right.\right.}{n}$$

$$= \frac{2\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{bn}$$

Mathematica [A] time = 0.11, size = 58, normalized size = 0.98

$$-\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,F\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[Csc[a + b*Log[c*x^n]]]/x,x]
```

```
[Out] (-2*Sqrt[Csc[a + b*Log[c*x^n]]]*EllipticF[(-2*a + Pi - 2*b*Log[c*x^n])/4, 2
]*Sqrt[Sin[a + b*Log[c*x^n]]])/(b*n)
```

fricas [F] time = 0.54, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] integral(sqrt(csc(b*log(c*x^n) + a))/x, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(csc(b*log(c*x^n) + a))/x, x)
```

maple [A] time = 0.12, size = 102, normalized size = 1.73

$$\frac{\sqrt{\sin \left(a + b \ln \left(c\, x^{n}\right)\right) + 1}\, \sqrt{-2 \sin \left(a + b \ln \left(c\, x^{n}\right)\right) + 2}\, \sqrt{-\sin \left(a + b \ln \left(c\, x^{n}\right)\right)}\, \operatorname{EllipticF}\left(\sqrt{\sin \left(a + b \ln \left(c\, x^{n}\right)\right) +}\right.}{n \cos \left(a + b \ln \left(c\, x^{n}\right)\right) \sqrt{\sin \left(a + b \ln \left(c\, x^{n}\right)\right)}\, b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^(1/2)/x,x)
```

```
[Out] 1/n*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*
ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))/cos(a
+b*ln(c*x^n))/sin(a+b*ln(c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\csc\left(b \log\left(c x^{n}\right) + a\right)}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(1/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(csc(b*log(c*x^n) + a))/x, x)
```

mupad [B] time = 2.62, size = 89, normalized size = 1.51

$$-\frac{2 \sqrt{\sin \left(a + b\, \ln \left(c\, x^{n}\right)\right)}\, \mathrm{F}\left(\operatorname{asin}\left(\frac{\sqrt{2}\, \sqrt{1-\sin(a+b\, \ln(c\, x^{n}))}}{2}\right) \middle| 2\right) \sqrt{\cos \left(a + b\, \ln \left(c\, x^{n}\right)\right)^{2}}\, \sqrt{\frac{1}{\sin(a+b\, \ln(c\, x^{n}))}}}{b\, n\, \cos \left(a + b\, \ln \left(c\, x^{n}\right)\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + b*log(c*x^n)))^(1/2)/x,x)
```

```
[Out] -(2*sin(a + b*log(c*x^n))^(1/2)*ellipticF(asin((2^(1/2)*(1 - sin(a + b*log(
c*x^n)))^(1/2))/2), 2)*(cos(a + b*log(c*x^n))^2)^(1/2)*(1/sin(a + b*log(c*x
^n)))^(1/2))/(b*n*cos(a + b*log(c*x^n)))
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\sqrt{\csc\left(a + b \log\left(c x^{n}\right)\right)}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**(1/2)/x,x)
[Out] Integral(sqrt(csc(a + b*log(c*x**n)))/x, x)
```

3.310 $\int \csc^{\frac{3}{2}}(a+b\log(cx^n))\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1-e^{2ia}(cx^n)^{2ib}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);e^{2ia}(cx^n)^{2ib}\right)\csc^{\frac{3}{2}}(a+b\log(cx^n))}{2+3ibn}$$

```
[Out] 2*x*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*csc(a+b*ln(c*x^n))^(3/2)*hypergeom
([3/2, 3/4-1/2*I/b/n],[7/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+3*I*b*
n)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4504, 4508, 364}

$$\frac{2x\left(1-e^{2ia}(cx^n)^{2ib}\right)^{3/2}{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);e^{2ia}(cx^n)^{2ib}\right)\csc^{\frac{3}{2}}(a+b\log(cx^n))}{2+3ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Csc[a + b*Log[c*x^n]]^(3/2)*
Hypergeometric2F1[3/2, (3 - (2*I)/(b*n))/4, (7 - (2*I)/(b*n))/4, E^((2*I)*a
)*(c*x^n)^((2*I)*b)])/(2 + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1}{n}}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int\frac{x^{-1+\frac{3ib}{2}+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^{3/2}}\,dx,\right.}{n}$$

$$=\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i}{bn}\right);\frac{1}{4}\left(7-\frac{2i}{bn}\right);e^{2ia}\left(c\right.\right.}{2+3ibn}$$

Mathematica [B] time = 6.04, size = 411, normalized size = 3.77

$$\frac{x\left(\left(b^2n^2+4\right)x^{ibn}\sqrt{2-2e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\frac{ie^{ia}\left(cx^n\right)^{ib}}{-1+e^{2ia}\left(cx^n\right)^{2ib}}}\,{}_2F_1\left(\frac{1}{2},\frac{3}{4}-\frac{i}{2bn};\frac{7}{4}-\frac{i}{2bn};e^{2ia}\left(cx^n\right)^{2ib}\right)-(3bn-2i)x^{-ibn}\left((-bn\right.\right.}{bn(3bn-2i)\left(2\sin\left(a+b\,\text{lo}\right.\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (x*((4 + b^2*n^2)*x^(I*b*n)*Sqrt[2 - 2*E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[
(I*E^(I*a)*(c*x^n)^(I*b))/(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Hypergeomet
ric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(b*n), E^((2*I)*a)*(c*x^n)^((2*I
)*b)] - ((-2*I + 3*b*n)*((2*I - b*n)*Sqrt[2 - 2*E^((2*I)*a)*(c*x^n)^((2*I)*
b)]*Sqrt[(I*E^(I*a)*(c*x^n)^(I*b))/(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*Hy
pergeometric2F1[1/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), E^((2*I)*a)
*(c*x^n)^((2*I)*b)] + 2*x^(I*b*n)*Sqrt[Csc[a + b*Log[c*x^n]]]*(b*n*Cos[b*n*
Log[x]] - 2*Sin[b*n*Log[x]])))/x^(I*b*n)))/(b*n*(-2*I + 3*b*n)*(b*n*Cos[a -
 b*n*Log[x] + b*Log[c*x^n]] + 2*Sin[a - b*n*Log[x] + b*Log[c*x^n]]))
```

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(csc(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int \csc^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(csc(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{3/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int((1/sin(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**(3/2), x)
```

3.311 $\int \frac{\csc^{\frac{3}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=94

$$-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{bn}-\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\right.\right.}{bn}$$

```
[Out] -2*cos(a+b*ln(c*x^n))*csc(a+b*ln(c*x^n))^(1/2)/b/n+2*(sin(1/2*a+1/4*Pi+1/2*
b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))*EllipticE(cos(1/2*a
+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))*csc(a+b*ln(c*x^n))^(1/2)*sin(a+b*ln(c*x^n
))^(1/2)/b/n
```

Rubi [A] time = 0.05, antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3768, 3771, 2639}

$$-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{bn}-\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\right.\right.}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (-2*Cos[a + b*Log[c*x^n]]*Sqrt[Csc[a + b*Log[c*x^n]]])/(b*n) - (2*Sqrt[Csc[
a + b*Log[c*x^n]]]*EllipticE[(a - Pi/2 + b*Log[c*x^n])/2, 2]*Sqrt[Sin[a + b
*Log[c*x^n]]])/(b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3768

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Csc[c + d*x])^(n - 1))/(d*(n - 1)), x] + Dist[(b^2*(n - 2))/(n - 1), I
nt[(b*Csc[c + d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] &&
IntegerQ[2*n]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
```

```
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \csc^{\frac{3}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\csc(a+bx)}}\,dx, x, \log(c\right.}{n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{\left(\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sin\left(a\right.\right.}}{}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{bn} - \frac{2\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a\right.\right.}{}$$

Mathematica [A] time = 0.14, size = 72, normalized size = 0.77

$$-\frac{2\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\left(\cos\left(a+b\log\left(cx^n\right)\right)-\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^(3/2)/x,x]
```

```
[Out] (-2*Sqrt[Csc[a + b*Log[c*x^n]]]*(Cos[a + b*Log[c*x^n]] - EllipticE[(-2*a +
Pi - 2*b*Log[c*x^n])/4, 2]*Sqrt[Sin[a + b*Log[c*x^n]]]))/(b*n)
```

fricas [F] time = 1.96, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(3/2)/x,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)^(3/2)/x, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(3/2)/x,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [A] time = 0.17, size = 190, normalized size = 2.02

$$\frac{2\sqrt{\sin(a+b\ln(cx^n))+1}\,\sqrt{-2\sin(a+b\ln(cx^n))+2}\,\sqrt{-\sin(a+b\ln(cx^n))}\,\mathrm{EllipticE}\left(\sqrt{\sin(a+b\ln(cx^n))}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^(3/2)/x,x)
```

```
[Out] 1/n*(2*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a
+b*ln(c*x^n)))^(1/2)*EllipticE((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-(s
in(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x
^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-2*cos(a+b*l
n(c*x^n))^2)/cos(a+b*ln(c*x^n))/sin(a+b*ln(c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(3/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(3/2)/x, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{\left(\frac{1}{\sin(a+b\,\ln(c\,x^n))}\right)^{3/2}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + b*log(c*x^n)))^(3/2)/x,x)
```

```
[Out] int((1/sin(a + b*log(c*x^n)))^(3/2)/x, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**(3/2)/x,x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**(3/2)/x, x)
```

3.312 $\int \csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=109

$$\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{2+5ibn}$$

```
[Out] 2*x*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*csc(a+b*ln(c*x^n))^(5/2)*hypergeom
([5/2, 5/4-1/2*I/b/n],[9/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+5*I*b*
n)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4504, 4508, 364}

$$\frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{2+5ibn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Csc[a + b*Log[c*x^n]]^(5/2)*
Hypergeometric2F1[5/2, (5 - (2*I)/(b*n))/4, (9 - (2*I)/(b*n))/4, E^((2*I)*a
)*(c*x^n)^((2*I)*b)])/(2 + (5*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\mathrm{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^{\frac{5}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1}{n}}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\mathrm{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}+\frac{1}{n}}}{\left(1-e^{2ia}x^{2ib}\right)^{5/2}}\,dx,\right.}{n}$$

$$= \frac{2x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i}{bn}\right);\frac{1}{4}\left(9-\frac{2i}{bn}\right);e^{2ia}\left(c\right.\right.}{2+5ibn}$$

Mathematica [A] time = 1.73, size = 174, normalized size = 1.60

$$\frac{2x^{1-2ibn}e^{-2i\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\left((2+ibn)\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right)\,{}_2F_1\left(1,\frac{3}{4}+\frac{i}{2bn};\frac{5}{4}+\frac{i}{2bn};e^{-2i\left(a\right.}\right.\right.}{3b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 - (2*I)*b*n)*Sqrt[Csc[a + b*Log[c*x^n]]]*(-(E^((2*I)*a)*(c*x^n)^((2
*I)*b)*(2 + b*n*Cot[a + b*Log[c*x^n]])) + (2 + I*b*n)*(-1 + E^((2*I)*a)*(c*
x^n)^((2*I)*b))*Hypergeometric2F1[1, 3/4 + (I/2)/(b*n), 5/4 + (I/2)/(b*n),
E^((-2*I)*(a + b*Log[c*x^n]))]))/(3*b^2*E^((2*I)*(a - b*n*Log[x] + b*Log[c*
x^n]))*n^2)
```

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(csc(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.15, size = 0, normalized size = 0.00

$$\int \csc^{\frac{5}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(csc(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{5/2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int((1/sin(a + b*log(c*x^n)))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.313 $\int \frac{\csc^{\frac{5}{2}}(a+b\log(cx^n))}{x}\,dx$

Optimal. Leaf size=98

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\csc^{\frac{3}{2}}\left(a+b\,l\right.}{3bn}$$

```
[Out] -2/3*cos(a+b*ln(c*x^n))*csc(a+b*ln(c*x^n))^(3/2)/b/n-2/3*(sin(1/2*a+1/4*Pi+
1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))*EllipticF(cos(1
/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))*csc(a+b*ln(c*x^n))^(1/2)*sin(a+b*ln(c
*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3768, 3771, 2641}

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\csc^{\frac{3}{2}}\left(a+b\,l\right.}{3bn}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (-2*Cos[a + b*Log[c*x^n]]*Csc[a + b*Log[c*x^n]]^(3/2))/(3*b*n) + (2*Sqrt[Cs
c[a + b*Log[c*x^n]]]*EllipticF[(a - Pi/2 + b*Log[c*x^n])/2, 2]*Sqrt[Sin[a +
 b*Log[c*x^n]]])/(3*b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3768

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> -Simp[(b*Cos[c + d*x
]*(b*Csc[c + d*x])^(n - 1))/(d*(n - 1)), x] + Dist[(b^2*(n - 2))/(n - 1), I
nt[(b*Csc[c + d*x])^(n - 2), x], x] /; FreeQ[{b, c, d}, x] && GtQ[n, 1] &&
IntegerQ[2*n]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
```

```
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \frac{\text{Subst}\left(\int \csc^{\frac{5}{2}}(a+bx)\,dx, x, \log\left(cx^n\right)\right)}{n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\text{Subst}\left(\int \sqrt{\csc(a+bx)}\,dx, x, \text{lo}\right.}{3n}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{\left(\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sin\left(a\right.}\right.}{}$$
$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3bn} + \frac{2\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a\right.\right.}{}$$

Mathematica [A] time = 0.18, size = 73, normalized size = 0.74

$$-\frac{2\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\left(\cos\left(a+b\log\left(cx^n\right)\right)+\sin^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)F\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^(5/2)/x,x]
```

```
[Out] (-2*Csc[a + b*Log[c*x^n]]^(3/2)*(Cos[a + b*Log[c*x^n]] + EllipticF[(-2*a +
Pi - 2*b*Log[c*x^n])/4, 2]*Sin[a + b*Log[c*x^n]]^(3/2)))/(3*b*n)
```

fricas [F] time = 1.08, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^(5/2)/x,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)^(5/2)/x, x)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(csc(a+b*log(c*x^n))^(5/2)/x,x, algorithm="giac")

[Out] Timed out

maple [A] time = 0.16, size = 131, normalized size = 1.34

$$\frac{\sqrt{\sin \left(a+b\ln \left(c\,x^{n}\right)\right)+1}\;\sqrt{-2\sin \left(a+b\ln \left(c\,x^{n}\right)\right)+2}\;\sqrt{-\sin \left(a+b\ln \left(c\,x^{n}\right)\right)}\;\mathrm{EllipticF}\left(\sqrt{\sin \left(a+b\ln \left(c\,x^{n}\right)\right)+}\right.}{3n\sin \left(a+b\ln \left(c\,x^{n}\right)\right)^{\frac{3}{2}}\cos \left(a+b\ln \left(c\,x^{n}\right)\right)b}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(csc(a+b*ln(c*x^n))^(5/2)/x,x)

[Out] 1/3/n/sin(a+b*ln(c*x^n))^(3/2)*((sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln (c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n)) +1)^(1/2),1/2*2^(1/2))*sin(a+b*ln(c*x^n))-2*cos(a+b*ln(c*x^n))^2)/cos(a+b*l n(c*x^n))/b

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{\csc \left(b\log \left(cx^{n}\right)+a\right)^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(csc(a+b*log(c*x^n))^(5/2)/x,x, algorithm="maxima")

[Out] integrate(csc(b*log(c*x^n) + a)^(5/2)/x, x)

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{{\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{5/2}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((1/sin(a + b*log(c*x^n)))^(5/2)/x,x)

[Out] int((1/sin(a + b*log(c*x^n)))^(5/2)/x, x)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**(5/2)/x,x)
```

```
[Out] Timed out
```

3.314 $\int \frac{1}{\sqrt{\csc(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=110

$$\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{bn+2i}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);e^{2ia}(cx^n)^{2ib}\right)}{(2-ibn)\sqrt{1-e^{2ia}(cx^n)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] 2*x*hypergeom([-1/2, 1/4*(-2*I-b*n)/b/n],[3/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)
^(2*I*b))/(2-I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)/csc(a+b*ln(c*x^n))
^(1/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4504, 4508, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{bn+2i}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);e^{2ia}(cx^n)^{2ib}\right)}{(2-ibn)\sqrt{1-e^{2ia}(cx^n)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x*Hypergeometric2F1[-1/2, -(2*I + b*n)/(4*b*n), (3 - (2*I)/(b*n))/4, E^(
(2*I)*a)*(c*x^n)^((2*I)*b)])/((2 - I*b*n)*Sqrt[1 - E^((2*I)*a)*(c*x^n)^((2*
I)*b)]*Sqrt[Csc[a + b*Log[c*x^n]]])
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\operatorname{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\sqrt{\csc(a+b\log(x))}}\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x\left(cx^n\right)^{\frac{ib}{2}-\frac{1}{n}}\right)\operatorname{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1}{n}}\sqrt{1-e^{2ia}x^{2ib}}\,dx,x,cx^n\right)}{n\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

$$=\frac{2x\,{}_2F_1\left(-\frac{1}{2},-\frac{2i+bn}{4bn};\frac{1}{4}\left(3-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [B] time = 3.96, size = 377, normalized size = 3.43

$$\frac{2x\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}{\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\left(2\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)+bn\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)}-\frac{2e^{ia}bnx\left(cx^n\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] (-2*b*E^(I*a)*n*x*(c*x^n)^(I*b)*Sqrt[2 - 2*E^((2*I)*a)*(c*x^n)^((2*I)*b)]*S
qrt[(I*E^(I*a)*(c*x^n)^(I*b))/(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]*((2*I +
 b*n)*x^((2*I)*b*n)*Hypergeometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(
b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)] + (-2*I + 3*b*n)*Hypergeometric2F1[1/2
, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)]
))/((2*I + b*n)*(-2*I + 3*b*n)*((2*I + b*n)*x^((2*I)*b*n) + E^((2*I)*a)*(-2
*I + b*n)*(c*x^n)^((2*I)*b))) + (2*x*Sin[a - b*n*Log[x] + b*Log[c*x^n]])/(S
qrt[Csc[a + b*Log[c*x^n]]]*(b*n*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + 2*Sin[
a - b*n*Log[x] + b*Log[c*x^n]]))
```

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/csc(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\csc\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/sqrt(csc(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.15, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\csc\left(a+b\ln\left(c\,x^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/csc(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(1/csc(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\csc\left(b\log\left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt(csc(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\sqrt{\frac{1}{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(1/sin(a + b*log(c*x^n)))^(1/2),x)
```

```
[Out] int(1/(1/sin(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\sqrt{\csc\left(a + b\log\left(cx^{n}\right)\right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(1/sqrt(csc(a + b*log(c*x**n))), x)
```

3.315 $\int \frac{1}{x\sqrt{\csc(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=59

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

```
[Out] -2*(sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*
x^n))*EllipticE(cos(1/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))*csc(a+b*ln(c*x^n
))^(1/2)*sin(a+b*ln(c*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.04, antiderivative size = 59, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {3771, 2639}

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Sqrt[Csc[a + b*Log[c*x^n]]]),x]
```

```
[Out] (2*Sqrt[Csc[a + b*Log[c*x^n]]]*EllipticE[(a - Pi/2 + b*Log[c*x^n])/2, 2]*Sq
rt[Sin[a + b*Log[c*x^n]]])/(b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{1}{x\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\sqrt{\csc(a+bx)}}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= \frac{\left(\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int \sqrt{\sin(a+bx)}\,dx, x, \text{l}\right.}{n}$$

$$= \frac{2\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log\left(cx^n\right)\right)\middle|2\right)\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}}{bn}$$

Mathematica [A] time = 0.10, size = 58, normalized size = 0.98

$$-\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,E\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)}{bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Sqrt[Csc[a + b*Log[c*x^n]]]),x]
```

```
[Out] (-2*Sqrt[Csc[a + b*Log[c*x^n]]]*EllipticE[(-2*a + Pi - 2*b*Log[c*x^n])/4, 2
]*Sqrt[Sin[a + b*Log[c*x^n]]])/(b*n)
```

fricas [F] time = 0.81, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] integral(1/(x*sqrt(csc(b*log(c*x^n) + a))), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/x/csc(a+b*log(c*x^n))^(1/2),x, algorithm="giac")

[Out] integrate(1/(x*sqrt(csc(b*log(c*x^n) + a))), x)

maple [A] time = 0.16, size = 129, normalized size = 2.19

$$-\frac{\sqrt{\sin \left(a+b\ln \left(c\,x^{n}\right)\right)+1}\,\sqrt{-2\sin \left(a+b\ln \left(c\,x^{n}\right)\right)+2}\,\sqrt{-\sin \left(a+b\ln \left(c\,x^{n}\right)\right)}\,\left(2\,\mathrm{EllipticE}\left(\sqrt{\sin \left(a+b\ln \left(c\,x^{n}\right)\right.}\right.\right.}{n\cos \left(a+b\ln \left(c\,x^{n}\right)\right)\sqrt{\sin \left(a+b\ln \left(c\,x^{n}\right)\right)}\,b}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/x/csc(a+b*ln(c*x^n))^(1/2),x)

[Out] -1/n*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*(2*EllipticE((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2)))/cos(a+b*ln(c*x^n))/sin(a+b*ln(c*x^n))^(1/2)/b

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\csc \left(b\log \left(cx^{n}\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate(1/x/csc(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")

[Out] integrate(1/(x*sqrt(csc(b*log(c*x^n) + a))), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.02

$$\int \frac{1}{x\,\sqrt{\frac{1}{\sin(a+b\,\ln(c\,x^n))}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(1/(x*(1/sin(a + b*log(c*x^n)))^(1/2)),x)

[Out] int(1/(x*(1/sin(a + b*log(c*x^n)))^(1/2)), x)

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\sqrt{\csc \left(a+b\log \left(cx^{n}\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*ln(c*x**n))**(1/2),x)
[Out] Integral(1/(x*sqrt(csc(a + b*log(c*x**n)))), x)
```

3.316 $\int \frac{1}{\csc^{\frac{3}{2}}(a+b\log(cx^n))} \, dx$

Optimal. Leaf size=109

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*hypergeom([-3/2, -3/4-1/2*I/b/n],[1/4-1/2*I/b/n],exp(2*I*a)*(c*x^n)^(2*
I*b))/(2-3*I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)/csc(a+b*ln(c*x^n))^(
3/2)
```

Rubi [A] time = 0.07, antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4504, 4508, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] (2*x*Hypergeometric2F1[-3/2, (-3 - (2*I)/(b*n))/4, (1 - (2*I)/(b*n))/4, E^(
(2*I)*a)*(c*x^n)^((2*I)*b)])/((2 - (3*I)*b*n)*(1 - E^((2*I)*a)*(c*x^n)^((2*
I)*b))^(3/2)*Csc[a + b*Log[c*x^n]]^(3/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\csc^{\frac{3}{2}}(a+b\log(x))}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{\frac{3ib}{2}-\frac{1}{n}}\right)\text{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1}{n}}\left(1-e^{2ia}x^{2ib}\right)^{3/2}\,dx, x, cx^n\right)}{n\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i}{bn}\right);\frac{1}{4}\left(1-\frac{2i}{bn}\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 2.31, size = 186, normalized size = 1.71

$$\frac{2ix\left((2-ibn)\left(3bn\cot\left(a+b\log\left(cx^n\right)\right)-2\right)-3e^{-2ia}b^2n^2\left(cx^n\right)^{-2ib}\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right){}_2F_1\left(1,\frac{3}{4}+\frac{i}{2bn};\frac{5}{4}+\frac{i}{2bn};e^{\cdots}\right.\right.}{(-3bn+2i)(bn+2i)(3bn+2i)\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^(-3/2),x]
```

```
[Out] ((2*I)*x*((2 - I*b*n)*(-2 + 3*b*n*Cot[a + b*Log[c*x^n]]) - (3*b^2*n^2*(-1 +
 E^((2*I)*a)*(c*x^n)^((2*I)*b))*Csc[a + b*Log[c*x^n]]^2*Hypergeometric2F1[1
, 3/4 + (I/2)/(b*n), 5/4 + (I/2)/(b*n), E^((-2*I)*(a + b*Log[c*x^n]))])/(E^
((2*I)*a)*(c*x^n)^((2*I)*b))))/((2*I - 3*b*n)*(2*I + b*n)*(2*I + 3*b*n)*Csc
[a + b*Log[c*x^n]]^(3/2))
```

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/csc(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(-3/2), x)
```

maple [F] time = 0.15, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc\left(a+b\ln\left(c\,x^{n}\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/csc(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(1/csc(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc\left(b\log\left(cx^{n}\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(-3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{{\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(1/sin(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int(1/(1/sin(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(csc(a + b*log(c*x**n))**(-3/2), x)
```

3.317 $\int \frac{1}{x \csc^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=98

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

```
[Out] -2/3*cos(a+b*ln(c*x^n))/b/n/csc(a+b*ln(c*x^n))^(1/2)-2/3*(sin(1/2*a+1/4*Pi+
1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))*EllipticF(cos(1
/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))*csc(a+b*ln(c*x^n))^(1/2)*sin(a+b*ln(c
*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3769, 3771, 2641}

$$\frac{2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{3bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Csc[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] (-2*Cos[a + b*Log[c*x^n]])/(3*b*n*Sqrt[Csc[a + b*Log[c*x^n]]]) + (2*Sqrt[Cs
c[a + b*Log[c*x^n]]]*EllipticF[(a - Pi/2 + b*Log[c*x^n])/2, 2]*Sqrt[Sin[a +
 b*Log[c*x^n]]])/(3*b*n)
```

Rule 2641

```
Int[1/Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticF[(1*(c -
 Pi/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3769

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Csc[c + d*x])^(n + 1))/(b*d*n), x] + Dist[(n + 1)/(b^2*n), Int[(b*Csc[c +
 d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] && IntegerQ[2*n
]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{1}{x \csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\text{Subst}\left(\int \frac{1}{\csc^{\frac{3}{2}}(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{n}$$

$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}} + \frac{\text{Subst}\left(\int \sqrt{\csc(a+bx)}\,dx, x, \log\left(cx^n\right)\right)}{3n}$$

$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}} + \frac{\left(\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\right)}{3n}$$

$$= -\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{3bn\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}} + \frac{2\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log(cx\right.\right.}{3bn}$$

Mathematica [A] time = 0.16, size = 76, normalized size = 0.78

$$-\frac{\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\left(\sin\left(2\left(a+b\log\left(cx^n\right)\right)\right)+2\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}F\left(\frac{1}{4}\left(-2a-2b\log\left(cx^n\right)+\pi\right)\middle|2\right)\right)}{3bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Csc[a + b*Log[c*x^n]]^(3/2)),x]
```

```
[Out] -1/3*(Sqrt[Csc[a + b*Log[c*x^n]]]*(2*EllipticF[(-2*a + Pi - 2*b*Log[c*x^n])
/4, 2]*Sqrt[Sin[a + b*Log[c*x^n]]] + Sin[2*(a + b*Log[c*x^n])]))/(b*n)
```

fricas [F] time = 0.55, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] integral(1/(x*csc(b*log(c*x^n) + a)^(3/2)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*csc(b*log(c*x^n) + a)^(3/2)), x)
```

maple [A] time = 0.17, size = 131, normalized size = 1.34

$$\frac{\frac{\sqrt{\sin(a+b\ln(c\,x^n))+1}\,\sqrt{-2\sin(a+b\ln(c\,x^n))+2}\,\sqrt{-\sin(a+b\ln(c\,x^n))}\,\operatorname{EllipticF}\left(\sqrt{\sin(a+b\ln(c\,x^n))+1},\frac{\sqrt{2}}{2}\right)}{3}-\frac{2\sin(a+b\ln(c\,x^n))\left(\cos^2(a+b\ln(c\,x^n))\right)}{3}}{n\cos\left(a+b\ln\left(c\,x^n\right)\right)\sqrt{\sin\left(a+b\ln\left(c\,x^n\right)\right)}\;b}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/csc(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] 1/n*(1/3*(sin(a+b*ln(c*x^n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin
(a+b*ln(c*x^n)))^(1/2)*EllipticF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))-
2/3*sin(a+b*ln(c*x^n))*cos(a+b*ln(c*x^n))^2)/cos(a+b*ln(c*x^n))/sin(a+b*ln(
c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*csc(b*log(c*x^n) + a)^(3/2)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x\left(\frac{1}{\sin(a+b\,\ln(c\,x^n))}\right)^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(1/sin(a + b*log(c*x^n)))^(3/2)),x)
```

```
[Out] int(1/(x*(1/sin(a + b*log(c*x^n)))^(3/2)), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\csc^{\frac{3}{2}}\left(a+b\log\left(cx^{n}\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*ln(c*x**n))**(3/2),x)
```

```
[Out] Integral(1/(x*csc(a + b*log(c*x**n))**(3/2)), x)
```

3.318 $\int \frac{1}{\csc^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=110

$$\frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x*hypergeom([-5/2, -5/4-1/2*I/b/n],[1/4*(-2*I-b*n)/b/n],exp(2*I*a)*(c*x^n
)^(2*I*b))/(2-5*I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)/csc(a+b*ln(c*x^
n))^(5/2)
```

Rubi [A] time = 0.07, antiderivative size = 110, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4504, 4508, 364}

$$\frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (2*x*Hypergeometric2F1[-5/2, (-5 - (2*I)/(b*n))/4, -(2*I + b*n)/(4*b*n), E^
((2*I)*a)*(c*x^n)^((2*I)*b)])/((2 - (5*I)*b*n)*(1 - E^((2*I)*a)*(c*x^n)^((2
*I)*b))^(5/2)*Csc[a + b*Log[c*x^n]]^(5/2))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \frac{1}{\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\operatorname{Subst}\left(\int \frac{x^{-1+\frac{1}{n}}}{\csc^{\frac{5}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{\frac{5ib}{2}-\frac{1}{n}}\right)\operatorname{Subst}\left(\int x^{-1-\frac{5ib}{2}+\frac{1}{n}}\left(1-e^{2ia}x^{2ib}\right)^{5/2}\,dx,x,cx^n\right)}{n\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x\,{}_2F_1\left(-\frac{5}{2},\frac{1}{4}\left(-5-\frac{2i}{bn}\right);-\frac{2i+bn}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2-5ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [B] time = 8.66, size = 876, normalized size = 7.96

$$\sqrt{\csc\left(a+bn\log(x)+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)}\left(-\frac{x\cos(bn\log(x))\left(-55b^2n^2+65b^2\cos\left(2\left(a+b\left(\log\left(cx^n\right)-n\right.\right.\right.\right.}{4(5bn-2i)(5bn+2i)\left(bn\right.}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^(-5/2),x]
```

```
[Out] (-30*b^3*E^(I*(a + b*(-(n*Log[x]) + Log[c*x^n])))*n^3*x^(1 - I*b*n)*Sqrt[2
- 2*E^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n)]*Sqrt[(I*E^(
I*(a + b*(-(n*Log[x]) + Log[c*x^n])))*x^(I*b*n))/(-1 + E^((2*I)*(a + b*(-(n
*Log[x]) + Log[c*x^n])))*x^((2*I)*b*n))]*((2*I + b*n)*x^((2*I)*b*n)*Hyperge
ometric2F1[1/2, 3/4 - (I/2)/(b*n), 7/4 - (I/2)/(b*n), E^((2*I)*(a + b*(-(n*
Log[x]) + Log[c*x^n])))*x^((2*I)*b*n)] + (-2*I + 3*b*n)*Hypergeometric2F1[1
/2, -1/4*(2*I + b*n)/(b*n), 3/4 - (I/2)/(b*n), E^((2*I)*(a + b*(-(n*Log[x])
 + Log[c*x^n])))*x^((2*I)*b*n)]))/((2*I + b*n)*(-2*I + 3*b*n)*(-2*I + 5*b*n
)*(2*I + 5*b*n)*(2*I + b*n + E^((2*I)*(a + b*(-(n*Log[x]) + Log[c*x^n])))*(
-2*I + b*n))) + Sqrt[Csc[a + b*n*Log[x] + b*(-(n*Log[x]) + Log[c*x^n])]]*(-
1/4*(x*Cos[b*n*Log[x]]*(-12 - 55*b^2*n^2 + 12*Cos[2*(a + b*(-(n*Log[x]) + L
```

```
og[c*x^n]))] + 65*b^2*n^2*Cos[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))] + 4*b*n
*Sin[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/((-2*I + 5*b*n)*(2*I + 5*b*n)*
(b*n*Cos[a + b*(-(n*Log[x]) + Log[c*x^n])] + 2*Sin[a + b*(-(n*Log[x]) + Log
[c*x^n])])) + (x*Sin[b*n*Log[x]]*(16*b*n - 4*b*n*Cos[2*(a + b*(-(n*Log[x])
+ Log[c*x^n]))] + 12*Sin[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))] + 65*b^2*n^2
*Sin[2*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/(4*(-2*I + 5*b*n)*(2*I + 5*b*n
)*(b*n*Cos[a + b*(-(n*Log[x]) + Log[c*x^n])] + 2*Sin[a + b*(-(n*Log[x]) + L
og[c*x^n])])) + (x*Cos[3*b*n*Log[x]]*(5*b*n*Cos[3*(a + b*(-(n*Log[x]) + Log
[c*x^n]))] - 2*Sin[3*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/(2*(-2*I + 5*b*n
)*(2*I + 5*b*n)) - (x*Sin[3*b*n*Log[x]]*(2*Cos[3*(a + b*(-(n*Log[x]) + Log[
c*x^n]))] + 5*b*n*Sin[3*(a + b*(-(n*Log[x]) + Log[c*x^n]))]))/(2*(-2*I + 5*
b*n)*(2*I + 5*b*n)))
```

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/csc(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc\left(b\log\left(cx^{n}\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(-5/2), x)
```

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc\left(a+b\ln\left(c\,x^{n}\right)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/csc(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(1/csc(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(csc(b*log(c*x^n) + a)^(-5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{\left(\frac{1}{\sin(a+b\,\ln(c\,x^n))}\right)^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(1/sin(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int(1/(1/sin(a + b*log(c*x^n)))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/csc(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.319 $\int \frac{1}{x\csc^{\frac{5}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=98

$$\frac{6\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{5bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{5bn\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] -2/5*cos(a+b*ln(c*x^n))/b/n/csc(a+b*ln(c*x^n))^(3/2)-6/5*(sin(1/2*a+1/4*Pi+
1/2*b*ln(c*x^n))^2)^(1/2)/sin(1/2*a+1/4*Pi+1/2*b*ln(c*x^n))*EllipticE(cos(1
/2*a+1/4*Pi+1/2*b*ln(c*x^n)),2^(1/2))*csc(a+b*ln(c*x^n))^(1/2)*sin(a+b*ln(c
*x^n))^(1/2)/b/n
```

Rubi [A] time = 0.06, antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {3769, 3771, 2639}

$$\frac{6\sqrt{\sin\left(a+b\log\left(cx^n\right)\right)}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}E\left(\frac{1}{2}\left(a+b\log\left(cx^n\right)-\frac{\pi}{2}\right)\middle|2\right)}{5bn}-\frac{2\cos\left(a+b\log\left(cx^n\right)\right)}{5bn\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[1/(x*Csc[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (-2*Cos[a + b*Log[c*x^n]])/(5*b*n*Csc[a + b*Log[c*x^n]]^(3/2)) + (6*Sqrt[Cs
c[a + b*Log[c*x^n]]]*EllipticE[(a - Pi/2 + b*Log[c*x^n])/2, 2]*Sqrt[Sin[a +
 b*Log[c*x^n]]])/(5*b*n)
```

Rule 2639

```
Int[Sqrt[sin[(c_.) + (d_.)*(x_)]], x_Symbol] :> Simp[(2*EllipticE[(1*(c - P
i/2 + d*x))/2, 2])/d, x] /; FreeQ[{c, d}, x]
```

Rule 3769

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Cos[c + d*x]*(
b*Csc[c + d*x])^(n + 1))/(b*d*n), x] + Dist[(n + 1)/(b^2*n), Int[(b*Csc[c +
 d*x])^(n + 2), x], x] /; FreeQ[{b, c, d}, x] && LtQ[n, -1] && IntegerQ[2*n
]
```

Rule 3771

```
Int[(csc[(c_.) + (d_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[(b*Csc[c + d*x]
)^n*Sin[c + d*x]^n, Int[1/Sin[c + d*x]^n, x], x] /; FreeQ[{b, c, d}, x] &&
EqQ[n^2, 1/4]
```

Rubi steps

$$\int \frac{1}{x\csc^{\frac{5}{2}}(a+b\log(cx^n))}dx = \frac{\text{Subst}\left(\int \frac{1}{\csc^{\frac{5}{2}}(a+bx)}dx, x, \log(cx^n)\right)}{n}$$

$$= -\frac{2\cos(a+b\log(cx^n))}{5bn\csc^{\frac{3}{2}}(a+b\log(cx^n))} + \frac{3\,\text{Subst}\left(\int \frac{1}{\sqrt{\csc(a+bx)}}dx, x, \log(cx^n)\right)}{5n}$$

$$= -\frac{2\cos(a+b\log(cx^n))}{5bn\csc^{\frac{3}{2}}(a+b\log(cx^n))} + \frac{\left(3\sqrt{\csc(a+b\log(cx^n))}\sqrt{\sin(a+b\log(cx^n))}\right.}{5n}$$

$$= -\frac{2\cos(a+b\log(cx^n))}{5bn\csc^{\frac{3}{2}}(a+b\log(cx^n))} + \frac{6\sqrt{\csc(a+b\log(cx^n))}\,E\left(\frac{1}{2}\left(a-\frac{\pi}{2}+b\log(cx^n\right.\right.}{5bn}$$

Mathematica [A] time = 0.20, size = 88, normalized size = 0.90

$$-\frac{2\sqrt{\csc(a+b\log(cx^n))}\left(\sin^2(a+b\log(cx^n))\cos(a+b\log(cx^n))+3\sqrt{\sin(a+b\log(cx^n))}\,E\left(\frac{1}{4}(-2a-2b\right.\right.}{5bn}$$

Antiderivative was successfully verified.

```
[In] Integrate[1/(x*Csc[a + b*Log[c*x^n]]^(5/2)),x]
```

```
[Out] (-2*Sqrt[Csc[a + b*Log[c*x^n]]]*(3*EllipticE[(-2*a + Pi - 2*b*Log[c*x^n])/4
, 2]*Sqrt[Sin[a + b*Log[c*x^n]]] + Cos[a + b*Log[c*x^n]]*Sin[a + b*Log[c*x^
n]]^2))/(5*b*n)
```

fricas [F] time = 0.56, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{1}{x\csc(b\log(cx^n)+a)^{\frac{5}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] integral(1/(x*csc(b*log(c*x^n) + a)^(5/2)), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*csc(b*log(c*x^n) + a)^(5/2)), x)
```

maple [A] time = 0.18, size = 205, normalized size = 2.09

$$\frac{\frac{2\left(\sin^4(a+b\ln(c\,x^n))\right)}{5}-\frac{2\left(\sin^2(a+b\ln(c\,x^n))\right)}{5}-\frac{6\sqrt{\sin(a+b\ln(c\,x^n))+1}\ \sqrt{-2\sin(a+b\ln(c\,x^n))+2}\ \sqrt{-\sin(a+b\ln(c\,x^n))}\ \mathrm{EllipticE}\left(\sqrt{\sin(a+b\ln(c\,x^n))}\right.}{5}}{n\cos\left(a+b\ln\left(c\,x^n\right)\right)\sqrt{\sin\left(a+b\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/csc(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] 1/n*(2/5*sin(a+b*ln(c*x^n))^4-2/5*sin(a+b*ln(c*x^n))^2-6/5*(sin(a+b*ln(c*x^
n))+1)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*El
lipticE((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2))+3/5*(sin(a+b*ln(c*x^n))+1
)^(1/2)*(-2*sin(a+b*ln(c*x^n))+2)^(1/2)*(-sin(a+b*ln(c*x^n)))^(1/2)*Ellipti
cF((sin(a+b*ln(c*x^n))+1)^(1/2),1/2*2^(1/2)))/cos(a+b*ln(c*x^n))/sin(a+b*ln
(c*x^n))^(1/2)/b
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{1}{x\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*csc(b*log(c*x^n) + a)^(5/2)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{1}{x\,{\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(x*(1/sin(a + b*log(c*x^n)))^(5/2)),x)
```

```
[Out] int(1/(x*(1/sin(a + b*log(c*x^n)))^(5/2)), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/csc(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.320 $\int (ex)^m \csc^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=122

$$-\frac{8e^{3iad}(ex)^{m+1}\left(cx^n\right)^{3ibd}\,{}_2F_1\left(3,-\frac{i(m+1)-3bdn}{2bdn};-\frac{i(m+1)-5bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(-3bdn+i(m+1))}$$

```
[Out] -8*exp(3*I*a*d)*(e*x)^(1+m)*(c*x^n)^(3*I*b*d)*hypergeom([3, 1/2*(-I*(1+m)+3
*b*d*n)/b/d/n],[1/2*(-I*(1+m)+5*b*d*n)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d
))/e/(I*(1+m)-3*b*d*n)
```

Rubi [A] time = 0.11, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4510, 4506, 364}

$$-\frac{8e^{3iad}(ex)^{m+1}\left(cx^n\right)^{3ibd}\,{}_2F_1\left(3,-\frac{i(m+1)-3bdn}{2bdn};-\frac{i(m+1)-5bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(-3bdn+i(m+1))}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Csc[d*(a + b*Log[c*x^n])]^3,x]
```

```
[Out] (-8*E^((3*I)*a*d)*(e*x)^(1 + m)*(c*x^n)^((3*I)*b*d)*Hypergeometric2F1[3, -(
I*(1 + m) - 3*b*d*n)/(2*b*d*n), -(I*(1 + m) - 5*b*d*n)/(2*b*d*n), E^((2*I)*
a*d)*(c*x^n)^((2*I)*b*d)])/(e*(I*(1 + m) - 3*b*d*n))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \csc^3\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\csc^3(d(a+b\log(x)))\,dx,x,cx^n\right)}{en}$$

$$= \frac{\left(8ie^{3iad}(ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+3ibd+\frac{1+m}{n}}}{\left(1-e^{2iad}x^{2ibd}\right)^3}\,dx,x,cx^n\right)}{en}$$

$$= -\frac{8e^{3iad}(ex)^{1+m}\left(cx^n\right)^{3ibd}\ {}_2F_1\left(3,-\frac{i(1+m)-3bdn}{2bdn};-\frac{i(1+m)-5bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{i(e+em)-3bden}$$

Mathematica [B] time = 2.29, size = 367, normalized size = 3.01

$$\frac{x(ex)^m\left(8(-ibdn+m+1)x^{ibdn}\left(\sin\left(d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)-i\cos\left(d\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)\right)\ {}_2F\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m*Csc[d*(a + b*Log[c*x^n])]^3,x]
```

```
[Out] (x*(e*x)^m*(-(b*d*n*Csc[(d*(a + b*Log[c*x^n]))/2]^2) - 4*(1 + m)*Csc[d*(a -
 b*n*Log[x] + b*Log[c*x^n])] + b*d*n*Sec[(d*(a + b*Log[c*x^n]))/2]^2 + 2*(1
 + m)*Csc[(d*(a + b*Log[c*x^n]))/2]*Csc[(d*(a - b*n*Log[x] + b*Log[c*x^n]))
/2]*Sin[(b*d*n*Log[x])/2] - 2*(1 + m)*Sec[(d*(a + b*Log[c*x^n]))/2]*Sec[(d*
(a - b*n*Log[x] + b*Log[c*x^n]))/2]*Sin[(b*d*n*Log[x])/2] + 8*(1 + m - I*b*
d*n)*x^(I*b*d*n)*Hypergeometric2F1[1, (-I - I*m + b*d*n)/(2*b*d*n), ((-1/2*
I)*(1 + m + (3*I)*b*d*n))/(b*d*n), x^((2*I)*b*d*n)*(Cos[2*d*(a - b*n*Log[x]
 + b*Log[c*x^n])] + I*Sin[2*d*(a - b*n*Log[x] + b*Log[c*x^n])])]*((-I)*Cos[
d*(a - b*n*Log[x] + b*Log[c*x^n])] + Sin[d*(a - b*n*Log[x] + b*Log[c*x^n])]
)))/(8*b^2*d^2*n^2)
```

fricas [F] time = 0.85, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m\csc\left(bd\log\left(cx^n\right)+ad\right)^3,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^3,x, algorithm="fricas")
```

```
[Out] integral((e*x)^m*csc(b*d*log(c*x^n) + a*d)^3, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \csc\left(\left(b \log\left(cx^n\right) + a\right)d\right)^3 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^3,x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*csc((b*log(c*x^n) + a)*d)^3, x)
```

maple [F] time = 5.47, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\csc^3\left(d\left(a + b\ln\left(c\,x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*csc(d*(a+b*ln(c*x^n)))^3,x)
```

```
[Out] int((e*x)^m*csc(d*(a+b*ln(c*x^n)))^3,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^3,x, algorithm="maxima")
```

```
[Out] -((b*d*e^m*n*cos(b*d*log(c)) - e^m*m*sin(b*d*log(c)) - e^m*sin(b*d*log(c)))
*x*x^m*cos(b*d*log(x^n) + a*d) - (b*d*e^m*n*sin(b*d*log(c)) + e^m*m*cos(b*d
*log(c)) + e^m*cos(b*d*log(c)))*x*x^m*sin(b*d*log(x^n) + a*d) - (((cos(3*b*
d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m*m -
(b*d*cos(4*b*d*log(c))*cos(3*b*d*log(c)) + b*d*sin(4*b*d*log(c))*sin(3*b*d*
log(c)))*e^m*n + (cos(3*b*d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*s
in(3*b*d*log(c)))*e^m)*x*x^m*cos(3*b*d*log(x^n) + 3*a*d) - ((cos(b*d*log(c)
)*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*sin(b*d*log(c)))*e^m*m + (b*d*cos(4
*b*d*log(c))*cos(b*d*log(c)) + b*d*sin(4*b*d*log(c))*sin(b*d*log(c)))*e^m*n
 + (cos(b*d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*sin(b*d*log(c)))*
e^m)*x*x^m*cos(b*d*log(x^n) + a*d) - ((cos(4*b*d*log(c))*cos(3*b*d*log(c))
+ sin(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m*m + (b*d*cos(3*b*d*log(c))*sin(4
*b*d*log(c)) - b*d*cos(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m*n + (cos(4*b*d*
log(c))*cos(3*b*d*log(c)) + sin(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m)*x*x^m
*sin(3*b*d*log(x^n) + 3*a*d) + ((cos(4*b*d*log(c))*cos(b*d*log(c)) + sin(4*
b*d*log(c))*sin(b*d*log(c)))*e^m*m - (b*d*cos(b*d*log(c))*sin(4*b*d*log(c))
```

```
 - b*d*cos(4*b*d*log(c))*sin(b*d*log(c)))*e^m*n + (cos(4*b*d*log(c))*cos(b*
d*log(c)) + sin(4*b*d*log(c))*sin(b*d*log(c)))*e^m)*x*x^m*sin(b*d*log(x^n)
+ a*d))*cos(4*b*d*log(x^n) + 4*a*d) - (2*((cos(2*b*d*log(c))*sin(3*b*d*log(
c)) - cos(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b*d*cos(3*b*d*log(c))*c
os(2*b*d*log(c)) + b*d*sin(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n + (cos(2*
b*d*log(c))*sin(3*b*d*log(c)) - cos(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*x
*x^m*cos(2*b*d*log(x^n) + 2*a*d) - 2*((cos(3*b*d*log(c))*cos(2*b*d*log(c))
+ sin(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m - (b*d*cos(2*b*d*log(c))*sin(3
*b*d*log(c)) - b*d*cos(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n + (cos(3*b*d*
log(c))*cos(2*b*d*log(c)) + sin(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*x*x^m
*sin(2*b*d*log(x^n) + 2*a*d) - (b*d*e^m*n*cos(3*b*d*log(c)) + e^m*m*sin(3*b
*d*log(c)) + e^m*sin(3*b*d*log(c)))*x*x^m)*cos(3*b*d*log(x^n) + 3*a*d) - 2*
(((cos(b*d*log(c))*sin(2*b*d*log(c)) - cos(2*b*d*log(c))*sin(b*d*log(c)))*e
^m*m + (b*d*cos(2*b*d*log(c))*cos(b*d*log(c)) + b*d*sin(2*b*d*log(c))*sin(b
*d*log(c)))*e^m*n + (cos(b*d*log(c))*sin(2*b*d*log(c)) - cos(2*b*d*log(c))*
sin(b*d*log(c)))*e^m)*x*x^m*cos(b*d*log(x^n) + a*d) - ((cos(2*b*d*log(c))*c
os(b*d*log(c)) + sin(2*b*d*log(c))*sin(b*d*log(c)))*e^m*m - (b*d*cos(b*d*lo
g(c))*sin(2*b*d*log(c)) - b*d*cos(2*b*d*log(c))*sin(b*d*log(c)))*e^m*n + (c
os(2*b*d*log(c))*cos(b*d*log(c)) + sin(2*b*d*log(c))*sin(b*d*log(c)))*e^m)*
x*x^m*sin(b*d*log(x^n) + a*d))*cos(2*b*d*log(x^n) + 2*a*d) + 2*(b^6*d^6*e^m
*n^6 + (b^4*d^4*e^m*m^2 + 2*b^4*d^4*e^m*m + b^4*d^4*e^m)*n^4 + ((b^6*d^6*co
s(4*b*d*log(c))^2 + b^6*d^6*sin(4*b*d*log(c))^2)*e^m*n^6 + ((b^4*d^4*cos(4*
b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d
*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(4*b*d*log(c)
)^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m)*n^4)*cos(4*b*d*log(x^n) + 4*a*d)^2
+ 4*((b^6*d^6*cos(2*b*d*log(c))^2 + b^6*d^6*sin(2*b*d*log(c))^2)*e^m*n^6 +
((b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m^2 + 2*(b
^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m + (b^4*d^4*
cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m)*n^4)*cos(2*b*d*log(
x^n) + 2*a*d)^2 + ((b^6*d^6*cos(4*b*d*log(c))^2 + b^6*d^6*sin(4*b*d*log(c))
^2)*e^m*n^6 + ((b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*
e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m
*m + (b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m)*n^4)*
sin(4*b*d*log(x^n) + 4*a*d)^2 + 4*((b^6*d^6*cos(2*b*d*log(c))^2 + b^6*d^6*s
in(2*b*d*log(c))^2)*e^m*n^6 + ((b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2
*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*
d*log(c))^2)*e^m*m + (b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c
))^2)*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d)^2 + 2*(b^6*d^6*e^m*n^6*cos(4*b*
d*log(c)) + (b^4*d^4*e^m*m^2*cos(4*b*d*log(c)) + 2*b^4*d^4*e^m*m*cos(4*b*d*
log(c)) + b^4*d^4*e^m*cos(4*b*d*log(c)))*n^4 - 2*((b^6*d^6*cos(4*b*d*log(c)
)*cos(2*b*d*log(c)) + b^6*d^6*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6
+ ((b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))
*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)
) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(4*b*d
*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e
```

```
^m)*n^4)*cos(2*b*d*log(x^n) + 2*a*d) - 2*((b^6*d^6*cos(2*b*d*log(c))*sin(4*
b*d*log(c)) - b^6*d^6*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 + ((b^4*
d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b
*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*
d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(2*b*d*log(c))
*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)
*sin(2*b*d*log(x^n) + 2*a*d))*cos(4*b*d*log(x^n) + 4*a*d) - 4*(b^6*d^6*e^m*
n^6*cos(2*b*d*log(c)) + (b^4*d^4*e^m*m^2*cos(2*b*d*log(c)) + 2*b^4*d^4*e^m*
m*cos(2*b*d*log(c)) + b^4*d^4*e^m*cos(2*b*d*log(c)))*n^4)*cos(2*b*d*log(x^n
) + 2*a*d) - 2*(b^6*d^6*e^m*n^6*sin(4*b*d*log(c)) + (b^4*d^4*e^m*m^2*sin(4*
b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(4*b*d*log(c)) + b^4*d^4*e^m*sin(4*b*d*log
(c)))*n^4 - 2*((b^6*d^6*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^6*d^6*cos(4
*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 + ((b^4*d^4*cos(2*b*d*log(c))*sin(4
*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^
4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2
*b*d*log(c)))*e^m*m + (b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^
4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*cos(2*b*d*log(x^n) + 2*a*d
) + 2*((b^6*d^6*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^6*d^6*sin(4*b*d*log
(c))*sin(2*b*d*log(c)))*e^m*n^6 + ((b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log
(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*co
s(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log
(c)))*e^m*m + (b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*
b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d))*sin(4
*b*d*log(x^n) + 4*a*d) + 4*(b^6*d^6*e^m*n^6*sin(2*b*d*log(c)) + (b^4*d^4*e^
m*m^2*sin(2*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(2*b*d*log(c)) + b^4*d^4*e^m*s
in(2*b*d*log(c)))*n^4)*sin(2*b*d*log(x^n) + 2*a*d))*integrate(1/4*(x^m*cos(
b*d*log(x^n) + a*d)*sin(b*d*log(c)) + x^m*cos(b*d*log(c))*sin(b*d*log(x^n)
+ a*d))/(2*b^4*d^4*n^4*cos(b*d*log(c))*cos(b*d*log(x^n) + a*d) - 2*b^4*d^4*
n^4*sin(b*d*log(c))*sin(b*d*log(x^n) + a*d) + b^4*d^4*n^4 + (b^4*d^4*cos(b*
d*log(c))^2 + b^4*d^4*sin(b*d*log(c))^2)*n^4*cos(b*d*log(x^n) + a*d)^2 + (b
^4*d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*log(c))^2)*n^4*sin(b*d*log(x^n)
+ a*d)^2), x) + 2*(b^6*d^6*e^m*n^6 + (b^4*d^4*e^m*m^2 + 2*b^4*d^4*e^m*m + b
^4*d^4*e^m)*n^4 + ((b^6*d^6*cos(4*b*d*log(c))^2 + b^6*d^6*sin(4*b*d*log(c))
^2)*e^m*n^6 + ((b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*
e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m
*m + (b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*sin(4*b*d*log(c))^2)*e^m)*n^4)*
cos(4*b*d*log(x^n) + 4*a*d)^2 + 4*((b^6*d^6*cos(2*b*d*log(c))^2 + b^6*d^6*s
in(2*b*d*log(c))^2)*e^m*n^6 + ((b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2
*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*
d*log(c))^2)*e^m*m + (b^4*d^4*cos(2*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c
))^2)*e^m)*n^4)*cos(2*b*d*log(x^n) + 2*a*d)^2 + ((b^6*d^6*cos(4*b*d*log(c))
^2 + b^6*d^6*sin(4*b*d*log(c))^2)*e^m*n^6 + ((b^4*d^4*cos(4*b*d*log(c))^2 +
 b^4*d^4*sin(4*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))^2 + b^
4*d^4*sin(4*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(4*b*d*log(c))^2 + b^4*d^4*s
in(4*b*d*log(c))^2)*e^m)*n^4)*sin(4*b*d*log(x^n) + 4*a*d)^2 + 4*((b^6*d^6*c
```

```
os(2*b*d*log(c))^2 + b^6*d^6*sin(2*b*d*log(c))^2)*e^m*n^6 + ((b^4*d^4*cos(2
*b*d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m^2 + 2*(b^4*d^4*cos(2*b*
d*log(c))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m*m + (b^4*d^4*cos(2*b*d*log(c
))^2 + b^4*d^4*sin(2*b*d*log(c))^2)*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d)^2
 + 2*(b^6*d^6*e^m*n^6*cos(4*b*d*log(c)) + (b^4*d^4*e^m*m^2*cos(4*b*d*log(c)
) + 2*b^4*d^4*e^m*m*cos(4*b*d*log(c)) + b^4*d^4*e^m*cos(4*b*d*log(c)))*n^4
- 2*((b^6*d^6*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^6*d^6*sin(4*b*d*log(c
))*sin(2*b*d*log(c)))*e^m*n^6 + ((b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c
)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(
4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c
)))*e^m*m + (b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*
d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*cos(2*b*d*log(x^n) + 2*a*d) - 2*((b^
6*d^6*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^6*d^6*cos(4*b*d*log(c))*sin(2
*b*d*log(c)))*e^m*n^6 + ((b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4
*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*lo
g(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*
m + (b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c)
)*sin(2*b*d*log(c)))*e^m)*n^4)*sin(2*b*d*log(x^n) + 2*a*d))*cos(4*b*d*log(x
^n) + 4*a*d) - 4*(b^6*d^6*e^m*n^6*cos(2*b*d*log(c)) + (b^4*d^4*e^m*m^2*cos(
2*b*d*log(c)) + 2*b^4*d^4*e^m*m*cos(2*b*d*log(c)) + b^4*d^4*e^m*cos(2*b*d*l
og(c)))*n^4)*cos(2*b*d*log(x^n) + 2*a*d) - 2*(b^6*d^6*e^m*n^6*sin(4*b*d*log
(c)) + (b^4*d^4*e^m*m^2*sin(4*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin(4*b*d*log(c
)) + b^4*d^4*e^m*sin(4*b*d*log(c)))*n^4 - 2*((b^6*d^6*cos(2*b*d*log(c))*sin
(4*b*d*log(c)) - b^6*d^6*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 + ((b
^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(
2*b*d*log(c)))*e^m*m^2 + 2*(b^4*d^4*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b
^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(2*b*d*log(
c))*sin(4*b*d*log(c)) - b^4*d^4*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n
^4)*cos(2*b*d*log(x^n) + 2*a*d) + 2*((b^6*d^6*cos(4*b*d*log(c))*cos(2*b*d*l
og(c)) + b^6*d^6*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n^6 + ((b^4*d^4*c
os(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*lo
g(c)))*e^m*m^2 + 2*(b^4*d^4*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^4*d^4*s
in(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m*m + (b^4*d^4*cos(4*b*d*log(c))*cos(
2*b*d*log(c)) + b^4*d^4*sin(4*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*n^4)*sin(
2*b*d*log(x^n) + 2*a*d))*sin(4*b*d*log(x^n) + 4*a*d) + 4*(b^6*d^6*e^m*n^6*s
in(2*b*d*log(c)) + (b^4*d^4*e^m*m^2*sin(2*b*d*log(c)) + 2*b^4*d^4*e^m*m*sin
(2*b*d*log(c)) + b^4*d^4*e^m*sin(2*b*d*log(c)))*n^4)*sin(2*b*d*log(x^n) + 2
*a*d))*integrate(-1/4*(x^m*cos(b*d*log(x^n) + a*d)*sin(b*d*log(c)) + x^m*co
s(b*d*log(c))*sin(b*d*log(x^n) + a*d))/(2*b^4*d^4*n^4*cos(b*d*log(c))*cos(b
*d*log(x^n) + a*d) - 2*b^4*d^4*n^4*sin(b*d*log(c))*sin(b*d*log(x^n) + a*d)
- b^4*d^4*n^4 - (b^4*d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*log(c))^2)*n^4
*cos(b*d*log(x^n) + a*d)^2 - (b^4*d^4*cos(b*d*log(c))^2 + b^4*d^4*sin(b*d*l
og(c))^2)*n^4*sin(b*d*log(x^n) + a*d)^2), x) - (((cos(4*b*d*log(c))*cos(3*b
*d*log(c)) + sin(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m*m + (b*d*cos(3*b*d*lo
g(c))*sin(4*b*d*log(c)) - b*d*cos(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m*n +
```

```
(cos(4*b*d*log(c))*cos(3*b*d*log(c)) + sin(4*b*d*log(c))*sin(3*b*d*log(c)))
*e^m)*x*x^m*cos(3*b*d*log(x^n) + 3*a*d) - ((cos(4*b*d*log(c))*cos(b*d*log(c
)) + sin(4*b*d*log(c))*sin(b*d*log(c)))*e^m*m - (b*d*cos(b*d*log(c))*sin(4*
b*d*log(c)) - b*d*cos(4*b*d*log(c))*sin(b*d*log(c)))*e^m*n + (cos(4*b*d*log
(c))*cos(b*d*log(c)) + sin(4*b*d*log(c))*sin(b*d*log(c)))*e^m)*x*x^m*cos(b*
d*log(x^n) + a*d) + ((cos(3*b*d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c
))*sin(3*b*d*log(c)))*e^m*m - (b*d*cos(4*b*d*log(c))*cos(3*b*d*log(c)) + b*
d*sin(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m*n + (cos(3*b*d*log(c))*sin(4*b*d
*log(c)) - cos(4*b*d*log(c))*sin(3*b*d*log(c)))*e^m)*x*x^m*sin(3*b*d*log(x^
n) + 3*a*d) - ((cos(b*d*log(c))*sin(4*b*d*log(c)) - cos(4*b*d*log(c))*sin(b
*d*log(c)))*e^m*m + (b*d*cos(4*b*d*log(c))*cos(b*d*log(c)) + b*d*sin(4*b*d*
log(c))*sin(b*d*log(c)))*e^m*n + (cos(b*d*log(c))*sin(4*b*d*log(c)) - cos(4
*b*d*log(c))*sin(b*d*log(c)))*e^m)*x*x^m*sin(b*d*log(x^n) + a*d))*sin(4*b*d
*log(x^n) + 4*a*d) - (2*((cos(3*b*d*log(c))*cos(2*b*d*log(c)) + sin(3*b*d*l
og(c))*sin(2*b*d*log(c)))*e^m*m - (b*d*cos(2*b*d*log(c))*sin(3*b*d*log(c))
- b*d*cos(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n + (cos(3*b*d*log(c))*cos(2
*b*d*log(c)) + sin(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*x*x^m*cos(2*b*d*lo
g(x^n) + 2*a*d) + 2*((cos(2*b*d*log(c))*sin(3*b*d*log(c)) - cos(3*b*d*log(c
))*sin(2*b*d*log(c)))*e^m*m + (b*d*cos(3*b*d*log(c))*cos(2*b*d*log(c)) + b*
d*sin(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m*n + (cos(2*b*d*log(c))*sin(3*b*d
*log(c)) - cos(3*b*d*log(c))*sin(2*b*d*log(c)))*e^m)*x*x^m*sin(2*b*d*log(x^
n) + 2*a*d) + (b*d*e^m*n*sin(3*b*d*log(c)) - e^m*m*cos(3*b*d*log(c)) - e^m*
cos(3*b*d*log(c)))*x*x^m)*sin(3*b*d*log(x^n) + 3*a*d) - 2*(((cos(2*b*d*log(
c))*cos(b*d*log(c)) + sin(2*b*d*log(c))*sin(b*d*log(c)))*e^m*m - (b*d*cos(b
*d*log(c))*sin(2*b*d*log(c)) - b*d*cos(2*b*d*log(c))*sin(b*d*log(c)))*e^m*n
 + (cos(2*b*d*log(c))*cos(b*d*log(c)) + sin(2*b*d*log(c))*sin(b*d*log(c)))*
e^m)*x*x^m*cos(b*d*log(x^n) + a*d) + ((cos(b*d*log(c))*sin(2*b*d*log(c)) -
cos(2*b*d*log(c))*sin(b*d*log(c)))*e^m*m + (b*d*cos(2*b*d*log(c))*cos(b*d*l
og(c)) + b*d*sin(2*b*d*log(c))*sin(b*d*log(c)))*e^m*n + (cos(b*d*log(c))*si
n(2*b*d*log(c)) - cos(2*b*d*log(c))*sin(b*d*log(c)))*e^m)*x*x^m*sin(b*d*log
(x^n) + a*d))*sin(2*b*d*log(x^n) + 2*a*d))/(4*b^2*d^2*n^2*cos(2*b*d*log(c))
*cos(2*b*d*log(x^n) + 2*a*d) - 4*b^2*d^2*n^2*sin(2*b*d*log(c))*sin(2*b*d*lo
g(x^n) + 2*a*d) - b^2*d^2*n^2 - (b^2*d^2*cos(4*b*d*log(c))^2 + b^2*d^2*sin(
4*b*d*log(c))^2)*n^2*cos(4*b*d*log(x^n) + 4*a*d)^2 - 4*(b^2*d^2*cos(2*b*d*l
og(c))^2 + b^2*d^2*sin(2*b*d*log(c))^2)*n^2*cos(2*b*d*log(x^n) + 2*a*d)^2 -
 (b^2*d^2*cos(4*b*d*log(c))^2 + b^2*d^2*sin(4*b*d*log(c))^2)*n^2*sin(4*b*d*
log(x^n) + 4*a*d)^2 - 4*(b^2*d^2*cos(2*b*d*log(c))^2 + b^2*d^2*sin(2*b*d*lo
g(c))^2)*n^2*sin(2*b*d*log(x^n) + 2*a*d)^2 - 2*(b^2*d^2*n^2*cos(4*b*d*log(c
)) - 2*(b^2*d^2*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^2*d^2*sin(4*b*d*log
(c))*sin(2*b*d*log(c)))*n^2*cos(2*b*d*log(x^n) + 2*a*d) - 2*(b^2*d^2*cos(2*
b*d*log(c))*sin(4*b*d*log(c)) - b^2*d^2*cos(4*b*d*log(c))*sin(2*b*d*log(c))
)*n^2*sin(2*b*d*log(x^n) + 2*a*d))*cos(4*b*d*log(x^n) + 4*a*d) + 2*(b^2*d^2
*n^2*sin(4*b*d*log(c)) - 2*(b^2*d^2*cos(2*b*d*log(c))*sin(4*b*d*log(c)) - b
^2*d^2*cos(4*b*d*log(c))*sin(2*b*d*log(c)))*n^2*cos(2*b*d*log(x^n) + 2*a*d)
 + 2*(b^2*d^2*cos(4*b*d*log(c))*cos(2*b*d*log(c)) + b^2*d^2*sin(4*b*d*log(c
```

```
))*sin(2*b*d*log(c)))*n^2*sin(2*b*d*log(x^n) + 2*a*d))*sin(4*b*d*log(x^n) +
 4*a*d))
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(e\,x)^m}{\sin\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^3,x)
[Out] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^3, x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*csc(d*(a+b*ln(c*x**n)))**3,x)
[Out] Timed out
```

3.321 $\int (ex)^m \csc^2\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$

Optimal. Leaf size=119

$$-\frac{4e^{2iad}(ex)^{m+1}\left(cx^n\right)^{2ibd}\,{}_2F_1\left(2,-\frac{i(m+1)-2bdn}{2bdn};-\frac{i(m+1)-4bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(2ibdn+m+1)}$$

```
[Out] -4*exp(2*I*a*d)*(e*x)^(1+m)*(c*x^n)^(2*I*b*d)*hypergeom([2, 1/2*(-I*(1+m)+2
*b*d*n)/b/d/n],[1/2*(-I*(1+m)+4*b*d*n)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d
))/e/(1+m+2*I*b*d*n)
```

Rubi [A] time = 0.10, antiderivative size = 119, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4510, 4506, 364}

$$-\frac{4e^{2iad}(ex)^{m+1}\left(cx^n\right)^{2ibd}\,{}_2F_1\left(2,-\frac{i(m+1)-2bdn}{2bdn};-\frac{i(m+1)-4bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(2ibdn+m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Csc[d*(a + b*Log[c*x^n])]^2,x]
```

```
[Out] (-4*E^((2*I)*a*d)*(e*x)^(1 + m)*(c*x^n)^((2*I)*b*d)*Hypergeometric2F1[2, -(
I*(1 + m) - 2*b*d*n)/(2*b*d*n), -(I*(1 + m) - 4*b*d*n)/(2*b*d*n), E^((2*I)*
a*d)*(c*x^n)^((2*I)*b*d)])/(e*(1 + m + (2*I)*b*d*n))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \csc^2\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\mathrm{Subst}\left(\int x^{-1+\frac{1+m}{n}}\csc^2(d(a+b\log(x)))\,dx,x,cx^n\right)}{en}$$

$$= -\frac{\left(4e^{2iad}(ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\mathrm{Subst}\left(\int\frac{x^{-1+2ibd+\frac{1+m}{n}}}{\left(1-e^{2iad}x^{2ibd}\right)^2}\,dx,x,cx^n\right)}{en}$$

$$= -\frac{4e^{2iad}(ex)^{1+m}\left(cx^n\right)^{2ibd}\;{}_2F_1\left(2,-\frac{i(1+m)-2bdn}{2bdn};-\frac{i(1+m)-4bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(1+m+2ibdn)}$$

Mathematica [B] time = 6.53, size = 534, normalized size = 4.49

$$\frac{x(ex)^m\sin(bdn\log(x))\csc\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)\csc\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)+bdn\log(x)\right)}{bdn}$$

Antiderivative was successfully verified.

```
[In] Integrate[(e*x)^m*Csc[d*(a + b*Log[c*x^n])]^2,x]
```

```
[Out] (x*(e*x)^m*Csc[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*Csc[b*d*n*Log[x] + d*(
a + b*(-(n*Log[x]) + Log[c*x^n]))]*Sin[b*d*n*Log[x]])/(b*d*n) - ((1 + m)*(e
*x)^m*Csc[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))]*((x^(1 + m)*Csc[d*(a + b*Lo
g[c*x^n])]*Sin[b*d*n*Log[x]])/(1 + m) - (I*(I*E^((a + 2*a*m + b*(1 + m)*n*L
og[x] + b*(1 + 2*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 + m + (2*I)*b*d*n
)*Cot[d*(a + b*Log[c*x^n])] - E^((a + 2*a*m + b*(1 + m)*n*Log[x] + b*(1 + 2
*m)*(-(n*Log[x]) + Log[c*x^n]))/(b*n))*(1 + m + (2*I)*b*d*n)*Hypergeometric
2F1[1, ((-1/2*I)*(1 + m))/(b*d*n), 1 - ((I/2)*(1 + m))/(b*d*n), E^((2*I)*d*
(a + b*Log[c*x^n]))] - E^((a*(1 + 2*m + (2*I)*b*d*n))/(b*n) + (1 + m + (2*I
)*b*d*n)*Log[x] + ((1 + 2*m + (2*I)*b*d*n)*(-(n*Log[x]) + Log[c*x^n]))/n)*(
1 + m)*Hypergeometric2F1[1, ((-1/2*I)*(1 + m + (2*I)*b*d*n))/(b*d*n), ((-1/
2*I)*(1 + m + (4*I)*b*d*n))/(b*d*n), E^((2*I)*d*(a + b*Log[c*x^n]))])*Sin[d
*(a + b*(-(n*Log[x]) + Log[c*x^n]))])/(E^(((1 + 2*m)*(a + b*(-(n*Log[x]) +
Log[c*x^n])))/(b*n))*(1 + m)*(1 + m + (2*I)*b*d*n))))/(b*d*n*x^m)
```

fricas [F] time = 0.97, size = 0, normalized size = 0.00

$$\mathrm{integral}\left((ex)^m\csc\left(bd\log\left(cx^n\right)+ad\right)^2,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^2,x, algorithm="fricas")
```

```
[Out] integral((e*x)^m*csc(b*d*log(c*x^n) + a*d)^2, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \csc \left(\left(b \log \left(cx^n\right) + a\right)d\right)^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^2,x, algorithm="giac")
```

```
[Out] integrate((e*x)^m*csc((b*log(c*x^n) + a)*d)^2, x)
```

maple [F] time = 2.18, size = 0, normalized size = 0.00

$$\int (ex)^m \left(\csc^2 \left(d \left(a + b \ln \left(c\, x^n\right)\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*csc(d*(a+b*ln(c*x^n)))^2,x)
```

```
[Out] int((e*x)^m*csc(d*(a+b*ln(c*x^n)))^2,x)
```

maxima [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(e\,x)^m}{\sin \left(d\,\left(a + b\,\ln \left(c\,x^n\right)\right)\right)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^2,x)
```

```
[Out] int((e*x)^m/sin(d*(a + b*log(c*x^n)))^2, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \csc^2\left(ad + bd\log\left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*csc(d*(a+b*ln(c*x**n)))**2,x)
```

```
[Out] Integral((e*x)**m*csc(a*d + b*d*log(c*x**n))**2, x)
```

3.322 $\int (ex)^m \csc\left(d\left(a+b\log\left(cx^n\right)\right)\right) dx$

Optimal. Leaf size=123

$$\frac{2e^{iad}(ex)^{m+1}\left(cx^n\right)^{ibd}\ {}_2F_1\left(1,-\frac{im-bdn+i}{2bdn};-\frac{i(m+1)-3bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(-bdn+i(m+1))}$$

```
[Out] 2*exp(I*a*d)*(e*x)^(1+m)*(c*x^n)^(I*b*d)*hypergeom([1, 1/2*(-I-I*m+b*d*n)/b
/d/n],[1/2*(-I*(1+m)+3*b*d*n)/b/d/n],exp(2*I*a*d)*(c*x^n)^(2*I*b*d))/e/(I*(
1+m)-b*d*n)
```

Rubi [A] time = 0.08, antiderivative size = 118, normalized size of antiderivative = 0.96, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4510, 4506, 364}

$$\frac{2e^{iad}(ex)^{m+1}\left(cx^n\right)^{ibd}\ {}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i(m+1)}{bdn}\right);-\frac{i(m+1)-3bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{e(-bdn+i(m+1))}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Csc[d*(a + b*Log[c*x^n])],x]
```

```
[Out] (2*E^(I*a*d)*(e*x)^(1 + m)*(c*x^n)^(I*b*d)*Hypergeometric2F1[1, (1 - (I*(1
+ m))/(b*d*n))/2, -(I*(1 + m) - 3*b*d*n)/(2*b*d*n), E^((2*I)*a*d)*(c*x^n)^(
(2*I)*b*d)])/(e*(I*(1 + m) - b*d*n))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4506

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(-2*I)^p*E^(I*a*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^
(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m}, x] && IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \csc\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\csc(d(a+b\log(x)))\,dx,x,cx^n\right)}{en}$$
$$= -\frac{\left(2ie^{iad}(ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+ibd+\frac{1+m}{n}}}{1-e^{2iad}x^{2ibd}}\,dx,x,cx^n\right)}{en}$$
$$= \frac{2e^{iad}(ex)^{1+m}\left(cx^n\right)^{ibd}\,{}_2F_1\left(1,\frac{1}{2}\left(1-\frac{i(1+m)}{bdn}\right);-\frac{i(1+m)-3bdn}{2bdn};e^{2iad}\left(cx^n\right)^{2ibd}\right)}{i(e+em)-bden}$$

Mathematica [A] time = 0.43, size = 181, normalized size = 1.47

$$\frac{2(ex)^m x^{1+ibdn}\left(\sin\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)-i\cos\left(d\left(a+b\left(\log\left(cx^n\right)-n\log(x)\right)\right)\right)\right)\,{}_2F_1\left(1,\frac{-im+bdn-i}{2bdn};\right.}{ibdn+m+}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m*Csc[d*(a + b*Log[c*x^n])],x]
```

```
[Out] (2*x^(1 + I*b*d*n)*(e*x)^m*Hypergeometric2F1[1, (-I - I*m + b*d*n)/(2*b*d*n
), ((-1/2*I)*(1 + m + (3*I)*b*d*n))/(b*d*n), x^((2*I)*b*d*n)*(Cos[2*d*(a +
b*(-(n*Log[x]) + Log[c*x^n]))] + I*Sin[2*d*(a + b*(-(n*Log[x]) + Log[c*x^n]
))])]*((-I)*Cos[d*(a + b*(-(n*Log[x]) + Log[c*x^n]))] + Sin[d*(a + b*(-(n*L
og[x]) + Log[c*x^n]))]))/(1 + m + I*b*d*n)
```

fricas [F] time = 0.68, size = 0, normalized size = 0.00

$$\text{integral}\left(\left(ex\right)^m\csc\left(bd\log\left(cx^n\right)+ad\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n))),x, algorithm="fricas")
```

```
[Out] integral((e*x)^m*csc(b*d*log(c*x^n) + a*d), x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \csc\left(\left(b\log\left(cx^n\right)+a\right)d\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n))),x, algorithm="giac")
[Out] integrate((e*x)^m*csc((b*log(c*x^n) + a)*d), x)
```

maple [F] time = 1.12, size = 0, normalized size = 0.00

$$\int (ex)^m \csc \left(d \left(a+b \ln \left(c\, x^n\right)\right)\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*csc(d*(a+b*ln(c*x^n))),x)
[Out] int((e*x)^m*csc(d*(a+b*ln(c*x^n))),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \csc \left(\left(b \log \left(cx^n\right)+a\right)d\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n))),x, algorithm="maxima")
[Out] integrate((e*x)^m*csc((b*log(c*x^n) + a)*d), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{(e\, x)^m}{\sin \left(d\ \left(a+b\ \ln \left(c\, x^n\right)\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m/sin(d*(a + b*log(c*x^n))),x)
[Out] int((e*x)^m/sin(d*(a + b*log(c*x^n))), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m \csc \left(ad+bd \log \left(cx^n\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*csc(d*(a+b*ln(c*x**n))),x)
[Out] Integral((e*x)**m*csc(a*d + b*d*log(c*x**n)), x)
```

3.323 $\int x^m \csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},-\frac{2im-5bn+2i}{4bn};-\frac{2im-9bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{5ibn+2m+2}$$

```
[Out] 2*x^(1+m)*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(5/2)*csc(a+b*ln(c*x^n))^(5/2)*hyp
ergeom([5/2, 1/4*(-2*I-2*I*m+5*b*n)/b/n],[1/4*(-2*I-2*I*m+9*b*n)/b/n],exp(2
*I*a)*(c*x^n)^(2*I*b))/(2+2*m+5*I*b*n)
```

Rubi [A] time = 0.10, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4510, 4508, 364}

$$\frac{2x^{m+1}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(m+1)}{bn}\right);-\frac{2im-9bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)}{5ibn+2m+2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Csc[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 + m)*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(5/2)*Csc[a + b*Log[c*x^n]
]^(5/2)*Hypergeometric2F1[5/2, (5 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)
*m - 9*b*n)/(4*b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(2 + 2*m + (5*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\csc^{\frac{5}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{5ib}{2}-\frac{1+m}{n}}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int \frac{x^{-1+\frac{5ib}{2}}}{\left(1-e^{2ia}x\right.}\right.}{n}$$

$$= \frac{2x^{1+m}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{5/2}\csc^{\frac{5}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{5}{2},\frac{1}{4}\left(5-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im}{4b}\right.}{2+2m+5ibn}$$

Mathematica [A] time = 2.99, size = 165, normalized size = 1.27

$$\frac{2x^{m+1}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\left(e^{-2ia}(ibn+2m+2)\left(cx^n\right)^{-2ib}\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right)\,{}_2F_1\left(1,\frac{2im+3bn+2i}{4bn};\frac{2im+5bn+2i}{4bn};e^{-2i(a}\right.\right.}{3b^2n^2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Csc[a + b*Log[c*x^n]]^(5/2),x]
```

```
[Out] (2*x^(1 + m)*Sqrt[Csc[a + b*Log[c*x^n]]]*(-2 - 2*m - b*n*Cot[a + b*Log[c*x^
n]] + ((2 + 2*m + I*b*n)*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Hypergeometri
c2F1[1, (2*I + (2*I)*m + 3*b*n)/(4*b*n), (2*I + (2*I)*m + 5*b*n)/(4*b*n), E
^((-2*I)*(a + b*Log[c*x^n]))])/(E^((2*I)*a)*(c*x^n)^((2*I)*b))))/(3*b^2*n^2
)
```

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^m*csc(a+b*log(c*x^n))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+b*log(c*x^n))^(5/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.21, size = 0, normalized size = 0.00

$$\int x^{m} \left(\csc^{\frac{5}{2}} \left(a +b \ln \left(c \,x^{n}\right)\right)\right)d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*csc(a+b*ln(c*x^n))^(5/2),x)
```

```
[Out] int(x^m*csc(a+b*ln(c*x^n))^(5/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \csc\left(b \log\left(c x^{n}\right) + a\right)^{\frac{5}{2}}\,{d x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+b*log(c*x^n))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*csc(b*log(c*x^n) + a)^(5/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^m\,{\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{5/2} \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(1/sin(a + b*log(c*x^n)))^(5/2),x)
```

```
[Out] int(x^m*(1/sin(a + b*log(c*x^n)))^(5/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*csc(a+b*ln(c*x**n))**(5/2),x)
```

```
[Out] Timed out
```

3.324 $\int x^m \csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},-\frac{2im-3bn+2i}{4bn};-\frac{2im-7bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3ibn+2m+2}$$

```
[Out] 2*x^(1+m)*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(3/2)*csc(a+b*ln(c*x^n))^(3/2)*hyp
ergeom([3/2, 1/4*(-2*I-2*I*m+3*b*n)/b/n],[1/4*(-2*I-2*I*m+7*b*n)/b/n],exp(2
*I*a)*(c*x^n)^(2*I*b))/(2+2*m+3*I*b*n)
```

Rubi [A] time = 0.09, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4510, 4508, 364}

$$\frac{2x^{m+1}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(m+1)}{bn}\right);-\frac{2im-7bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}{3ibn+2m+2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Csc[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Csc[a + b*Log[c*x^n]
]^(3/2)*Hypergeometric2F1[3/2, (3 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)
*m - 7*b*n)/(4*b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(2 + 2*m + (3*I)*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m \csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\csc^{\frac{3}{2}}(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{3ib}{2}-\frac{1+m}{n}}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int \frac{x^{-1+\frac{3}{}}}{\left(1-e^{2i}\right.}\right.}{n}$$

$$= \frac{2x^{1+m}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(\frac{3}{2},\frac{1}{4}\left(3-\frac{2i(1+m)}{bn}\right);-\frac{2i+2}{}\right.}{2+2m+3ibn}$$

Mathematica [B] time = 9.42, size = 466, normalized size = 3.58

$$\frac{x^{-ibn+m+1}\left(\left(b^2n^2+4m^2+8m+4\right)x^{2ibn}\sqrt{2-2e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\frac{ie^{ia}\left(cx^n\right)^{ib}}{-1+e^{2ia}\left(cx^n\right)^{2ib}}}\,{}_2F_1\left(\frac{1}{2},-\frac{i\left(m+\frac{3ibn}{2}+1\right)}{2bn};-\frac{2im-7bn+2i}{4bn};e^{2ia}\left(\right.\right.\right.}{bn(3bn}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Csc[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (x^(1 + m - I*b*n)*((4 + 8*m + 4*m^2 + b^2*n^2)*x^((2*I)*b*n)*Sqrt[2 - 2*E^
((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[(I*E^(I*a)*(c*x^n)^(I*b))/(-1 + E^((2*I)*
a)*(c*x^n)^((2*I)*b))]*Hypergeometric2F1[1/2, ((-1/2*I)*(1 + m + ((3*I)/2)*
b*n))/(b*n), -1/4*(2*I + (2*I)*m - 7*b*n)/(b*n), E^((2*I)*a)*(c*x^n)^((2*I)
*b)] + (-2*I - (2*I)*m + 3*b*n)*((-2*I - (2*I)*m + b*n)*Sqrt[2 - 2*E^((2*I)
*a)*(c*x^n)^((2*I)*b)]*Sqrt[(I*E^(I*a)*(c*x^n)^(I*b))/(-1 + E^((2*I)*a)*(c*
x^n)^((2*I)*b))]*Hypergeometric2F1[1/2, -1/4*(2*I + (2*I)*m + b*n)/(b*n), -
1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)] - 2*x^(I*
b*n)*Sqrt[Csc[a + b*Log[c*x^n]]]*(b*n*Cos[b*n*Log[x]] - 2*(1 + m)*Sin[b*n*L
og[x]]))))/(b*n*(-2*I - (2*I)*m + 3*b*n)*(b*n*Cos[a - b*n*Log[x] + b*Log[c*
x^n]] + 2*(1 + m)*Sin[a - b*n*Log[x] + b*Log[c*x^n]]))
```

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^m*csc(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (constant residues)
```

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] Timed out
```

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int x^{m} \left(\csc^{\frac{3}{2}} \left(a + b \ln \left(c \, x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*csc(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(x^m*csc(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \csc \left(b \log \left(cx^{n}\right) + a\right)^{\frac{3}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*csc(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^m \left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)^{3/2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(1/sin(a + b*log(c*x^n)))^(3/2),x)
```

```
[Out] int(x^m*(1/sin(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*csc(a+b*ln(c*x**n))**(3/2),x)
[Out] Timed out
```

3.325 $\int x^m \sqrt{\csc \left(a+b \log \left(c x^n\right)\right)} \, dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\ {}_2F_1\left(\frac{1}{2},-\frac{2im-bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{ibn+2m+2}$$

```
[Out] 2*x^(1+m)*hypergeom([1/2, 1/4*(-2*I-2*I*m+b*n)/b/n],[1/4*(-2*I-2*I*m+5*b*n)
/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)*csc(
a+b*ln(c*x^n))^(1/2)/(2+2*m+I*b*n)
```

Rubi [A] time = 0.09, antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4510, 4508, 364}

$$\frac{2x^{m+1}\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\ {}_2F_1\left(\frac{1}{2},-\frac{2im-bn+2i}{4bn};-\frac{2im-5bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}{ibn+2m+2}$$

Antiderivative was successfully verified.

```
[In] Int[x^m*Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^(1 + m)*Sqrt[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Csc[a + b*Log[c*x
^n]]]*Hypergeometric2F1[1/2, -(2*I + (2*I)*m - b*n)/(4*b*n), -(2*I + (2*I)*
m - 5*b*n)/(4*b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(2 + 2*m + I*b*n)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x^m\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\sqrt{\csc(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{ib}{2}-\frac{1+m}{n}}\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{ib}{2}+}}{\sqrt{1-e^{2i}}}\right.}{n}$$

$$= \frac{2x^{1+m}\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(\frac{1}{2},-\frac{2i+2im-bn}{4bn};-\frac{2i+2im-5bn}{4bn}\right.}{2+2m+ibn}$$

Mathematica [A] time = 0.93, size = 138, normalized size = 1.06

$$\frac{2e^{-2ia}x^{m+1}\left(cx^n\right)^{-2ib}\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right)\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\,{}_2F_1\left(1,\frac{2im+3bn+2i}{4bn};\frac{2im+5bn+2i}{4bn};e^{-2i\left(a+b\log\left(cx^n\right)\right)}\right)}{-ibn+2m+2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m*Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] (2*x^(1 + m)*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Sqrt[Csc[a + b*Log[c*x^n]
]]*Hypergeometric2F1[1, (2*I + (2*I)*m + 3*b*n)/(4*b*n), (2*I + (2*I)*m + 5
*b*n)/(4*b*n), E^((-2*I)*(a + b*Log[c*x^n]))])/(E^((2*I)*a)*(2 + 2*m - I*b*
n)*(c*x^n)^((2*I)*b))
```

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^m*csc(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^m\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^m*sqrt(csc(b*log(c*x^n) + a)), x)
```

maple [F] time = 0.17, size = 0, normalized size = 0.00

$$\int x^{m} \left(\sqrt{\csc}\, (a + b\ln(c\,x^{n}))\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*csc(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(x^m*csc(a+b*ln(c*x^n))^(1/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sqrt{\csc\left(b\log\left(cx^{n}\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m*csc(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m*sqrt(csc(b*log(c*x^n) + a)), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x^{m} \sqrt{\frac{1}{\sin\left(a + b\,\ln\left(c\,x^{n}\right)\right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m*(1/sin(a + b*log(c*x^n)))^(1/2),x)
```

```
[Out] int(x^m*(1/sin(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x^{m} \sqrt{\csc\left(a + b\log\left(cx^{n}\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m*csc(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(x**m*sqrt(csc(a + b*log(c*x**n))), x)
```

3.326 $\int \frac{x^m}{\sqrt{\csc(a+b\log(cx^n))}}\,dx$

Optimal. Leaf size=129

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{1}{2},-\frac{2im+bn+2i}{4bn};-\frac{2im-3bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-ibn+2m+2)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

[Out] 2*x^(1+m)*hypergeom([-1/2, 1/4*(-2*I-2*I*m-b*n)/b/n],[1/4*(-2*I-2*I*m+3*b*n)/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+2*m-I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2*I*b))^(1/2)/csc(a+b*ln(c*x^n))^(1/2)

Rubi [A] time = 0.09, antiderivative size = 126, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4510, 4508, 364}

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bn}-1\right);-\frac{2im-3bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-ibn+2m+2)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

Antiderivative was successfully verified.

[In] Int[x^m/Sqrt[Csc[a + b*Log[c*x^n]]],x]

[Out] (2*x^(1 + m)*Hypergeometric2F1[-1/2, (-1 - ((2*I)*(1 + m))/(b*n))/4, -(2*I + (2*I)*m - 3*b*n)/(4*b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((2 + 2*m - I*b*n)*Sqrt[1 - E^((2*I)*a)*(c*x^n)^((2*I)*b)]*Sqrt[Csc[a + b*Log[c*x^n]]])

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] && !IGtQ[p, 0] && (ILtQ[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; FreeQ[{a, b, d, e, m, p}, x] && !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\sqrt{\csc(a+b\log(x))}}\,dx, x, cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{\frac{ib}{2}-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1-\frac{ib}{2}+\frac{1+m}{n}}\sqrt{1-e^{2ia}x^{2ib}}\,dx, x, cx^n\right)}{n\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

$$= \frac{2x^{1+m}\,{}_2F_1\left(-\frac{1}{2},\frac{1}{4}\left(-1-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-3bn}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+2m-ibn)\sqrt{1-e^{2ia}\left(cx^n\right)^{2ib}}\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}}$$

Mathematica [B] time = 7.23, size = 441, normalized size = 3.42

$$\frac{2x^{m+1}\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)}{\sqrt{\csc\left(a+b\log\left(cx^n\right)\right)}\left(2(m+1)\sin\left(a+b\log\left(cx^n\right)-bn\log(x)\right)+bn\cos\left(a+b\log\left(cx^n\right)-bn\log(x)\right)\right)} - 2e^{ia}bn$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Sqrt[Csc[a + b*Log[c*x^n]]],x]
```

```
[Out] (-2*b*E^(I*a)*n*x^(1 + m)*(c*x^n)^(I*b)*Sqrt[2 - 2*E^((2*I)*a)*(c*x^n)^((2*
I)*b)]*Sqrt[(I*E^(I*a)*(c*x^n)^(I*b))/(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))]
*((2*I + (2*I)*m + b*n)*x^((2*I)*b*n)*Hypergeometric2F1[1/2, ((-1/2*I)*(1 +
 m + ((3*I)/2)*b*n))/(b*n), -1/4*(2*I + (2*I)*m - 7*b*n)/(b*n), E^((2*I)*a)
*(c*x^n)^((2*I)*b)] + (-2*I - (2*I)*m + 3*b*n)*Hypergeometric2F1[1/2, -1/4*
(2*I + (2*I)*m + b*n)/(b*n), -1/4*(2*I + (2*I)*m - 3*b*n)/(b*n), E^((2*I)*a
)*(c*x^n)^((2*I)*b)]))/((2 + 2*m - I*b*n)*(2 + 2*m + (3*I)*b*n)*((2*I + (2*
I)*m + b*n)*x^((2*I)*b*n) + E^((2*I)*a)*(-2*I - (2*I)*m + b*n)*(c*x^n)^((2*
I)*b))) + (2*x^(1 + m)*Sin[a - b*n*Log[x] + b*Log[c*x^n]])/(Sqrt[Csc[a + b*
Log[c*x^n]]]*(b*n*Cos[a - b*n*Log[x] + b*Log[c*x^n]] + 2*(1 + m)*Sin[a - b*
n*Log[x] + b*Log[c*x^n]]))
```

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^m/csc(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [**F**] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/csc(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/sqrt(csc(b*log(c*x^n) + a)), x)
```

maple [**F**] time = 0.16, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\csc\left(a+b\ln\left(c\,x^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/csc(a+b*ln(c*x^n))^(1/2),x)
```

```
[Out] int(x^m/csc(a+b*ln(c*x^n))^(1/2),x)
```

maxima [**F**] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\csc\left(b\log\left(cx^n\right)+a\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/csc(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/sqrt(csc(b*log(c*x^n) + a)), x)
```

mupad [**F**] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{\sqrt{\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/(1/sin(a + b*log(c*x^n)))^(1/2),x)
```

```
[Out] int(x^m/(1/sin(a + b*log(c*x^n)))^(1/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\sqrt{\csc\left(a + b\log\left(cx^n\right)\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/csc(a+b*ln(c*x**n))**(1/2),x)
```

```
[Out] Integral(x**m/sqrt(csc(a + b*log(c*x**n))), x)
```

3.327 $\int \frac{x^m}{\csc^{\frac{3}{2}}(a+b\log(cx^n))}\,dx$

Optimal. Leaf size=130

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{3}{2},-\frac{2im+3bn+2i}{4bn};-\frac{2im-bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-3ibn+2m+2)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

```
[Out] 2*x^(1+m)*hypergeom([-3/2, 1/4*(-2*I-2*I*m-3*b*n)/b/n],[1/4*(-2*I-2*I*m+b*n
)/b/n],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+2*m-3*I*b*n)/(1-exp(2*I*a)*(c*x^n)^(2
*I*b))^(3/2)/csc(a+b*ln(c*x^n))^(3/2)
```

Rubi [A] time = 0.09, antiderivative size = 126, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {4510, 4508, 364}

$$\frac{2x^{m+1}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-\frac{2i(m+1)}{bn}-3\right);-\frac{2im-bn+2i}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(-3ibn+2m+2)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x^m/Csc[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*Hypergeometric2F1[-3/2, (-3 - ((2*I)*(1 + m))/(b*n))/4, -(2*I
+ (2*I)*m - b*n)/(4*b*n), E^((2*I)*a)*(c*x^n)^((2*I)*b)])/((2 + 2*m - (3*I)
*b*n)*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^(3/2)*Csc[a + b*Log[c*x^n]]^(3/2)
)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int \frac{x^m}{\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}\,dx = \frac{\left(x^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\mathrm{Subst}\left(\int \frac{x^{-1+\frac{1+m}{n}}}{\csc^{\frac{3}{2}}(a+b\log(x))}\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x^{1+m}\left(cx^n\right)^{\frac{3ib}{2}-\frac{1+m}{n}}\right)\mathrm{Subst}\left(\int x^{-1-\frac{3ib}{2}+\frac{1+m}{n}}\left(1-e^{2ia}x^{2ib}\right)^{3/2}\,dx,x,cx^n\right)}{n\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

$$= \frac{2x^{1+m}\,{}_2F_1\left(-\frac{3}{2},\frac{1}{4}\left(-3-\frac{2i(1+m)}{bn}\right);-\frac{2i+2im-bn}{4bn};e^{2ia}\left(cx^n\right)^{2ib}\right)}{(2+2m-3ibn)\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^{3/2}\csc^{\frac{3}{2}}\left(a+b\log\left(cx^n\right)\right)}$$

Mathematica [A] time = 2.38, size = 218, normalized size = 1.68

$$\frac{2x^{m+1}\left(3e^{-2ia}b^2n^2\left(cx^n\right)^{-2ib}\left(-1+e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^2\left(a+b\log\left(cx^n\right)\right){}_2F_1\left(1,\frac{2im+3bn+2i}{4bn};\frac{2im+5bn+2i}{4bn};e^{-2i\left(a+b\log\left(cx^n\right)\right)}\right)\right.}{(-ibn+2m+2)(-3ibn+2m+2)(3ibn+2m+2)\csc^{\frac{3}{2}}\left(a+b\log\right.}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^m/Csc[a + b*Log[c*x^n]]^(3/2),x]
```

```
[Out] (2*x^(1 + m)*((2 + 2*m - I*b*n)*(2 + 2*m - 3*b*n*Cot[a + b*Log[c*x^n]]) + (
3*b^2*n^2*(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b))*Csc[a + b*Log[c*x^n]]^2*Hype
rgeometric2F1[1, (2*I + (2*I)*m + 3*b*n)/(4*b*n), (2*I + (2*I)*m + 5*b*n)/(
4*b*n), E^((-2*I)*(a + b*Log[c*x^n]))])/(E^((2*I)*a)*(c*x^n)^((2*I)*b))))/(
(2 + 2*m - I*b*n)*(2 + 2*m - (3*I)*b*n)*(2 + 2*m + (3*I)*b*n)*Csc[a + b*Log
[c*x^n]]^(3/2))
```

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^m/csc(a+b*log(c*x^n))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: TypeError >>  Error detected within library code:   integ
rate: implementation incomplete (has polynomial part)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/csc(a+b*log(c*x^n))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^m/csc(b*log(c*x^n) + a)^(3/2), x)
```

maple [F] time = 0.16, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\csc\left(a+b\ln\left(c\,x^n\right)\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/csc(a+b*ln(c*x^n))^(3/2),x)
```

```
[Out] int(x^m/csc(a+b*ln(c*x^n))^(3/2),x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\csc\left(b\log\left(cx^n\right)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^m/csc(a+b*log(c*x^n))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^m/csc(b*log(c*x^n) + a)^(3/2), x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int \frac{x^m}{{\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^n\right)\right)}\right)}^{3/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^m/(1/sin(a + b*log(c*x^n)))^(3/2),x)
[Out] int(x^m/(1/sin(a + b*log(c*x^n)))^(3/2), x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{x^m}{\csc^{\frac{3}{2}}\left(a + b\log\left(cx^n\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**m/csc(a+b*ln(c*x**n))**(3/2),x)
[Out] Integral(x**m/csc(a + b*log(c*x**n))**(3/2), x)
```

3.328 $\int (ex)^m \csc^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\,dx$

Optimal. Leaf size=139

$$\frac{(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p {}_2F_1\left(p,-\frac{im-bdnp+i}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);e^{2iad}\left(cx^n\right)^{2ibd}\right)\csc^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(ibdnp+m+1)}$$

```
[Out] (e*x)^(1+m)*(1-exp(2*I*a*d)*(c*x^n)^(2*I*b*d))^p*csc(d*(a+b*ln(c*x^n)))^p*h
ypergeom([p, 1/2*(-I-I*m+b*d*n*p)/b/d/n],[1-1/2*I*(1+m)/b/d/n+1/2*p],exp(2*
I*a*d)*(c*x^n)^(2*I*b*d))/e/(1+m+I*b*d*n*p)
```

Rubi [A] time = 0.11, antiderivative size = 133, normalized size of antiderivative = 0.96, number of steps used = 3, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {4510, 4508, 364}

$$\frac{(ex)^{m+1}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p {}_2F_1\left(p,\frac{1}{2}\left(p-\frac{i(m+1)}{bdn}\right);\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);e^{2iad}\left(cx^n\right)^{2ibd}\right)\csc^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)}{e(ibdnp+m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(e*x)^m*Csc[d*(a + b*Log[c*x^n])]^p,x]
```

```
[Out] ((e*x)^(1 + m)*(1 - E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p*Csc[d*(a + b*Log[c
*x^n])]^p*Hypergeometric2F1[p, (((-I)*(1 + m))/(b*d*n) + p)/2, (2 - (I*(1 +
 m))/(b*d*n) + p)/2, E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)])/(e*(1 + m + I*b*d*
n*p))
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
```

```
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int (ex)^m \csc^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)dx = \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}}\right)\text{Subst}\left(\int x^{-1+\frac{1+m}{n}}\csc^p(d(a+b\log(x)))\,dx,x,cx^n\right)}{en}$$

$$= \frac{\left((ex)^{1+m}\left(cx^n\right)^{-\frac{1+m}{n}-ibdp}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\csc^p\left(d\left(a+b\log\left(cx^n\right)\right)\right)\right)\text{Sub}}{en}$$

$$= \frac{(ex)^{1+m}\left(1-e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\csc^p\left(d\left(a+b\log\left(cx^n\right)\right)\right){}_2F_1\left(p,\frac{1}{2}\left(-\frac{i(1+m)}{bdn}+\right.\right.}{e(1+m+ibdnp)}$$

Mathematica [A] time = 1.69, size = 169, normalized size = 1.22

$$\frac{x(ex)^m\left(2-2e^{2iad}\left(cx^n\right)^{2ibd}\right)^p\left(\frac{ie^{iad}\left(cx^n\right)^{ibd}}{-1+e^{2iad}\left(cx^n\right)^{2ibd}}\right)^p{}_2F_1\left(p,-\frac{i(m+ibdnp+1)}{2bdn};\frac{1}{2}\left(-\frac{i(m+1)}{bdn}+p+2\right);e^{2iad}\left(cx^n\right)^{2ibd}\right)}{ibdnp+m+1}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(e*x)^m*Csc[d*(a + b*Log[c*x^n])]^p,x]
```

```
[Out] (x*(e*x)^m*(2 - 2*E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d))^p*((I*E^(I*a*d)*(c*x^n
)^(I*b*d))/(-1 + E^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)))^p*Hypergeometric2F1[p,
 ((-1/2*I)*(1 + m + I*b*d*n*p))/(b*d*n), (2 - (I*(1 + m))/(b*d*n) + p)/2, E
^((2*I)*a*d)*(c*x^n)^((2*I)*b*d)])/(1 + m + I*b*d*n*p)
```

fricas [F] time = 0.64, size = 0, normalized size = 0.00

$$\text{integral}\left((ex)^m\csc\left(bd\log\left(cx^n\right)+ad\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^p,x, algorithm="fricas")
```

```
[Out] integral((e*x)^m*csc(b*d*log(c*x^n) + a*d)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (ex)^m\csc\left(\left(b\log\left(cx^n\right)+a\right)d\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^p,x, algorithm="giac")
[Out] integrate((e*x)^m*csc((b*log(c*x^n) + a)*d)^p, x)
```

maple [F] time = 0.20, size = 0, normalized size = 0.00

$$\int (ex)^{m} \left(\csc^{p}\left(d \left(a+b \ln \left(c \,x^{n}\right)\right)\right)\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*csc(d*(a+b*ln(c*x^n)))^p,x)
[Out] int((e*x)^m*csc(d*(a+b*ln(c*x^n)))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \left(ex\right)^{m} \csc\left(\left(b \log\left(cx^{n}\right) + a\right)d\right)^{p}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)^m*csc(d*(a+b*log(c*x^n)))^p,x, algorithm="maxima")
[Out] integrate((e*x)^m*csc((b*log(c*x^n) + a)*d)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(e\,x\right)}^m\,{\left(\frac{1}{\sin\left(d\,\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}\right)}^p \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x)^m*(1/sin(d*(a + b*log(c*x^n))))^p,x)
[Out] int((e*x)^m*(1/sin(d*(a + b*log(c*x^n))))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \left(ex\right)^{m} \csc^{p}{\left(ad + bd \log{\left(cx^{n} \right)} \right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x)**m*csc(d*(a+b*ln(c*x**n)))**p,x)
[Out] Integral((e*x)**m*csc(a*d + b*d*log(c*x**n))**p, x)
```

3.329 $\int x \csc^p \left(a + b \log \left(cx^n\right)\right) dx$

Optimal. Leaf size=106

$$\frac{x^2 \left(1 - e^{2ia} \left(cx^n\right)^{2ib}\right)^p {}_2F_1\left(p, \frac{1}{2}\left(p - \frac{2i}{bn}\right); \frac{1}{2}\left(p - \frac{2i}{bn} + 2\right); e^{2ia} \left(cx^n\right)^{2ib}\right) \csc^p \left(a + b \log \left(cx^n\right)\right)}{2 + ibnp}$$

```
[Out] x^2*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^p*csc(a+b*ln(c*x^n))^p*hypergeom([p, -I/
b/n+1/2*p],[1-I/b/n+1/2*p],exp(2*I*a)*(c*x^n)^(2*I*b))/(2+I*b*n*p)
```

Rubi [A] time = 0.08, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 15, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {4510, 4508, 364}

$$\frac{x^2 \left(1 - e^{2ia} \left(cx^n\right)^{2ib}\right)^p {}_2F_1\left(p, \frac{1}{2}\left(p - \frac{2i}{bn}\right); \frac{1}{2}\left(p - \frac{2i}{bn} + 2\right); e^{2ia} \left(cx^n\right)^{2ib}\right) \csc^p \left(a + b \log \left(cx^n\right)\right)}{2 + ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[x*Csc[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x^2*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*Csc[a + b*Log[c*x^n]]^p*Hypergeo
metric2F1[p, ((-2*I)/(b*n) + p)/2, (2 - (2*I)/(b*n) + p)/2, E^((2*I)*a)*(c*
x^n)^((2*I)*b)])/(2 + I*b*n*p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rule 4510

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_
.), x_Symbol] :> Dist[(e*x)^(m + 1)/(e*n*(c*x^n)^((m + 1)/n)), Subst[Int[x^
((m + 1)/n - 1)*Csc[d*(a + b*Log[x])]^p, x], x, c*x^n], x] /; FreeQ[{a, b,
```

```
c, d, e, m, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rubi steps

$$\int x\csc^p\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{\left(x^2\left(cx^n\right)^{-2/n}\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}}\csc^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$=\frac{\left(x^2\left(cx^n\right)^{-\frac{2}{n}-ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^p\csc^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{2}{n}+ibp}\left(1-\right.\right.}{n}$$

$$=\frac{x^2\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^p\csc^p\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(p,\frac{1}{2}\left(-\frac{2i}{bn}+p\right);\frac{1}{2}\left(2-\frac{2i}{bn}+p\right);\right.}{2+ibnp}$$

Mathematica [A] time = 1.11, size = 142, normalized size = 1.34

$$-\frac{ix^2\left(2-2e^{2ia}\left(cx^n\right)^{2ib}\right)^p\left(\frac{ie^{ia}\left(cx^n\right)^{ib}}{-1+e^{2ia}\left(cx^n\right)^{2ib}}\right)^p{}_2F_1\left(\frac{p}{2}-\frac{i}{bn},p;\frac{p}{2}-\frac{i}{bn}+1;e^{2ia}\left(cx^n\right)^{2ib}\right)}{bnp-2i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Csc[a + b*Log[c*x^n]]^p,x]
```

```
[Out] ((-I)*x^2*(2 - 2*E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*((I*E^(I*a)*(c*x^n)^(I*b)
)/(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)))^p*Hypergeometric2F1[(-I)/(b*n) + p/
2, p, 1 - I/(b*n) + p/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(-2*I + b*n*p)
```

fricas [F] time = 0.85, size = 0, normalized size = 0.00

$$\text{integral}\left(x\csc\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral(x*csc(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x\csc\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*log(c*x^n))^p,x, algorithm="giac")
```

```
[Out] integrate(x*csc(b*log(c*x^n) + a)^p, x)
```

maple [F] time = 0.17, size = 0, normalized size = 0.00

$$\int x \left(\csc^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*csc(a+b*ln(c*x^n))^p,x)
```

```
[Out] int(x*csc(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \csc\left(b\log\left(cx^{n}\right)+a\right)^{p} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

```
[Out] integrate(x*csc(b*log(c*x^n) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int x \left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)^{p} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(1/sin(a + b*log(c*x^n)))^p,x)
```

```
[Out] int(x*(1/sin(a + b*log(c*x^n)))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int x \csc^{p}\left(a+b\log\left(cx^{n}\right)\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*csc(a+b*ln(c*x**n))**p,x)
```

```
[Out] Integral(x*csc(a + b*log(c*x**n))**p, x)
```

3.330 $\int \csc^p\left(a+b\log\left(cx^n\right)\right)\,dx$

Optimal. Leaf size=107

$$\frac{x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^p\,{}_2F_1\left(p,-\frac{i-bnp}{2bn};\frac{1}{2}\left(p-\frac{i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^p\left(a+b\log\left(cx^n\right)\right)}{1+ibnp}$$

```
[Out] x*(1-exp(2*I*a)*(c*x^n)^(2*I*b))^p*csc(a+b*ln(c*x^n))^p*hypergeom([p, 1/2*(
-I+b*n*p)/b/n],[1-1/2*I/b/n+1/2*p],exp(2*I*a)*(c*x^n)^(2*I*b))/(1+I*b*n*p)
```

Rubi [A] time = 0.07, antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, integrand size = 13, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {4504, 4508, 364}

$$\frac{x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^p\,{}_2F_1\left(p,-\frac{i-bnp}{2bn};\frac{1}{2}\left(p-\frac{i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)\csc^p\left(a+b\log\left(cx^n\right)\right)}{1+ibnp}$$

Antiderivative was successfully verified.

```
[In] Int[Csc[a + b*Log[c*x^n]]^p,x]
```

```
[Out] (x*(1 - E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*Csc[a + b*Log[c*x^n]]^p*Hypergeome
tric2F1[p, -(I - b*n*p)/(2*b*n), (2 - I/(b*n) + p)/2, E^((2*I)*a)*(c*x^n)^(
(2*I)*b)])/(1 + I*b*n*p)
```

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rule 4504

```
Int[Csc[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]^(p_.), x_Symbol] :> Di
st[x/(n*(c*x^n)^(1/n)), Subst[Int[x^(1/n - 1)*Csc[d*(a + b*Log[x])]^p, x],
x, c*x^n], x] /; FreeQ[{a, b, c, d, n, p}, x] && (NeQ[c, 1] || NeQ[n, 1])
```

Rule 4508

```
Int[Csc[((a_.) + Log[x_]*(b_.))*(d_.)]^(p_.)*((e_.)*(x_))^(m_.), x_Symbol]
:> Dist[(Csc[d*(a + b*Log[x])]^p*(1 - E^(2*I*a*d)*x^(2*I*b*d))^p)/x^(I*b*d*
p), Int[((e*x)^m*x^(I*b*d*p))/(1 - E^(2*I*a*d)*x^(2*I*b*d))^p, x], x] /; Fr
```

```
eeQ[{a, b, d, e, m, p}, x] &&  !IntegerQ[p]
```

Rubi steps

$$\int \csc^p\left(a+b\log\left(cx^n\right)\right)dx = \frac{\left(x\left(cx^n\right)^{-1/n}\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}}\csc^p(a+b\log(x))\,dx,x,cx^n\right)}{n}$$

$$= \frac{\left(x\left(cx^n\right)^{-\frac{1}{n}-ibp}\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^p\csc^p\left(a+b\log\left(cx^n\right)\right)\right)\text{Subst}\left(\int x^{-1+\frac{1}{n}+ibp}\left(1-e^{2ia}\right.\right.}{n}$$

$$= \frac{x\left(1-e^{2ia}\left(cx^n\right)^{2ib}\right)^p\csc^p\left(a+b\log\left(cx^n\right)\right)\,{}_2F_1\left(p,-\frac{i-bnp}{2bn};\frac{1}{2}\left(2-\frac{i}{bn}+p\right);e^{2ia}\left(cx^n\right)^{2}\right.}{1+ibnp}$$

Mathematica [A] time = 0.87, size = 142, normalized size = 1.33

$$-\frac{ix\left(2-2e^{2ia}\left(cx^n\right)^{2ib}\right)^p\left(\frac{ie^{ia}\left(cx^n\right)^{ib}}{-1+e^{2ia}\left(cx^n\right)^{2ib}}\right)^p\,{}_2F_1\left(p,\frac{bnp-i}{2bn};\frac{1}{2}\left(p-\frac{i}{bn}+2\right);e^{2ia}\left(cx^n\right)^{2ib}\right)}{bnp-i}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Csc[a + b*Log[c*x^n]]^p,x]
```

```
[Out] ((-I)*x*(2 - 2*E^((2*I)*a)*(c*x^n)^((2*I)*b))^p*((I*E^(I*a)*(c*x^n)^(I*b))/
(-1 + E^((2*I)*a)*(c*x^n)^((2*I)*b)))^p*Hypergeometric2F1[p, (-I + b*n*p)/(
2*b*n), (2 - I/(b*n) + p)/2, E^((2*I)*a)*(c*x^n)^((2*I)*b)])/(-I + b*n*p)
```

fricas [F] time = 0.56, size = 0, normalized size = 0.00

$$\text{integral}\left(\csc\left(b\log\left(cx^n\right)+a\right)^p,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

```
[Out] integral(csc(b*log(c*x^n) + a)^p, x)
```

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^n\right)+a\right)^p\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^p,x, algorithm="giac")
[Out] integrate(csc(b*log(c*x^n) + a)^p, x)
```

maple [F] time = 0.13, size = 0, normalized size = 0.00

$$\int \csc^{p}\left(a+b\ln\left(c\,x^{n}\right)\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(csc(a+b*ln(c*x^n))^p,x)
[Out] int(csc(a+b*ln(c*x^n))^p,x)
```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc\left(b\log\left(cx^{n}\right)+a\right)^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*log(c*x^n))^p,x, algorithm="maxima")
[Out] integrate(csc(b*log(c*x^n) + a)^p, x)
```

mupad [F] time = 0.00, size = -1, normalized size = -0.01

$$\int {\left(\frac{1}{\sin\left(a+b\,\ln\left(c\,x^{n}\right)\right)}\right)}^{p}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((1/sin(a + b*log(c*x^n)))^p,x)
[Out] int((1/sin(a + b*log(c*x^n)))^p, x)
```

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \csc^{p}\left(a+b\log\left(cx^{n}\right)\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(csc(a+b*ln(c*x**n))**p,x)
[Out] Integral(csc(a + b*log(c*x**n))**p, x)
```

Chapter 4

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.

4.0.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* ::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_] :=
  If[ExpnType[result]<=ExpnType[optimal],
```

```
    If[FreeQ[result,Complex] || Not[FreeQ[optimal,Complex]],
      If[LeafCount[result]<=2*LeafCount[optimal],
        "A",
      "B"],
    "C"],
  If[FreeQ[result,Integrate] && FreeQ[result,Int],
    "C",
  "F"]]


(* ::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]
```

4.0.2 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

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";
      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";
  end if;


  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;
            #both result and optimal complex
            if leaf_count_result<=2*leaf_count_optimal then
               return "A";
            else
               return "B";
            end if
         else #result contains complex but optimal is not
            if debug then
               print("result contains complex but optimal is not");
            fi;
            return "C";
         end if
      else # result do not contain complex
           # this assumes optimal do not as well
           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";
           end if
      end if
  else #ExpnType(result) > ExpnType(optimal)
      if debug then
         print("ExpnType(result) > ExpnType(optimal)");
      fi;
      return "C";
  end if

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:
```

4.0.3 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)),ExpnType(op(2,expn)))
    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):

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        return "F"

    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:
                    return "A"
                else:
                    return "B"
            else: #result contains complex but optimal is not
                return "C"
        else: # result do not contain complex, this assumes optimal do not as
   well
            if leaf_count_result <= 2*leaf_count_optimal:
                return "A"
            else:
                return "B"
    else:
        return "C"
```

4.0.4 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'

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.
    """
    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',
              '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")


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-
    sagemath-equivalent-to-atomic-type-in-maple/
    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:
        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.operands()[0]),expnType(expn.operands()[1]))
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #
    isinstance(expn,Add) or isinstance(expn,Mul)
        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")

    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:
                return "A"
            else:
                return "B"
        else: #result contains complex but optimal is not
            return "C"
    else: # result do not contain complex, this assumes optimal do not as
well
        if leaf_count_result <= 2*leaf_count_optimal:
            return "A"
        else:
            return "B"
else:
    return "C"
```